

# Large and Small Bird Use Report 2021–2022

# Riverbend Wind Energy Facility Sanilac County, Michigan

**Confidential Business Information** 

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**April 2022** 



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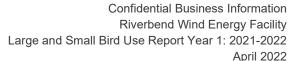
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# 1.0 Introduction

This report summarizes the large and small bird use study (Study) conducted by TRC Environmental Corporation (TRC) at the proposed Riverbend Wind Energy Facility (Project) between March 2021 and February 2022. The Project was located on 37,194 acres (ac; 15,052 hectares [ha]) in Sanilac County, Michigan, approximately 12 miles (mi; 20 kilometers [km]) south of the city of Sandusky (Figure 1).

This pre-construction Study at the Project was conducted in compliance with the US Fish and Wildlife Service's (USFWS) Land-based Wind Energy Guidelines (WEG; USFWS 2012), the Eagle Conservation Plan Guidance Module 1—Land-based Wind Energy Version 2 (ECPG; USFWS 2013), and Revisions to Regulations for Eagle Incidental Take and Take of Eagle Nests (USFWS 2016).

The Study included all bird species, but separate surveys were conducted for large and small birds. The species considered to be large birds included all raptors and any non-passerines of at least 10 inches (in; 25 centimeters [cm]) in length; the species considered to be small birds included all passerines and any non-passerines, excluding raptors, of less than 10 in (25 cm) in length (Sibley 2000). The size definitions for this Study were developed to be exhaustive yet simple and considered species behavior and ecology as well as size in order to assign bird species to a suitable category.

The objectives of the Study included: (1) developing a complete list of bird species observed in the Project area, including those observed incidentally, (2) assessing temporal and spatial use of large and small birds in the Project area, and (3) documenting use of the Project area by threatened, endangered, and other sensitive bird species. Sensitive bird species considered in this study include both federal and state listed species, eagles protected by the Bald and Golden Eagle Protection Act (BGEPA), non-listed state species of concern identified in the Michigan Natural Features Inventory (MNFI) online list (MNFI 2021), and non-listed federal species of concern identified in a Project-specific Information for Planning and Consultation (IPaC) report (USFWS 2021).



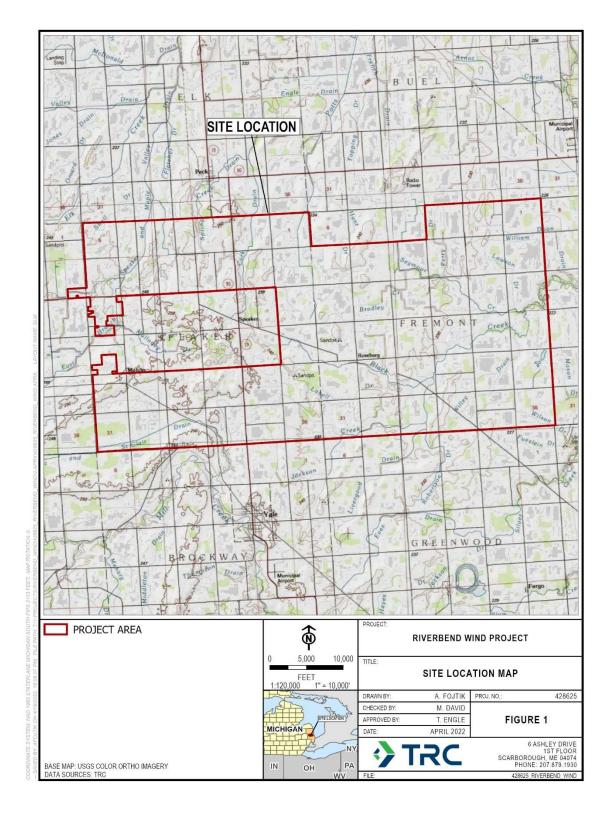
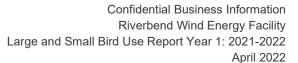


Figure 1. Project Area for the proposed Riverbend Wind Energy Facility, Sanilac County, Michigan, March 2021–February 2022.





# 2.0 Background

# 2.1 General Site Description

The Project lies within the Saginaw Lake Plain Level IV Ecoregion, which is characterized by clayey lake deposits, beach ridges, and dunes of low relief (USEPA 2021). Historically, the native habitat was mostly forested, with extensive coastal marches and wet prairies along Saginaw Bay in Lake Huron. Today, the majority of the land is used to cultivate crops, dairy, and livestock; natural habitats remaining in the area include swamp forest, wet prairie, and marsh (Albert 1995). Elevation within the Project area ranges from approximately 755 feet (ft; 230 meters [m]) to 820 ft (250 m) above mean sea level.

The National Land Cover Database (NLCD; Homer et al. 2020) characterized the Project area as 76% cultivated crops; 8% woody wetlands; 8% deciduous forest; 3% developed, open space; 3% pasture/hay; 2% developed, low intensity; and less than 1% each of mixed forest; evergreen forest; emergent herbaceous wetlands; grassland/herbaceous; open water; shrub/scrub; developed, medium intensity; barren land; and developed, high intensity (Figure 2; Table 1).

According to the USFWS National Wetlands Inventory, wetland features covered 1,942 ac (786 ha) of the Project area (USFWS 2014). These features included freshwater emergent wetlands (47 ac; 19 ha), freshwater forested/shrub wetlands (1,871 ac; 757 ha), and freshwater ponds (24 ac; 10 ha; Figure 2, Table 2).

The U.S. Geological Survey (USGS) National Hydrology Dataset (NHD) identified 130.8 mi (210.6 km) of watercourses within the Project area (USGS 2020; Figure 2; Table 3). The watercourses included 93.6 mi (150.6 km) of canal/ditches, 37.2 mi (59.9 km) of stream/rivers, and less than 0.1 mi (0.1 km) of artificial paths (Table 3). There were 23 named streams distributed throughout the Project area; the most significant of these are Black Creek on the eastern edge of the Project and Sanilac and Saint Clair Drain in the southwest corner of the Project (Figure 2).



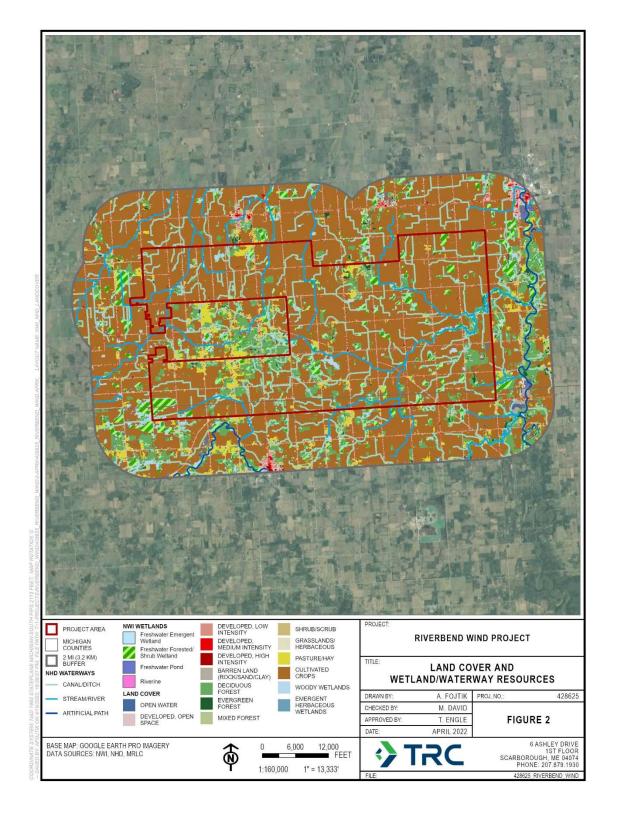


Figure 2. Land cover types, wetlands, and watercourses within the proposed Riverbend Wind Energy Facility, Sanilac County, Michigan, March 2021–February 2022.



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Table 1. National Land Cover Database land cover types within the proposed Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021–February 2022.

Land Cover Type <sup>1</sup>	Acres	Hectares	% Composition	Definition <sup>2</sup>
Cultivated Crops	28,103	11373	76%	Areas used for the production of annual crops (>20% of total vegetation) such as corn, soybeans, vegetables, tobacco, and cotton, as well as perennial woody crops (e.g., orchards and vineyards). This class also includes all land being actively tilled.
Woody Wetlands	2,899	1,173	8%	Areas where forest or shrubland vegetation accounts for greater than 20% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.
Deciduous Forest	2,829	1,145	8%	Dominated by trees generally greater than 16 ft (5 m) tall, and greater than 20% of total vegetation cover. More than 75% of the tree species shed foliage simultaneously in response to seasonal changes.
Developed, Open Space	1,180	478	3%	Mixture of constructed materials, mostly vegetation in the form of lawn grasses. Impervious surfaces less than 20% of the total cover. Includes large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.
Pasture/Hay	1,034	418	3%	Grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20% of the total vegetation.
Developed, Low Intensity	704	285	2%	A mixture of constructed materials and vegetation. Impervious surfaces account for 20% to 49% of the total cover. These areas most commonly include single-family housing units.
Mixed Forest	192	78	< 1%	Dominated by trees generally greater than 16 ft (5 m) tall, and greater than 20% of total vegetation cover. Neither deciduous nor evergreen species are greater than 75% of the total tree cover.
Evergreen Forest	102	41	< 1%	Dominated by trees generally greater than 16 ft (5 m) tall, and greater than 20% of total vegetation cover. More than 75% of the tree species maintain their leaves all year. Canopy is never without green foliage.
Emergent Herbaceous Wetlands	77	31	< 1%	Perennial herbaceous vegetation accounts for greater than 80% of vegetative cover, and the soil or substrate is periodically saturated with or covered with water.
Grassland/Herb aceous	27	11	< 1%	Dominated by graminoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management, such as tilling, but can be utilized for grazing.



Table 1. National Land Cover Database land cover types within the proposed Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021–February 2022.

Land Cover Type <sup>1</sup>	Acres	Hectares	% Composition	Definition <sup>2</sup>
Open Water	20	8	< 1%	Open water, generally with less than 25% vegetation cover or soil.
Shrub/Scrub	14	5	< 1%	Dominated by shrubs less than 16 ft (5 m) tall, typically greater than 20% of the total vegetation. This class includes true shrubs, young trees in an early successional stage, or trees stunted from environmental conditions.
Developed, Medium Intensity	12	5	< 1%	A mixture of constructed materials and vegetation. Impervious surfaces account for 50% to 79% of the total cover. These areas most commonly include single-family housing units.
Barren Land	1	<1	< 1%	Bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits, and other accumulations of earthen material. Generally, vegetation accounts for less than 15% of the total cover.
Developed, High Intensity	< 1	< 1	< 1%	Highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80% to 100% of the total cover.
Total:	37,194	15,052	100%	

<sup>&</sup>lt;sup>1</sup>Land cover data were obtained from the 2016 NLCD (Homer et al. 2020)

Table 2. National Wetlands Inventory wetland types within the proposed Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021–February 2022.

Westland Type1	Project Area Wetland Features					
Wetland Type <sup>1</sup>	# of Features	Acres	Hectares			
Freshwater Emergent Wetland	38	47	19			
Freshwater Forested/Shrub Wetland	226	1,871	757			
Freshwater Pond	21	24	10			
Total:	285	1,942	786			

<sup>&</sup>lt;sup>1</sup>USFWS 2014

<sup>&</sup>lt;sup>2</sup>Multi-Resolution Land Characteristic Consortium 2016



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Table 3. National Hydrology Dataset watercourse types within the proposed Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021-February 2022.

Watercourse Type1	Project Area Watercourse Features					
Watercourse Type <sup>1</sup>	# of Features	Miles	Kilometers			
Canal/Ditch	119	93.6	150.6			
Stream/River	54	37.2	59.9			
Artificial Path	1	< 0.1	0.1			
Total:	174	130.8	210.6			

<sup>&</sup>lt;sup>1</sup>National Hydrography Dataset; NHD Feature Catalog (USGS 2020)

#### 2.2 Birds

The official bird list for Michigan currently contains 448 extant species, two extant species groups (pertaining to individuals identified only at a higher taxonomic level), and four extinct or extirpated species (Michigan Bird Records Committee [MBRC] 2022). The extant species and species groups represent 21 orders and 60 families. Out of the 450 extant species and species groups on the MBRC list, 193 fall under this Study's definition of large bird species, representing 19 orders and 32 families, and 257 fall under this Study's definition of small bird species, representing seven orders and 36 families (MBRC 2022).

The IPaC report (USFWS 2021), BGEPA, and MNFI (MNFI 2021) were used to assemble a list of listed and non-listed sensitive bird species that may be encountered during the Study.

The IPaC report identified two federal listed bird species that have a known or expected range which includes the Project area: piping plover (Charadrius melodus) and red knot (Calidris canutus rufa; USFWS 2021).

The IPaC also identified six non-listed federal species of concern (USFWS 2021). The MNFI, which identifies federal and state listed bird species and non-listed state species of concern in Michigan, included 46 species. The BGEPA federally protects bald eagle (Haliaeetus leucocephalus) and golden eagle (Aguila chrysaetos), both of which may occur in the region (Table 4). Some bird species were returned from more than one of these sources.

Together, these sources designated 53 bird species of concern (USFWS 2021, MNFI 2021). Twenty-five of these species were classified as large for this Study and 28 were classified as small. The seasonal potential for occurrence within the Project area was determined for these 53 species by referencing county-level bar charts from eBird (eBird 2021). Seasons were defined as: spring (March-May), summer (June-August), fall (September-November), and winter (December-February).

Based on desktop evaluation, 39 species of concern, including one federal and 16 state listed species, were determined to have potential to occur in the Project area during at least one season (Table 4).



Table 4. Bird species of concern and their seasons of potential occurrence in the proposed Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021–February 2022.

Common Name	Scientific Name	Listing Status <sup>1</sup>	Season	s of Potenti in Project		urrence
		Status	Spring	Summer	Fall	Winter
	Anatidae (Ducks, Gee	se, & Swans)				•
Trumpeter Swan	Cygnus buccinator	ST			Х	Х
	Cuculidae (Cuc	koos)			•	
Black-billed Cuckoo	Coccyzus erythropthalmus	FSC	Х	Х	Х	
	Caprimulgidae (N	ightjars)			•	
Common Nighthawk	Chordeiles minor	SSC	Х	Х	Х	
Eastern Whip-poor-will	Antrostomus vociferus	SSC	Х	Х		
	Rallidae (Rails &	Allies)			•	
Common Gallinule	Gallinula galeata	ST	Х	Х		
	Charadriidae (P	lovers)			•	
Piping Plover	Charadrius melodus	FE, SE	Х	Х		
	Scolopacidae (Sandpi	pers & Allies)				
Wilson's Phalarope	Phalaropus tricolor	SSC		Х		
	Laridae (Gulls &	Allies)				
Caspian Tern	Hydroprogne caspia	ST	Х	Х		
Black Tern	Chlidonias niger	SSC		Х		
Common Tern	Sterna hirundo	ST	Х	Х	Х	
Forster's Tern	Sterna forsteri	ST	Х	Х	Х	
	Gaviidae (Loc	ons)				
Common Loon	Gavia immer	ST	Х	Х	Х	Х
	Ardeidae (Herons	& Allies)			•	
American Bittern	Botaurus lentiginosus	SSC	Х	Х		
Least Bittern	Ixobrychus exilis	ST	Х			
Black-crowned Night-Heron	Nycticorax nycticorax	SSC	Х	Х	Х	
	Pandionidae (O	sprey)				
Osprey	Pandion haliaetus	SSC	Х	Х	Х	
	Accipitridae (Hawks, Ea	agles, & Kites	)			
Golden Eagle	Aquila chrysaetos	BGEPA	Х			Х
Northern Harrier	Circus hudsonius	SSC	Х	Х	Х	Х
Bald Eagle	Haliaeetus leucocephalus	BGEPA, SSC	Х	Х	Х	Х
Red-shouldered Hawk	Buteo lineatus	ST	X	X		X
	Strigidae (Ov	vls)				
Long-eared Owl	Asio otus	ST	Х	Х		Х
Short-eared Owl	Asio flammeus	SE	Х		Х	Х
	Picidae (Woodpo	eckers)				
Red-headed Woodpecker	Melanerpes erythrocephalus	SSC	Х	Х	Х	Х



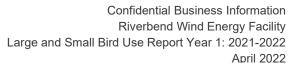
Table 4. Bird species of concern and their seasons of potential occurrence in the proposed Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021–February 2022.

Common Name	Scientific Name	Listing Status <sup>1</sup>	Seasons of Potential Occurrence in Project Area				
		Otatus	Spring	Summer	Fall	Winter	
	Falconidae (Fa	lcons)	<u> </u>			1	
Merlin	Falco columbarius	ST	Х	Х	Х	Х	
Peregrine Falcon	Falco peregrinus	SE	Х	X	Х		
	Tyrannidae (Flyc	atchers)					
Willow Flycatcher Empidonax traillii		FSC	Х	Х			
	Laniidae (Shr	ikes)					
Loggerhead Shrike	Lanius Iudovicianus	SE		Х			
	Troglodytidae (	Vrens)					
Marsh Wren	Cistothorus palustris	SSC	Х	Х	Х		
	Turdidae (Thru	shes)		•	•		
Wood Thrush	Hylocichla mustelina	FSC	Х	Х	Х		
	Passerellidae (Sparro	ws & Allies)					
Grasshopper Sparrow	Ammodramus savannarum	SSC	Х	Х			
Henslow's Sparrow	Centronyx henslowii	SE		Х			
	lcteridae (Blackbird	s & Allies)					
Yellow-headed Blackbird	Xanthocephalus	SSC	Х	Х			
Bobolink	Dolichonyx oryzivorus	FSC	Х	Х	Х		
Rusty Blackbird	Euphagus carolinus	FSC	X		Х		
	Parulidae (Wood-\	Varblers)					
Louisiana Waterthrush	Parkesia motacilla	ST	X				
Golden-winged Warbler	Vermivora chrysoptera	SSC	Х	Х			
Hooded Warbler	Setophaga citrina	SSC		Х			
Cerulean Warbler	Setophaga cerulea	ST	Х	Х			
	Cardinalidae (Cardin	als & Allies)					
Dickcissel	Spiza americana	SSC		Х			

<sup>&</sup>lt;sup>1</sup>Listing Status definitions: BGEPA = Bald and Golden Eagle Protection Act; FE = Federal Endangered; SE = State Endangered; ST = State Threatened; SX = State Probably Extirpated; SSC = Non-listed State Special Concern; FSC = Non-listed Federal Species of Concern

#### 3.0 Methods

Study methods were based on the guidelines set forth in the USFWS Land-based Wind Energy Guidelines (WEG; USFWS 2012), the Eagle Conservation Plan Guidance Module 1—Land-based Wind Energy Version 2 (ECPG; USFWS 2013), and Revisions to Regulations for Eagle Incidental Take and Take of Eagle Nests (USFWS 2016).





# 3.1 Survey Point Locations, Timing, and Frequency

A fixed-radius point count method (Hutto et al. 1986) was used to survey the birds present within the Project area. Twenty-four survey points (termed points, hereafter) were distributed throughout the Project area with a minimum of 1.0 mi (1.6 km) spacing between points (Figure 3). The number of points was chosen to achieve 30% minimum coverage of the Project area by large bird survey plots (see section 3.1.1 below). Point locations were selected using aerial imagery based on accessibility, safety, viewshed, and coverage across the Project area. Locations were then inspected in the field to verify each as acceptable and adjusted if necessary. One set of surveys at all points was termed a visit (a visit would span multiple days). Surveys for large and small birds were conducted separately, but the same points were used for both survey types.

# 3.1.1 Large Bird Surveys

Survey visits were conducted 12 times between March 2021 and February 2022. One visit was conducted each month.

A 2,625-ft (800-m) radius circle was designated as the plot surrounding each point. Each survey was 60 minutes in duration, initiated after sunrise, and completed before sunset. The order in which points were surveyed was varied between visits to ensure each point was surveyed at different times of day.

### 3.1.2 Small Bird Surveys

Survey visits were conducted 12 times between March 2021 and February 2022 on the same schedule as large bird surveys. Each survey was typically conducted directly before a large bird survey at the same point; large bird and small bird surveys did not overlap.

A 328-ft (100-m) radius circle was designated as the plot surrounding each point. Each survey was 10 minutes in duration, initiated after sunrise, and completed before sunset.



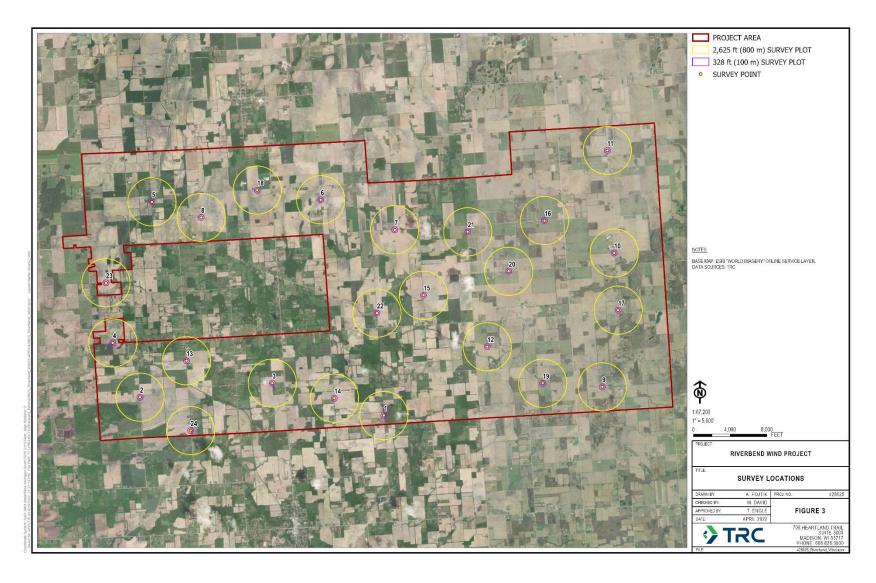


Figure 3. Survey points, 2,625-ft (800-m) radius large bird plots, and 328-ft (100-m) radius small bird plots for the large and small bird use study in the proposed Riverbend Wind Energy Facility, Sanilac County, Michigan, March 2021–February 2022.



3.2 Data Collection

#### 3.2.1 Large and Small Bird Surveys

The date, point number, start time, end time, and weather were documented for each survey. Weather data collected included temperature (degrees Celsius), wind speed (meters/second), wind direction (16-point compass directions), and cloud cover (0–25%, 25–75%, or 75–100%). Fog and precipitation were recorded if present.

Surveys were conducted during any weather unless fog or precipitation inhibited horizontal vision to 2,625 ft (800 m) or vertical vision to 656 ft (200 m). If the weather was unsafe (e.g., lightning) or not suitable for surveys, they were postponed until conditions were appropriate to continue.

Each time a bird or group of birds was detected (either visually or audibly) within the plot during the corresponding large or small bird survey, the observer collected the following information:

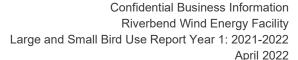
- Species
- Number of individuals
- Age; categorized as adult, subadult, juvenile, or unknown
- Sex; categorized as male, female, or unknown
- Estimated distance of a bird's closest approach to the point; categorized as 0–164 ft (0–50 m), 164–328 ft (50–100 m), 328–1,312 ft (100–400 m), or 1,312–2,625 ft (400–800 m); an additional distance category (> 2,625 ft [> 800 m]) was available for recording eagle minutes beyond the plot boundary and any incidental observations (see section 3.2.3 below)
- Behavior of the bird; categorized as flapping flight, soaring flight, gliding flight, eating/hunting, perched/landed, swimming, antagonistic interaction, breeding/nesting activity, singing, calling/other vocal sound, or drumming/non-vocal sound. All applicable behavior codes were assigned to a single observation.
- Flight height; categorized as less than 115 ft (35 m), 115–656 ft (35–200 m), or more than 656 ft (200 m) above ground level. Birds that occupied multiple flight height categories while within the plot were assigned all relevant flight heights.
- Habitat type(s) in which the bird was observed; categorized according to the NLCD land cover codes (Homer et al. 2020).

# 3.2.2 Eagle Observations

Additional information was collected for all eagles, whether observed during a large bird survey or incidentally. For each individual observed, the observer recorded the total number of observation minutes and the eagle's distance from the point, flight height, and behavior during each minute of the observation. A sketch of the flight path and a written description of the observation were also recorded.

#### 3.2.3 Incidental Observations

Incidental bird observations were recorded with the objectives of (1) providing information on bird species of concern (see section 2.2) observed outside of the standard survey protocols and





(2) contributing to the complete lists of large and small bird species observed in the Project area. All observations of species of concern were recorded regardless of when they were encountered, as were any observations of species not yet recorded within the Project area. Incidental observations were recorded in a similar fashion to data collected during surveys. An additional distance category (> 2,625 ft [800 m]) was used for birds observed during a survey but beyond the survey plot, and for any birds observed within the Project area but not during a survey.

## 3.3 Data Analysis

Large and small bird data were analyzed separately. All analyses described in Sections 3.3.2–3.3.5 were completed for both large and small birds. Data from incidental observations were not included in the analyses described in Sections 3.3.2–3.3.6 and are reported separately from data collected during standard surveys.

Survey data were compiled and summarized by species and taxonomic family. Families, unlike species, have no standardized common name equivalent to their scientific name; thus, we referred to families by scientific name.

#### 3.3.1 Weather

Weather data for each survey were presented in tabular format.

#### 3.3.2 Observations, Relative Abundance, and Diversity

Metrics were defined as follows:

- observation—each bird recorded
- group—one or more observations recorded together
- relative abundance—the percent of the total number of survey observations
- diversity—number of different species or families

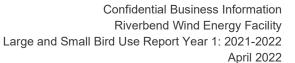
Groups, observations, and diversity were calculated for the entire Study period and by season for all species combined. Groups, observations, and relative abundance were calculated for the entire Study period and by season for each species and family.

#### 3.3.3 Use, Frequency of Occurrence, and Spatial Distribution

Use was defined for large birds as number of observations per 2,625-ft (800-m) plot per 60-minute survey, and for small birds as number of observations per 328-ft (100-m) plot per 10-minute survey (abbreviated as obs/plot/survey). Use and associated standard error (SE)¹ were calculated for all species combined in total, by season, and by point. Use and standard error by point were displayed on a bar chart.

Use was also calculated in total and by season for each species and family. For the five highestuse species recorded during the surveys, and for any additional species with the highest or second-highest use in any one season, a single-species SE was calculated in total and by

<sup>1</sup> Standard error (SE) is defined as the sample standard deviation divided by the square root of the sample size.





season. Histograms of use and SE by season were created for each of these species and for all species combined.

Frequency of occurrence (abbreviated as frequency) was defined as the proportion of surveys during which one or more observations were made. Frequency was calculated in total and by season for each species, for each family, and for all species combined.

Use and frequency were also calculated by point for each species and family. Species and family diversity were also calculated for each point.

The spatial distribution of bird use within the Project area was evaluated by mapping use and species diversity by point in a geographic information system (GIS). In addition, for each point, it was determined how many families had their highest single-point use at that point. This analysis was repeated for frequency.

### 3.3.4 Flight Height

Group and observation counts, use, and *percent of observations flying*—the percent of all observations that included flight behavior— were calculated for flying birds by species, family, and overall.

Observations were also calculated for each flight height category (see section 3.2.1 above.) Flight height category observations were divided by observations of flying birds to give *percent* of flying observations in flight height categories for each species, family, and overall. The flight height category of 115–656 ft (35–200 m) above the ground was considered the rotor-swept zone (RSZ). Use and *frequency* within the RSZ were calculated for each species, family, and overall.

#### 3.3.5 Threatened or Endangered Species and Other Sensitive Species

Observations of bird species that were federally or state listed as threatened or endangered, or were considered non-listed federal or state species of concern, were summed and tabulated. Use and frequency were reported in total, by season, and by point for each listed species observed during the surveys and for non-listed species of concern observed at two or more points. For non-listed species of concern that were observed at only one point, we detailed the location and timing of each observation instead of summarizing their use and frequency.

#### 3.3.6 Eagle Use Minutes

Each eagle observation was divided into 1-minute intervals (see section 3.2.2). Each eagle observation interval during a large bird survey in which the eagle was:

- 1) within the survey plot;
- 2) flying; and
- 3) at a height no more than 656 ft (200 m) above the ground;

was termed an *eagle use minute*. Eagle use minutes were summed and tabulated in total and by month, season, and point. The number of eagle use minutes per survey hour was also calculated for each of these categories. The eagle use minutes for each point were visually represented on a map created in a GIS.



# 3.3.7 Eagle Flight Paths

All flight paths and perch locations, which were sketched in the field for each eagle observation (including incidental observations), were digitized in a GIS and plotted on a map of the Project area. The flight paths and perch locations were examined qualitatively for any tendencies in flight direction/style or associations with land cover or terrain features.

#### 4.0 Results

# 4.1 Survey Summary

In total, 283 large bird surveys and 286 small bird surveys were completed during 12 visits between March 2021 and February 2022 (Table 5). These totals exclude five scheduled large bird surveys and two scheduled small bird surveys which were performed but not fully completed between sunrise and sunset. Data from the excluded surveys were retained but all observations were designated as incidental.

Weather conditions for all surveys are presented in Attachment A. No scheduled surveys were canceled or interrupted due to unsuitable weather conditions.

Table 5. Summary of the surveys completed for each visit during the large and small bird use study in the proposed Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021–February 2022.

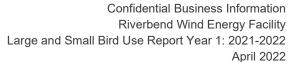
Visit	Start Date	Finish Date	Large Bird Surveys Completed	Small Bird Surveys Completed
1	3/17/2021	3/19/2021	22	22
2	4/8/2021	4/11/2021	24	24
3	5/13/2021	5/15/2021	24	24
4	6/14/2021	6/16/2021	24	24
5	7/13/2021	7/15/2021	24	24
6	8/15/2021	8/17/2021	23	24
7	9/14/2021	9/16/2021	23	24
8	10/12/2021	10/15/2021	24	24
9	11/15/2021	11/18/2021	24	24
10	12/14/2021	12/17/2021	23	24
11	1/10/2022	1/13/2022	24	24
12	2/15/2022	2/18/2022	24	24
Total:	<u> </u>	·	283	286

# 4.2 Large Bird Use Surveys

#### 4.2.1 Observations, Relative Abundance, and Diversity

During the surveys, 3,673 observations in 1,445 groups were recorded (Attachment B; Table B-1).<sup>2</sup> Observations by season consisted of 801 observations in 422 groups in spring, 746 observations in 377 groups in summer, 1,406 observations in 441 groups in fall, and 702 observations in 205 groups in winter (Table B-1).

<sup>&</sup>lt;sup>2</sup> Tables B-1 to B-7 are provided in Attachment B.





The five most numerous large bird species observed during the surveys were mourning dove (*Zenaida macroura*; 1,349 observations), rock pigeon (*Columba livia*; 736 observations), turkey vulture (*Cathartes aura*; 574 observations), Canada goose (*Branta canadensis*; 311 observations), and killdeer (*Charadrius vociferus*; 184 observations; Table B-1). Relative abundances for these species were 36.7%, 20.0%, 15.6%, 8.5%, and 5.0% of all large bird observations, respectively (Table B-1). None of these five species are federally listed or state listed species.

The most-observed families were Columbidae (pigeons and doves; 2,085 observations), Cathartidae (vultures; 574 observations), and Anatidae (ducks, geese, and swans; 331 observations; Table B-1). Relative abundances for these families were 56.8%, 15.6%, and 9.0%, respectively (Table B-1).

Twenty-four species from 12 taxonomic families were recorded during the surveys, with 18 species observed in spring, 15 in summer, 19 in fall, and 10 in winter (Table B-1). Two additional species were recorded incidentally (Table B-2). In total, 26 large bird species from 12 families were recorded during the Study (Table B-2).

# 4.2.2 Use and Frequency of Occurrence

Overall use recorded during the surveys was 12.98 (SE = 0.85) obs/plot/survey (Table B-3). Mourning dove use was 4.77 (SE = 0.46) obs/plot/survey, rock pigeon use was 2.60 (SE = 0.48) obs/plot/survey, turkey vulture use was 2.03 (SE = 0.23) obs/plot/survey, Canada goose use was 1.10 (SE = 0.31) obs/plot/survey, and killdeer was 0.65 (SE = 0.08) obs/plot/survey (Table B-3; Figure 4).

Among families, Columbidae use was 7.37 obs/plot/survey, Cathartidae use was 2.03 obs/plot/survey, and Anatidae use was 1.17 obs/plot/survey (Table B-3).

The species with the highest frequency were mourning dove (0.72), red-tailed hawk (*Buteo jamaicensis*; 0.44), turkey vulture (0.43), rock pigeon (0.31), and killdeer (0.29; Table B-3).

Families with the highest frequency were Columbidae (0.84), Accipitridae (hawks, eagles, and kites; 0.53), and Cathartidae (0.43; Table B-3).

#### 4.2.2.1 Temporal Variation in Use

Large bird use was 11.44 (SE = 1.01) obs/plot/survey in spring, 10.51 (SE = 1.02) obs/plot/survey in summer, 19.80 (SE = 2.41) obs/plot/survey in fall, and 10.14 (SE = 1.68) in winter (Figure 4). In spring, turkey vulture had the highest use, followed by killdeer; in summer, mourning dove had the highest use, followed by turkey vulture; in fall, mourning dove had the highest use, followed by rock pigeon; and in winter, rock pigeon had the highest use, followed by mourning dove (Figure 4; Table B-3).

Mourning dove use was 1.16 (SE = 0.21) obs/plot/survey in spring, 4.89 (SE = 0.71) obs/plot/survey in summer, 9.72 (SE = 1.41) obs/plot/survey in fall, and 3.25 (SE = 0.57) obs/plot/survey in winter (Figure 4). Mourning dove comprised 10.1% of spring, 46.5% of summer, 49.1% of fall, and 32.1% of winter observations (Table B-1). Frequency for the species was 0.49 in spring, 0.87 in summer, 0.87 in fall, and 0.65 in winter (Table B-3).

Rock pigeon use was 1.21 (SE = 0.24) obs/plot/survey in spring, 0.86 (SE = 0.24) obs/plot/survey in summer, 4.52 (SE = 1.62) obs/plot/survey in fall, and 3.79 (SE = 0.94)



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obs/plot/survey in winter (Figure 4). Rock pigeon comprised 10.6% of spring, 8.2% of summer, 22.8% of fall, and 37.4% of winter observations (Table B-1). Frequency for the species was 0.31 in spring, 0.23 in summer, 0.34 in fall, and 0.37 in winter (Table B-3).

Turkey vulture use was 4.01 (SE = 0.61) obs/plot/survey in spring, 2.01 (SE = 0.36) obs/plot/survey in summer, and 2.11 (SE = 0.52) obs/plot/survey in fall; the species was not observed in winter (Figure 4). Turkey vulture comprised 35.1% of spring, 19.2% of summer, and 10.7% of fall observations (Table B-1). Frequency for the species was 0.74 in spring, 0.61 in summer, and 0.37 in fall (Table B-3).

Canada goose use was 1.14 (SE = 0.37) obs/plot/survey in spring, 0.39 (SE = 0.26) obs/plot/survey in summer, 1.58 (SE = 0.59) obs/plot/survey in fall, and 1.28 (SE = 0.97) in winter (Figure 4). Canada goose comprised 10.0% of spring, 3.8% of summer, 8.0% of fall, and 12.6% of winter observations (Table B-1). Frequency for the species was 0.26 in spring, 0.04 in summer, 0.18 in fall, and 0.04 in winter (Table B-3).

Killdeer use was 1.54 (SE = 0.23) obs/plot/survey in spring, 0.72 (SE = 0.15) obs/plot/survey in summer, and 0.35 (SE = 0.12) obs/plot/survey in fall; the species was not observed in winter (Figure 4). Killdeer comprised 13.5% of spring, 6.8% of summer, and 1.8% of fall observations (Table B-1). Frequency for the species was 0.57 in spring, 0.39 in summer, and 0.18 in fall (Table B-3).



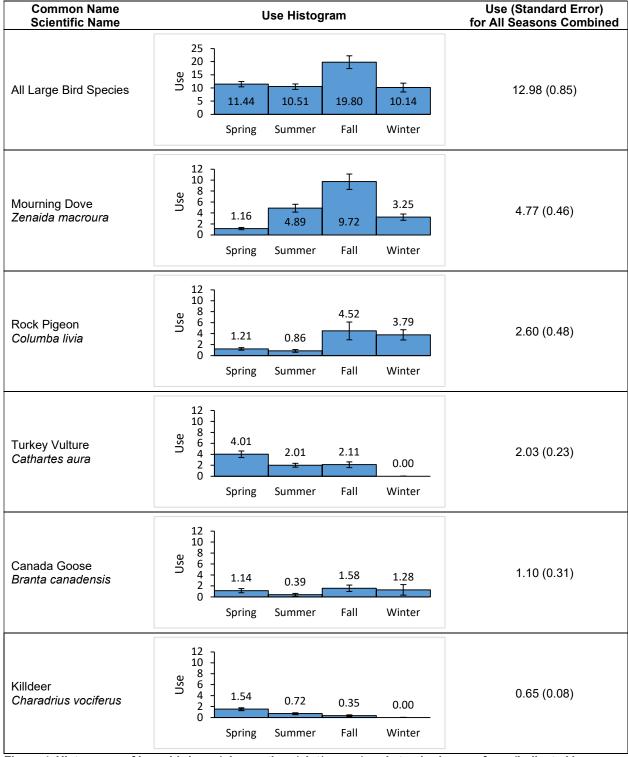
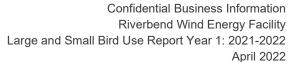


Figure 4. Histograms of large bird use (observations/plot/survey) and standard error of use (indicated by error bars) for all species and for each of the five species with highest overall use during the large bird use study in the proposed Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021–February 2022.





In spring, Cathartidae was the family with the highest use, at 4.01 obs/plot/survey (Table B-3). Relative abundance for Cathartidae was 35.1% in spring (Table B-1); frequency was 0.74 in spring (Table B-3). In summer, fall, and winter, Columbidae was the family with the highest use, at 5.75 obs/plot/survey in summer, 14.24 obs/plot/survey in fall, and 7.04 obs/plot survey in winter (Table B-3). Relative abundance for Columbidae was 54.7% in summer, 71.9% in fall, and 69.4% in winter (Table B-1). Frequency for Columbidae was 0.90 in summer, 0.94 in fall, and 0.85 in winter (Table B-3).

# 4.2.2.2 Spatial Variation in Use and Diversity

Comparisons among points in this section include results from all points; however, note that points 14 and 15 had ten surveys each and point 24 had 11 surveys, while the remaining points had 12 surveys each.

Overall large bird use was highest at point 10 (39.42 obs/plot/survey, SE = 9.77), followed by point 8 (16.83 obs/plot/survey, SE = 5.05) and point 13 (16.50 obs/plot/survey, SE = 4.62; Figure 5; Figure 6; Table B-4). Use was lowest at point 9 (5.92 obs/plot/survey, SE = 1.40), followed by point 3 (6.25 obs/plot/survey, SE = 1.67) and point 17 (6.92 obs/plot/survey, SE = 1.71; Figure 5; Figure 6; Table B-4).

Point 5 had the highest species diversity (13 species), followed by point 7 (12 species) and points 13, 14, and 18 (11 species each; Figure 6; Table B-4). Point 22 had the lowest species diversity (5 species), followed by point 3 (8 species) and points 8, 11, 15, 21, and 24 (9 species each; Figure 6; Table B-4). Family diversity was highest at points 5 and 17 (9 families), followed by points 4, 6, 7, 10, 12, 14, 18, 19, and 24 (8 families each; Figure 6; Table B-4). Family diversity was lowest at points 8, 16, and 22 (5 families each; Figure 6; Table B-4).

When use by point for each family was examined, point 10 had the highest use for four families: Anatidae, Columbidae, Gruidae (cranes), and Laridae (gulls and their allies; Table B-4). Point 21 had the highest use for two families: Charadriidae (plovers) and Accipitridae (Table B-4). Points 4, 5, 13, 14, 15, 18 and 24 had the highest or tied-highest use for one family each: point 4 for Strigidae (owls), point 5 for Ardeidae (herons and their allies), point 13 for Falconidae (falcons), point 14 for Picidae (woodpeckers), point 15 for Picidae, point 18 for Cathartidae, and point 24 for Phasianidae (grouse and their allies; Table B-4).

When frequency by point for each family was examined, point 10 had the highest or tied-highest frequency for three families (Table B-5). Points 14, 15, and 21 had the highest or tied-highest frequency for two families each, and points 1, 2, 3, 4, 5, 7, 9, 13, 16, 17, 18, 19, 20, and 24 had the highest or tied-highest frequency for one family each (Table B-5).



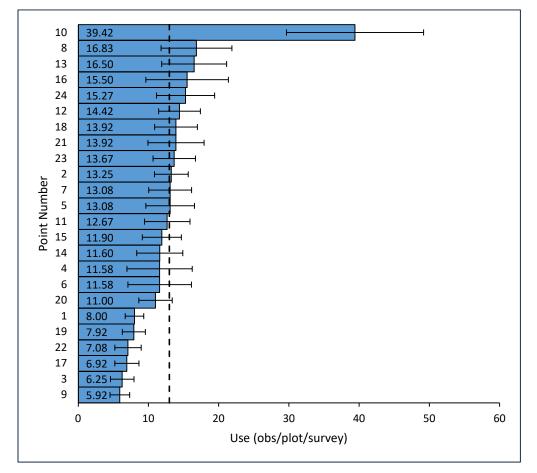


Figure 5. Large bird use (observations/plot/survey), standard error of use (represented by error bars), and average use (represented by dashed line) by point during the large bird use study in the proposed Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021–February 2022.



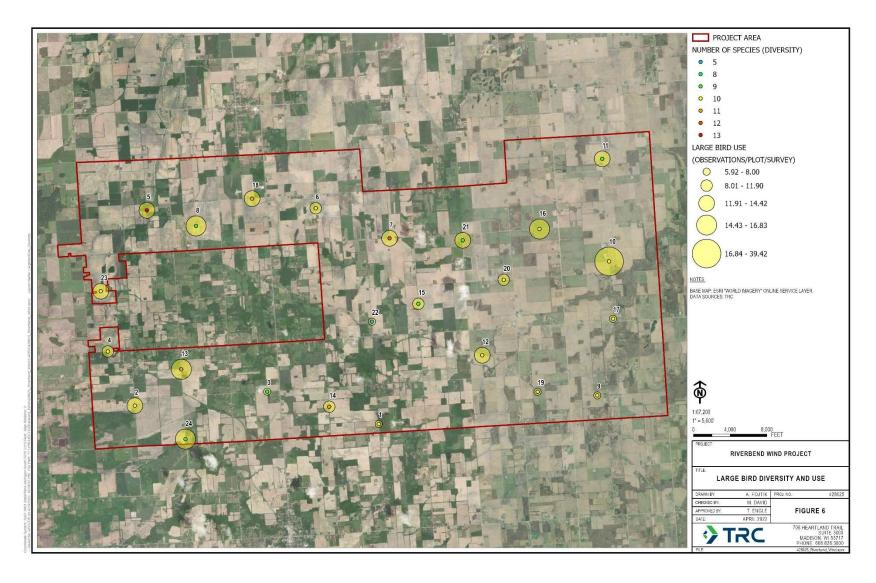
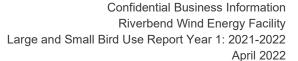


Figure 6. Map of large bird use (observations/plot/survey) and species diversity recorded at each point during the large bird use study in the proposed Riverbend Wind Energy Facility, Sanilac County, Michigan, March 2021–February 2022.





#### 4.2.3 Flight Height Characteristics

During the surveys, 2,334 observations of flying birds in 1,042 groups were recorded (Table B-6). This represented 63.5% of all survey observations (Table B-6). Of all large birds observed flying, 23.6% (551 observations) were estimated to be within the height range for the RSZ (115–656 ft; 35–200 m; Table B-6).

Overall use within the RSZ was 1.95 obs/plot/survey (Table B-6). Species with the highest RSZ use were turkey vulture (1.37 obs/plot/survey), Canada goose (0.20 obs/plot/survey), sandhill crane (*Antigone canadensis*; 0.15 obs/plot/survey), and red-tailed hawk (0.12 obs/plot/survey; Table B-6). Use for all other species within the RSZ was ≤ 0.04 obs/plot/survey each (Table B-6).

# 4.3 Small Bird Use Surveys

#### 4.3.1 Observations, Relative Abundance, and Diversity

During the surveys, 6,899 observations in 1,454 groups were recorded (Attachment C; Table C-1).<sup>3</sup> Observations by season consisted of 1,193 observations in 454 groups in spring, 1,070 observations in 507 groups in summer, 3,250 observations in 303 groups in fall, and 1,386 observations in 190 groups in winter (Table C-1).

The most numerous small bird species observed during the surveys were European starling (*Sturnus vulgaris*; 4,324 observations), red-winged blackbird (*Agelaius phoeniceus*; 907 observations), American robin (*Turdus migratorius*; 362 observations), horned lark (*Eremophila alpestris*; 265 observations), and barn swallow (*Hirundo rustica*; 238 observations; Table C-1). These observations made up 62.7%, 13.1%, 5.2%, 3.8%, and 3.4% of all small bird observations, respectively (Table C-1).

The most-observed families were Sturnidae (starlings; 4,324 observations), Icteridae (blackbirds and their allies; 1,080 observations), and Turdidae (thrushes; 366 observations; Table C-1). Relative abundances for these families were 62.7%, 15.7%, and 5.3%, respectively (Table C-1).

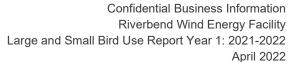
Forty-two species from 20 taxonomic families were recorded during the surveys, with 21 species observed in spring, 22 in summer, 27 in fall, and 14 in winter (Table C-1). One additional species was recorded incidentally; thus, in total, 43 small bird species from 20 families were recorded during the Study (Table C-2).

#### 4.3.2 Use and Frequency of Occurrence

Overall use recorded during the surveys was 24.12 (SE = 2.72) obs/plot/survey (Table C-3). European starling use was 15.12 (SE = 2.72) obs/plot/survey, red-winged blackbird use was 3.17 (SE = 0.57) obs/plot/survey, American robin use was 1.27 (SE = 0.14) obs/plot/survey, horned lark use was 0.93 (SE = 0.11) obs/plot/survey, and barn swallow use was 0.83 (SE = 0.14) obs/plot/survey (Table C-3; Figure 7).

Among families, Sturnidae use was 15.12 obs/plot/survey, Icteridae use was 3.78 obs/plot/survey, and Turdidae use was 1.28 obs/plot/survey (Table C-3).

<sup>&</sup>lt;sup>3</sup> Tables C-1 to C-7 are provided in Attachment C.





The species with the highest frequency were American robin (0.44), red-winged blackbird (0.43), horned lark (0.37), European starling (0.35), and blue jay (*Cyanocitta cristata*; 0.24; Table C-3).

The families with the highest frequency were Icteridae (0.45), Turdidae (0.45), and Alaudidae (larks; 0.37; Table C-3).

#### 4.3.2.1 Temporal Variation in Use

Small bird use was 17.04 (SE = 1.67) obs/plot/survey in spring, 14.86 (SE = 2.23) obs/plot/survey in summer, 45.14 (SE = 8.95) obs/plot/survey in fall, and 19.25 (SE = 4.62) in winter (Figure 7). In spring, European starling had the highest use, followed by America robin; in summer, red-winged blackbird had the highest use, followed by barn swallow; in fall, European starling had the highest use, followed by horned lark; and in winter, European starling had the highest use, followed by American tree sparrow (*Spizelloides arborea*; Figure 7; Table C-3).

European starling use was 6.91 (SE = 1.57) obs/plot/survey in spring, 38.50 (SE = 9.04) obs/plot/survey in fall, and 14.83 (SE = 4.69) obs/plot/survey in winter; the species was not observed in summer (Figure 7). Relative abundance for European starling was 40.6% in spring, 85.3% in fall, and 77.1% in winter (Table C-1). Frequency for the species was 0.41 in spring, 0.61 in fall, and 0.38 in winter (Table C-3).

Red-winged blackbird use was 2.94 (SE = 0.57) obs/plot/survey in spring, 8.28 (SE = 2.02) obs/plot/survey in summer, and 1.46 (SE = 0.56) obs/plot/survey in fall; the species was not observed in winter (Figure 7). Relative abundance for red-winged blackbird was 17.3% in spring, 55.7% in summer, and 3.2% in fall (Table C-1). Frequency for the species was 0.69 in spring, 0.89 in summer, and 0.17 in fall (Table C-3).

American robin use was 3.06 (SE = 0.41) obs/plot/survey in spring, 1.71 (SE = 0.18) obs/plot/survey in summer, and 0.35 (SE = 0.16) obs/plot/survey in fall; the species was not observed in winter (Figure 7). Relative abundance for American robin was 17.9% in spring, 11.5% in summer, and 0.8% in fall (Table C-1). Frequency for the species was 0.90 in spring, 0.78 in summer, and 0.11 in fall (Table C-3).

Horned lark use was 0.76 (SE = 0.16) obs/plot/survey in spring, 0.39 (SE = 0.10) obs/plot/survey in summer, 1.50 (SE = 0.22) obs/plot/survey in fall, and 1.06 (SE = 0.34) obs/plot/survey in winter (Figure 7). Relative abundance for horned lark was 4.4% in spring, 2.6% in summer, 3.3% in fall, and 5.5% in winter (Table C-1). Frequency for the species was 0.34 in spring, 0.25 in summer, 0.58 in fall, and 0.31 in winter (Table C-3).

Barn swallow use was 0.71 (SE = 0.22) obs/plot/survey in spring, 2.46 (SE = 0.43) obs/plot/survey in summer, and 0.15 (SE = 0.11) obs/plot/survey in fall; the species was not observed in winter (Figure 7). Relative abundance for barn swallow was 4.2% in spring, 16.5% in summer, and 0.3% in fall (Table C-1). Frequency for the species was 0.21 in spring, 0.64 in summer, and 0.03 in fall (Table C-3).

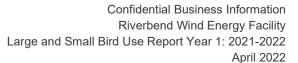
In spring, fall, and winter, Sturnidae was the family with the highest use. Use for Sturnidae was 6.91, 38.50, and 14.83 obs/plot/survey in spring, fall, and winter, respectively (Table C-3). Relative abundance for Sturnidae was 40.6% in spring, 85.3% in fall, and 77.1% in winter (Table C-1). Frequency for the species was 0.41 in spring, 0.61 in fall, and 0.38 in winter (Table C-3).

In summer, Icteridae was the family with the highest use, at 8.82 obs/plot/survey (Table C-3). Relative abundance for Icteridae was 59.3% in summer (Table C-1); frequency was 0.89 in summer (Table C-3).



**Common Name Use (Standard Error) Use Histogram** for All Seasons Combined Scientific Name 50 40 30 20 19.25 17.04 14.86 All Small Bird Species 24.12 (2.72) 45.14 10 0 Spring Fall Winter Summer 50 40 30 20 European Starling 14.83 15.12 (2.72) 6.91 Sturnus vulgaris 0.00 38.50 I 10 0 Fall Winter Spring Summer 12 10 8 Use Red-winged Blackbird 6 2.94 3.17 (0.57) Agelaius phoeniceus 4 1.46 2 8.28 0.00 0 Spring Summer Fall Winter 12 10 8 6 4 2 0 Use American Robin 3.06 1.71 1.27 (0.14) 0.35 Turdus migratorius 0.00 Winter Spring Summer Fall 12 10 86 42 0 Horned Lark 1.50 0.76 1.06 0.93 (0.11) 0.39 Eremophila alpestris Spring Summer Fall Winter 12 10 86 42 0 Barn Swallow 2.46 0.83(0.14)Hirundo rustica 0.15 0.00 Spring Summer Winter Fall 10 10 64 20 American Tree Sparrow 1.29 0.37 (0.07) 0.17 0.00 0.00 Spizelloides arborea Spring Summer Fall Winter

Figure 7. Histograms of small bird use (observations/plot/survey) and standard error of use (indicated by error bars) for all species combined, for each of the five species with highest overall use, and for one species with the second-highest winter use during the small bird use study in the proposed Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021–February 2022.





4.3.2.2 Spatial Variation in Use and Diversity

Comparisons among points in this section include results from all points; however, note that points 14 and 24 had 11 surveys, while the remaining points had 12 surveys each.

Overall small bird use was highest at point 19 (54.92 obs/plot/survey, SE = 39.94), followed by point 10 (48.75 obs/plot/survey, SE = 12.91) and point 21 (44.08 obs/plot/survey, SE = 23.67; Figure 8; Figure 9; Table C-4). Use was lowest at point 23 (10.25 obs/plot/survey, SE = 2.07), followed by point 4 (10.75 obs/plot/survey, SE = 4.46) and point 20 (10.92 obs/plot/survey, SE = 5.55; Figure 8; Figure 9; Table C-4).

Point 5 had the highest species diversity (22 species), followed by point 24 (19 species) and point 17 (18 species; Figure 9; Table C-4). Point 16 had the lowest species diversity (8 species), followed by points 11 and 12 (11 species each; Figure 9; Table C-4). Family diversity was highest at point 5 (15 families), followed by point 17 (13 families) and points 1, 2, 23, and 24 (12 families each; Figure 9; Table C-4). Family diversity was lowest at points 10, 11, 16, and 20 (8 families each; Figure 9; Table C-4).

When use by point for each family was examined, point 5 had the highest or tied-highest use for five families: Tyrannidae (flycatchers), Vireonidae (vireos), Paridae (chickadees and titmice), Regulidae (kinglets), and Sittidae (nuthatches; Table C-4).

Point 19 had the highest or tied-highest use for three families: Corvidae (crows and their allies), Sturnidae, and Cardinalidae (cardinals and their allies; Table C-4).

Points 1, 2, 10, 17, 18, and 24 had the highest or tied-highest use for two families each: point 1 for Paridae and Cardinalidae, point 2 for Picidae and Turdidae, point 10 for Passeridae (old world sparrows) and Icteridae, point 17 for Paridae and Parulidae (wood-warblers), point 18 for Fringillidae (finches) and Passerellidae (sparrows), and point 24 for Hirundinidae (swallows) and Calcariidae (longspurs and their allies; Table C-4).

Points 3, 9, 13, 21, and 23 had the highest or tied-highest use for one family each: point 3 for Paridae, point 9 for Sittidae, point 13 for Laniidae (shrikes), point 21 for Alaudidae, and point 23 for Mimidae (thrashers and their allies; Table C-4).

When frequency by point for each family was examined, point 5 had the highest or tied-highest frequency for five families (Table C-5). Point 24 had the highest frequency for four families (Table C-5). Points 1 and 18 had the highest or tied-highest frequency for three families each; points 13, 17, 22, and 23 did for two families each; and points 2, 3, 6, 9, 10, 16, and 21 did for one family each (Table C-5).



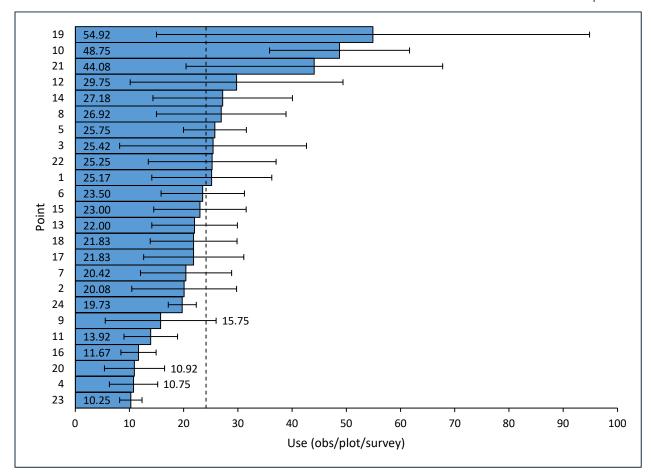


Figure 8. Small bird use (observations/plot/survey), standard error of use (represented by error bars), and average use (represented by vertical dashed line) by point during the small bird use study in the proposed Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021–February 2022.



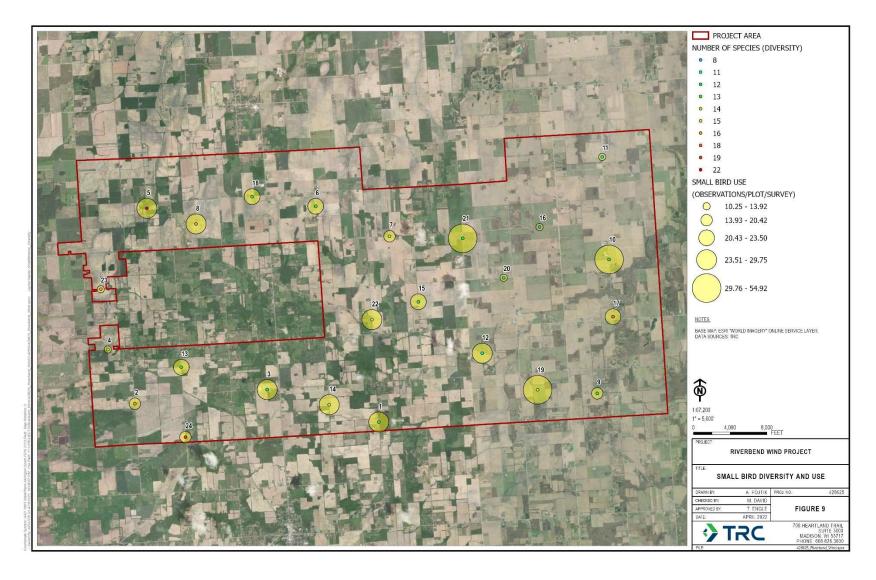
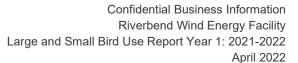


Figure 9. Map of small bird use (observations/plot/survey) and species diversity recorded at each point during the small bird use study in the proposed Riverbend Wind Energy Facility, Sanilac County, Michigan, March 2021–February 2022.





4.3.2.3 Flight Height Characteristics

During the surveys, 5,477 observations of flying birds in 1,187 groups were recorded (Table C-6). This represented 79.4% of all survey observations (Table C-6). Of the small birds observed flying, 0.9% (48 observations) were estimated to be within the RSZ (Table C-6).

Overall use within the RSZ was 0.17 obs/plot/survey (Table C-7). The two species with use in the RSZ were red-winged blackbird (0.16 obs/plot/survey) and American robin (0.01 obs/plot/survey; Table C-6). Use for all other species within the RSZ was  $\leq$  0.02 obs/plot/survey each (Table C-7).

# 4.4 Observations of Sensitive Species

No federally listed or state listed threatened or endangered species were observed during the Study. There were four protected or non-listed state special concern species observed: northern harrier (*Circus hudsonius*), bald eagle, grasshopper sparrow (*Ammodramus savannarum*), and dickcissel (*Spiza americana*; Table 6).

During the surveys, bald eagle was observed at 12 points, northern harrier was observed at four points, and grasshopper sparrow and dickcissel were observed at one point each (Tables B-4, C-4).

The highest number of sensitive species recorded at a single point was three at point 8, followed by two each at points 7, 13, and 16, and one each at points 1, 2, 10, 11, 15, 18, 20, 21, and 23 (Tables B-4, C-4).

Northern harrier was observed four times during the surveys (Table 6). Northern harrier use was 0.01 obs/plot/survey overall; seasonal use was 0.01 obs/plot/survey in fall and 0.04 obs/plot/survey in winter, with no observations in other seasons (Table B-3). Use by point was 0.08 obs/plot/survey at points 2, 7, 8, and 16, with no observations at other points (Table B-4). Northern harrier frequency was 0.01 overall; seasonal frequency was 0.01 in fall and 0.04 in winter (Table B-3). Frequency was 0.08 each at points 2, 7, 8, and 16 (Table B-5).

See Section 4.5 for details on bald eagle observations.

Grasshopper sparrow was observed two times during the surveys (Table 6). Both observations occurred at point 8 in fall (Tables C-1, C-4).

Dickcissel was observed once during the surveys (Table 6). The observation occurred at point 13 in summer (Tables C-1, C-4).



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Table 6. Summary of the listed, protected, and non-listed special concern species observed during the large and small bird use study in the proposed Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021-February 2022.

Common Name (Scientific Name)	Listing Status <sup>1</sup>	# Groups During Surveys	# Obs During Surveys	# Incidental Groups	# Incidental Obs	# Total Groups	# Total Obs
Northern Harrier (Circus hudsonius)	SSC	4	4	0	0	4	4
Bald Eagle (Haliaeetus leucocephalus)	BGEPA, SSC	19	26	2	2	21	28
Grasshopper Sparrow (Ammodramus savannarum)	SSC	1	2	0	0	1	2
Dickcissel (Spiza americana)	SSC	1	1	0	0	1	1

Listing Status definitions: BGEPA = Bald and Golden Eagle Protection Act; SSC = Non-listed State Species of Concern

#### 4.5 **Eagle Use**

#### 4.5.1 **Bald Eagles**

Bald eagle was observed 26 times during the surveys, and two times incidentally (Table 6). Bald eagle use was 0.09 obs/plot/survey overall; seasonal use was 0.03 obs/plot/survey in spring. 0.06 obs/plot/survey in summer, 0.06 obs/plot/survey in fall, and 0.23 obs/plot/survey in winter (Table B-3). Use was highest at point 10 (0.50 obs/plot/survey; Table B-4). Bald eagle frequency was 0.06 overall; seasonal frequency was 0.03 in spring, 0.06 in summer, 0.04 in fall, and 0.13 in winter (Table B-3). Frequency was highest (0.25) at point 21 (Table B-5).

#### 4.5.2 Golden Eagles

No golden eagles were observed during the Study.

#### 4.5.3 Bald Eagle Use Minutes

For bald eagles, 50 use minutes were recorded during 26 observations over 283 survey hours (Table 7). There were also two incidental observations (Table 7).

During the surveys, bald eagle observations by season consisted of two in spring, four in summer, four in fall, and 16 in winter (Table 7). One incidental observation occurred in fall, and the other occurred in winter (Table 7). Bald eagle use minutes by season consisted of four use minutes during 70 survey hours in spring, 14 use minutes during 71 survey hours in summer, four use minutes during 71 survey hours in fall, and 28 use minutes during 71 survey hours in winter (Table 7).

Bald eagle use minutes per survey hour were 0.06 in spring, 0.20 in summer, 0.06 in fall, and 0.39 in winter (Table 7; Figure 10).

Bald eagle was observed at 12 points during the surveys: point 1 (four use minutes), point 7 (five use minutes), point 8 (four use minutes), point 10 (zero use minutes), point 11 (three use minutes), point 13 (seven use minutes), point 15 (five use minutes), point 16 (zero use minutes),



point 18 (five use minutes), point 20 (eight use minutes), point 21 (six use minutes), and point 23 (three use minutes; Table 8; Figure 11).

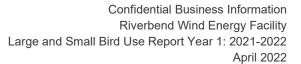
Table 7. Number of bald eagle observations, use minutes, survey hours, and use minutes per survey hour by month, season, and overall, during the large bird use surveys in the proposed Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021–February 2022.

Month or Season	# Eagle Observations	# Eagle Use Minutes	Survey Hours	Eagle Minutes / Survey Hour	# Incidental Eagles
March	0	0	22	0.00	0
April	0	0	24	0.00	0
May	2	4	24	0.17	0
June	1	0	24	0.00	0
July	3	14	24	0.58	0
August	0	0	23	0.00	0
September	0	0	23	0.00	1
October	2	0	24	0.00	0
November	2	4	24	0.17	0
December	11	11	23	0.48	1
January	3	9	24	0.38	0
February	2	8	24	0.33	0
Spring (Mar-May)	2	4	70	0.06	0
Summer (Jun-Aug)	4	14	71	0.20	0
Fall (Sep-Nov)	4	4	71	0.06	1
Winter (Dec-Feb)	16	28	71	0.39	1
All Seasons	26	50	283	0.18	2



Table 8. Number of bald eagle observations, use minutes, survey hours, and use minutes per survey hour by point during the large bird use surveys in the proposed Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021–February 2022.

Point	# Eagle Observations	# Eagle Use Minutes	Survey Hours	Eagle Minutes/Survey Hour
1	2	4	12	0.33
2	0	0	12	0.00
3	0	0	12	0.00
4	0	0	12	0.00
5	0	0	12	0.00
6	0	0	12	0.00
7	2	5	12	0.42
8	1	4	12	0.33
9	0	0	12	0.00
10	6	0	12	0.00
11	2	3	12	0.25
12	0	0	12	0.00
13	3	7	12	0.58
14	0	0	10	0.00
15	2	5	10	0.50
16	1	0	12	0.00
17	0	0	12	0.00
18	1	5	12	0.42
19	0	0	12	0.00
20	1	8	12	0.67
21	4	6	12	0.50
22	0	0	12	0.00
23	1	3	12	0.25
24	0	0	11	0.00
Total	26	50	283	0.18





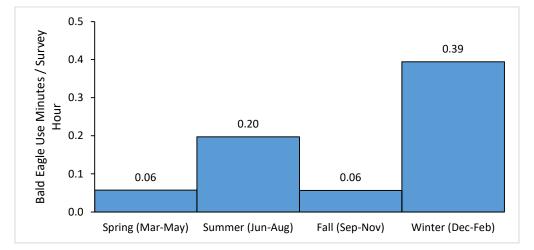


Figure 10. Bald eagle use minutes per survey hour by season during the large bird use surveys in the proposed Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021–February 2022.



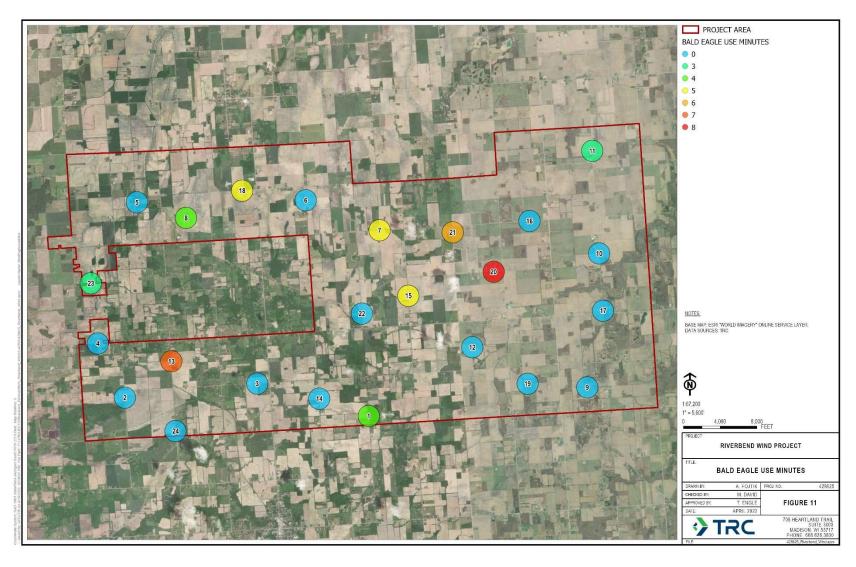


Figure 11. Map of bald eagle use minutes documented during the large bird use surveys in the proposed Riverbend Wind Energy Facility, Sanilac County, Michigan, March 2021–February 2022.



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# 4.5.4 Eagle Flight Paths and Perch Locations

The eagle flight paths and perch locations documented during the Study are mapped in Figure 12.

Out of the 28 bald eagles observed during the study, including incidental observations, 15 observations (53.6%) included perching behavior, and 13 (46.4%) included only flight behaviors. Most flight paths included circling or direction changes; there were no apparent trends in overall flight directions.

Flight paths and perch locations were spread across most of the Project Area, but there were a few areas with a noticeably higher concentration. Six bald eagles were observed on the ground together east of point 10. This group was feeding on animal remains and were likely drawn to this temporary resource, though the area includes a forested riparian corridor which may have contributed to their presence. The other points with more than two observations were points 13 and 21. Land cover in these locations is more varied than in most of the Project Area and includes a patchwork of pasture/hay, forest, and woody wetland, with less cultivated crop cover.



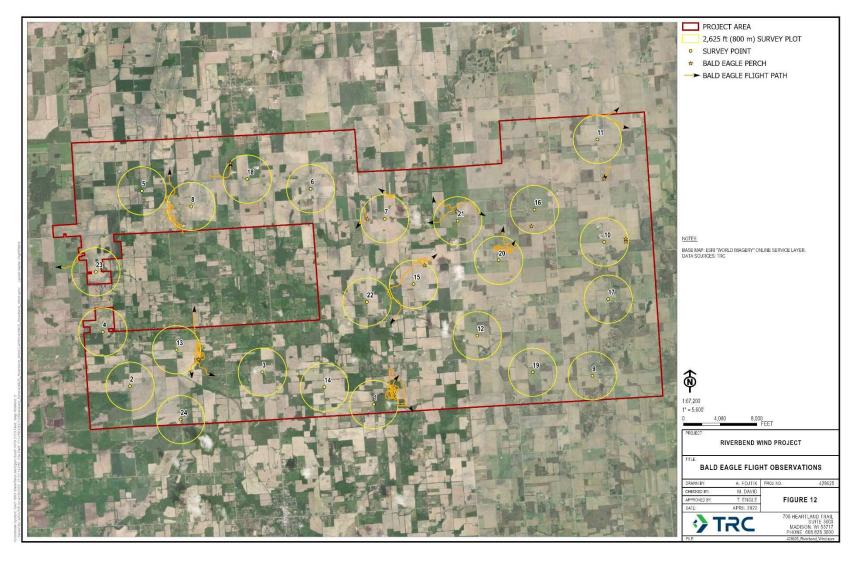


Figure 12. Map of bald eagle flight paths documented during the large bird use study in the proposed Riverbend Wind Energy Facility, Sanilac County, Michigan, March 2021–February 2022.



# 5.0 Summary

# 5.1 Large Bird Use Surveys

In total, 283 60-minute large bird use surveys were conducted over 12 visits during the Study (Table 5).

During the surveys, 3,673 observations were recorded (Table B-1). The five most numerous large bird species observed during the surveys were, in order: mourning dove, rock pigeon, turkey vulture, Canada goose, and killdeer (Table B-1).

Twenty-four species were recorded during the surveys, and two others were observed incidentally (Table B-2).

Overall use recorded during the surveys was 12.98 (SE = 0.85) obs/plot/survey (Table B-3). Use was highest in fall, followed by spring, then summer, then winter (Figure 4). Use by point ranged from 5.92 (SE = 1.40) to 39.42 (SE = 9.77) obs/plot/survey (Table B-4).

# 5.2 Small Bird Use Surveys

In total, 286 ten-minute surveys were conducted over 12 visits during the Year 1 surveys (Table 5). During the surveys, 6,899 observations were recorded (Table C-1). The five most numerous small bird species observed during the surveys were, in order: European starling, red-winged blackbird, American robin, horned lark, and barn swallow (Table C-1).

Forty-two species were recorded during the surveys, and one other was observed incidentally (Table C-2). Overall use recorded during the surveys was 24.12 (SE = 2.72) obs/plot/survey (Table C-3). Use was highest in fall, followed by winter, then spring, then summer (Figure 7).

### 5.3 Observations of Sensitive Species

No federally or state listed threatened or endangered species were observed during the Study. There were four protected or non-listed state special concern species observed (Table 6).

# 5.4 Eagle Use

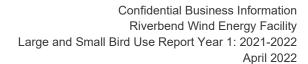
For bald eagles, 50 use minutes were recorded during 26 survey observations; there were also two incidental observations (Table 7). Bald eagle use minutes per survey hour were highest in winter, then summer, then spring tied with fall (Table 7). Bald eagles were observed during surveys at 12 of the 24 survey points (Table 8).

No golden eagles were observed during the Study.



# 6.0 References

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Attachment A. Weather data from each survey during the large and small bird use study in the proposed Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021–February 2022.

Attachment A. Weather data from each survey during the bird use study in the proposed Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021–February 2022.

		•		erature	Wind				-	Cover		
Survey	Point ID	Date		(°F)		mph)	Wind D	irection		3) 3)	Precip	itation
Event			Start	End	Start	End	Start	End	Start	End	Start	End
1	1	3/17/2021	14 (57)	13 (55)	4 (9)	4 (8)	ENE	ENE	75-100	75-100	None	None
1	2	3/17/2021	12 (54)	9 (48)	4 (8)	6 (13)	ENE	ENE	75-100	75-100	None	None
1	3	3/17/2021	8 (46)	7 (45)	6 (13)	6 (14)	ENE	ENE	75-100	75-100	None	None
1	4	3/17/2021	6 (43)	4 (39)	6 (14)	4 (10)	NE	NE	75-100	75-100	None	None
1	5	3/18/2021	2 (36)	2 (36)	9 (20)	9 (20)	NE	NE	75-100	75-100	None	None
1	6	3/18/2021	2 (36)	3 (37)	9 (20)	9 (21)	NE	NNE	75-100	75-100	None	None
1	7	3/18/2021	2 (36)	3 (37)	9 (21)	10 (22)	NNE	NE	75-100	75-100	None	None
1	8	3/18/2021	3 (37)	4 (39)	11 (24)	11 (25)	NE	NE	75-100	75-100	None	None
1	9	3/18/2021	4 (39)	4 (39)	11 (25)	11 (24)	NNE	NNE	75-100	75-100	None	None
1	10	3/18/2021	5 (41)	4 (39)	11 (24)	11 (25)	NNE	NNE	75-100	75-100	None	None
1	11	3/18/2021	4 (39)	4 (39)	12 (26)	12 (26)	NNE	NNE	75-100	75-100	None	None
1	12	3/18/2021	2 (36)	2 (36)	12 (26)	13 (29)	N	Ν	75-100	75-100	None	None
1	13	3/18/2021	2 (36)	1 (34)	13 (29)	12 (26)	NNE	NNE	75-100	25-75	None	None
1	15	3/19/2021	-3 (27)	-1 (30)	8 (18)	8 (17)	NNE	NE	25-75	25-75	None	None
1	16	3/19/2021	0 (32)	2 (36)	8 (17)	7 (15)	NE	NE	25-75	25-75	None	None
1	17	3/19/2021	2 (36)	2 (36)	7 (15)	6 (14)	NE	NE	0-25	0-25	None	None
1	18	3/19/2021	7 (45)	6 (43)	4 (9)	3 (7)	NE	NE	0-25	0-25	None	None
1	19	3/19/2021	3 (37)	4 (39)	6 (13)	5 (12)	NE	NE	0-25	0-25	None	None
1	20	3/19/2021	4 (39)	4 (39)	5 (12)	4 (10)	NE	NE	0-25	0-25	None	None
1	21	3/19/2021	4 (39)	4 (39)	4 (10)	4 (10)	NNE	NNE	0-25	0-25	None	None
1 1	22	3/19/2021	6 (43)	6 (43)	4 (10)	4 (9)	NE	NE	0-25	0-25	None	None
1	23	3/17/2021	7 (45)	6 (43)	2 (5)	1 (2)	NE	ENE	0-25	0-25	None	None
2	1	4/8/2021	24 (75)	20 (68)	8 (17)	4 (8)	SSE	S	75-100	75-100	None	Rain
2	2	4/9/2021	13 (55)	14 (57)	4 (10)	6 (14)	S	S	75-100 75-100	75-100 75-100	None	None
2	3	4/9/2021	14 (57)	16 (61)	6 (14)	6 (13)	S	S	75-100 75-100	25-75	None	None
2	4	4/9/2021	18 (64)	19 (66)	6 (13)	7 (15)	S	S	25-75	25-75	None	None
2	5	4/9/2021	20 (68)	20 (68)	8 (18)	9 (21)	S	S	0-25	0-25	None	None
2	6	4/9/2021	21 (70)	21 (70)	9 (21)	10 (22)	S	S	25-75	25-75	None	None
2	7	4/9/2021	21 (70)	22 (72)	10 (22)	8 (18)	S	S	25-75	75-100	None	None
2	8	4/9/2021	21 (70)	21 (70)	10 (22)	9 (21)	S	SSE	25-75	25-75	None	None
2	9	4/9/2021	22 (72)	22 (72)	9 (21)	8 (18)	SSE	S	25-75	25-75	None	None
2	10	4/9/2021	22 (72)	20 (68)	4 (10)	6 (13)	S	S	75-100	75-100	None	None
2	11	4/10/2021	8 (46)	9 (48)	3 (6)	4 (8)	SSE	ESE	75-100	75-100	None	None
2	12	4/10/2021	13 (55)	16 (61)	4 (8)	3 (6)	ESE	SE	75-100	75-100	None	None
2	13	4/10/2021	17 (63)	18 (64)	3 (6)	3 (7)	ESE	ESE	25-75	25-75	None	None
2	14	4/10/2021	20 (68)	22 (72)	4 (8)	2 (5)	ESE	ESE	25-75	25-75	None	None
2	15	4/10/2021	22 (72)	22 (72)	2 (5)	4 (9)	ENE	ENE	25-75	25-75	None	None
2	16	4/10/2021	22 (72)	22 (72)	4 (9)	5 (12)	ENE	E	75-100	75-100	None	None
2	17	4/10/2021	22 (72)	20 (68)	6 (14)	5 (12)	E	E	75-100	75-100	None	None
2	18	4/10/2021	20 (68)	20 (68)	5 (12)	4 (8)	ESE	E	75-100	75-100	None	None
2	19	4/10/2021	18 (64)	18 (64)	4 (8)	3 (6)	E	E	75-100	75-100	None	None
2	20	4/11/2021	12 (54)	13 (55)	4 (9)	4 (8)	SSW	SSW	25-75	25-75	None	None
2	21	4/11/2021	12 (54)	13 (55)	4 (9)	4 (10)	SSW	SSW	25-75	25-75	None	None
2	22	4/11/2021	14 (57)	16 (61)	5 (12)	4 (9)	SW	SSW	25-75	25-75	None	None
2	23	4/11/2021	15 (59)	16 (61)	4 (9)	7 (16)	SSW	SSW	25-75	75-100	None	None
2	24	4/11/2021	17 (63)	17 (63)	7 (16)	6 (13)	SSW	S	25-75	25-75	None	None
3	1	5/13/2021	13 (55)	14 (57)	4 (8)	4 (10)	NNW	NW	0-25	0-25	None	None
3	2	5/13/2021	16 (61)	17 (63)	4 (10)	5 (12)	NW	NW	0-25	0-25	None	None
3	3	5/13/2021	17 (63)	18 (64)	5 (12)	5 (12)	NNW	NNW	0-25	0-25	None	None
3	4	5/13/2021	18 (64)	19 (66)	6 (13)	5 (12)	NW	NW	0-25	0-25	None	None
3	5	5/13/2021	19 (66)	19 (66)	5 (12)	5 (12)	N	NE	0-25	0-25	None	None
3	6	5/13/2021	19 (66)	18 (64)	5 (12)	6 (13)	E	E	0-25	0-25	None	None
3	7	5/13/2021	18 (64)	15 (59)	4 (10)	2 (5)	E	E	0-25	0-25	None	None
3	8	5/13/2021	17 (63)	15 (59)	2 (5)	3 (6)	E	ESE	0-25	0-25	None	None
3	9	5/14/2021	4 (39)	6 (43)	1 (3)	1 (3)	W	W	0-25	0-25	None	None
3	10	5/14/2021	7 (45)	11 (52)	2 (5)	4 (8)	W	W	0-25	0-25	None	None
3	11	5/14/2021	11 (52)	14 (57)	4 (8)	3 (6)	W	WNW	0-25	0-25	None	None
3	12	5/14/2021	14 (57)	18 (64)	3 (6)	4 (8)	WNW	NW	0-25	0-25	None	None
3	13	5/14/2021	20 (68)	20 (68)	2 (5)	3 (6)	NW	NW	0-25	0-25	None	None
3	14	5/14/2021	21 (70)	23 (73)	3 (6)	4 (10)	NW	NW	0-25	0-25	None	None
3	15	5/14/2021	21 (70)	23 (73)	4 (10)	3 (6)	Е	Е	25-75	25-75	None	None
3	16	5/14/2021	23 (73)	19 (66)	4 (9)	4 (8)	E	E	25-75	25-75	None	None
3	17	5/14/2021	20 (68)	20 (68)	4 (8)	3 (6)	E	SE	25-75	25-75	None	None
3	18	5/14/2021	20 (68)	19 (66)	3 (6)	3 (6)	SE	SE	25-75	25-75	None	None
3	22	5/14/2021	19 (66)	18 (64)	1 (2)	1 (2)	SE	SE	0-25	0-25	None	None
3	19	5/15/2021	5 (41)	9 (48)	3 (6)	0 (0)	W	WSW	0-25	0-25	None	None
3	20	5/15/2021	10 (50)	14 (57)	1 (3)	3 (6)	W	W	0-25	0-25	None	None
3	21	5/15/2021	17 (63)	19 (66)	3 (6)	1 (3)	W	W	0-25	0-25	None	None
3	23	5/15/2021	20 (68)	21 (70)	1 (3)	2 (5)	W	W	0-25	0-25	None	None
3	24	5/15/2021	22 (72)	22 (72)	4 (10)	4 (8)	W	WSW	25-75	25-75	None	None
		-,,	- ()	- 11	. (. )	. (~)	I		3	,	1	. 50

Attachment A. Weather data from each survey during the bird use study in the proposed Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021–February 2022.

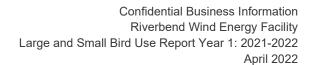
			Tempe	erature	Wind 9	Speed	Wind D	iraatian	Cloud	Cover	Draein	itation
Survey Event	Point ID	Date	°C	(°F)		mph)	wina D	irection	(%	<b>%)</b>	Precip	itation
			Start	End	Start	End	Start	End	Start	End	Start	End
4	1	6/14/2021	22 (72)	20 (68)	5 (12)	4 (10)	NNW	NNW	25-75	25-75	None	None
4	2	6/14/2021	20 (68)	19 (66)	4 (10)	4 (8)	NNW	NNE	25-75	25-75	None	None
4	3	6/14/2021	19 (66)	19 (66)	4 (9)	4 (9)	N	NW	25-75	25-75	None	None
4	4	6/14/2021	22 (72)	20 (68)	4 (9)	3 (6)	N	NNW	0-25	0-25	None	None
4	5 6	6/15/2021 6/15/2021	15 (59) 17 (63)	17 (63)	8 (17)	8 (18) 9 (21)	NNW N	N N	25-75 0-25	25-75 0-25	None	None None
4	7	6/15/2021	18 (64)	18 (64) 19 (66)	8 (18) 9 (21)	8 (18)	N	N	0-25 0-25	0-25	None None	None
4	8	6/15/2021	21 (70)	22 (72)	9 (20)	11 (25)	N	N	0-25	0-25	None	None
4	9	6/15/2021	22 (72)	22 (72)	11 (25)	11 (25)	N	N	0-25	25-75	None	None
4	10	6/15/2021	22 (72)	21 (70)	10 (23)	10 (22)	N	N	25-75	25-75	None	None
4	11	6/15/2021	21 (70)	20 (68)	10 (22)	9 (21)	Ν	NNE	25-75	25-75	None	None
4	12	6/15/2021	22 (72)	21 (70)	9 (21)	9 (20)	N	NNE	25-75	25-75	None	None
4	13	6/15/2021	20 (68)	19 (66)	7 (16)	6 (13)	NNE	NNE	25-75	25-75	None	None
4	14	6/15/2021	17 (63)	14 (57)	6 (13)	5 (12)	NNE	Ν	25-75	25-75	None	None
4	15	6/16/2021	7 (45)	11 (52)	3 (6)	3 (6)	Ν	NNE	25-75	25-75	None	None
4	16	6/16/2021	13 (55)	14 (57)	3 (6)	4 (8)	NE	NE	25-75	25-75	None	None
4	17	6/16/2021	16 (61)	18 (64)	3 (7)	3 (6)	N	NNE	25-75	25-75	None	None
4	18	6/16/2021	20 (68)	20 (68)	3 (6)	5 (12)	NNW	NNW	25-75	0-25	None	None
4	19	6/16/2021	20 (68)	21 (70)	5 (12)	7 (15)	NNW	NNW	0-25	0-25	None	None
4	20	6/16/2021	21 (70)	23 (73)	7 (15)	7 (16)	ENE	NE	0-25	0-25	None	None
4	21	6/16/2021	23 (73)	22 (72)	7 (16)	6 (14)	NE	NE	0-25	0-25	None	None
4	22	6/16/2021	22 (72)	20 (68)	6 (14)	6 (13)	NE	NE	0-25	0-25	None	None
4	23 24	6/16/2021	24 (75)	23 (73)	6 (13)	4 (10)	N	NNE	0-25	0-25	None	None
5	1	6/16/2021 7/13/2021	19 (66) 24 (75)	18 (64) 24 (75)	4 (10)	3 (7)	E SSW	ESE SSW	0-25 75-100	0-25 75-100	None None	None None
5	2	7/13/2021	24 (75)	24 (73)	3 (6) 6 (13)	5 (12) 4 (8)	SSW	SW	75-100 75-100	75-100 75-100	None	Drizzle
5	3	7/13/2021	22 (72)	21 (70)	4 (8)	1 (2)	SW	SW	75-100 75-100	75-100 75-100	None	None
5	4	7/13/2021	21 (70)	21 (70)	1 (2)	1 (3)	SW	SW	75-100	75-100	None	None
5	5	7/14/2021	18 (64)	19 (66)	4 (8)	3 (6)	W	W	25-75	0-25	None	None
5	6	7/14/2021	19 (66)	22 (72)	1 (3)	3 (7)	W	W	0-25	0-25	None	None
5	7	7/14/2021	22 (72)	23 (73)	3 (7)	3 (7)	WSW	WSW	0-25	0-25	None	None
5	8	7/14/2021	26 (79)	27 (81)	3 (7)	3 (7)	W	W	0-25	25-75	None	None
5	9	7/14/2021	26 (79)	27 (81)	3 (7)	3 (7)	W	WSW	25-75	25-75	None	None
5	10	7/14/2021	28 (82)	28 (82)	3 (7)	4 (8)	W	SW	25-75	25-75	None	None
5	11	7/14/2021	29 (84)	29 (84)	4 (8)	4 (9)	S	S	25-75	25-75	None	None
5	12	7/14/2021	29 (84)	28 (82)	5 (12)	5 (12)	SW	SW	25-75	25-75	None	None
5	13	7/14/2021	27 (81)	27 (81)	5 (12)	3 (7)	SW	SW	25-75	25-75	None	None
5	14	7/14/2021	27 (81)	26 (79)	3 (7)	3 (7)	SW	SW	25-75	25-75	None	None
5	15	7/15/2021	21 (70)	22 (72)	5 (12)	7 (15)	SSW	S	25-75	25-75	None	None
5	16	7/15/2021	22 (72)	23 (73)	7 (15)	7 (16)	S	SSW	25-75	25-75	None	None
5	17	7/15/2021	24 (75)	27 (81)	7 (16)	7 (15)	SSW	SSW	25-75	25-75	None	None
5 5	18 19	7/15/2021 7/15/2021	27 (81) 26 (79)	27 (81) 26 (79)	7 (15) 5 (12)	5 (12)	SSW SW	SW SW	25-75 25-75	25-75 25-75	None None	None None
5	20	7/15/2021	28 (82)	27 (81)	6 (14)	6 (13) 6 (14)	SW	SW	25-75 25-75	25-75 25-75	None	None
5	21	7/15/2021	27 (81)	27 (81)	6 (14)	6 (14)	SW	SW	25-75 25-75	25-75 25-75	None	None
5	22	7/15/2021	26 (79)	26 (79)	6 (14)	7 (16)	SW	SW	25-75	25-75	None	None
5	23	7/15/2021	24 (75)	24 (75)	7 (15)	4 (9)	WSW	W	25-75	25-75	None	None
5	24	7/15/2021	24 (75)	24 (75)	4 (9)	5 (12)	W	W	25-75	25-75	None	None
6	1	8/15/2021	24 (75)	25 (77)	4 (9)	4 (9)	ESE	ESE	25-75	25-75	None	None
6	2	8/15/2021	26 (79)	26 (79)	4 (9)	4 (8)	ESE	ENE	25-75	0-25	None	None
6	3	8/15/2021	26 (79)	24 (75)	4 (8)	3 (7)	ENE	ENE	0-25	0-25	None	None
6	4	8/15/2021	24 (75)	24 (75)	2 (5)	2 (5)	ENE	Е	0-25	0-25	None	None
6	5	8/16/2021	13 (55)	14 (57)	1 (2)	2 (5)	Е	ENE	25-75	0-25	None	None
6	6	8/16/2021	14 (57)	17 (63)	2 (5)	3 (6)	ENE	ENE	25-75	25-75	None	None
6	7	8/16/2021	17 (63)	21 (70)	3 (6)	2 (5)	ENE	ENE	25-75	25-75	None	None
6	8	8/16/2021	21 (70)	22 (72)	4 (9)	3 (7)	E	E	25-75	25-75	None	None
6	9	8/16/2021	22 (72)	23 (73)	3 (7)	3 (7)	ENE	ENE	25-75	25-75	None	None
6	10	8/16/2021	23 (73)	23 (73)	3 (7) 3 (7)	3 (7)	ENE	ENE E	25-75 25-75	25-75 75-100	None	None
6	11 12	8/16/2021 8/16/2021	23 (73) 21 (70)	24 (75) 22 (72)	3 (7) 2 (5)	1 (3) 1 (3)	ENE SE	SE	25-75 75-100	75-100 75-100	None Drizzle	None None
6	13	8/16/2021	21 (70)	22 (72) 22 (72)	2 (5)	3 (6)	SE SE	ESE	75-100 75-100	25-75	None	None
6	14	8/16/2021	22 (72)	22 (72)	1 (2)	1 (2)	ESE	E	25-75	25-75 25-75	None	None
6	15	8/16/2021	22 (72)	20 (68)	1 (2)	2 (5)	E	E	25-75 25-75	25-75 25-75	None	None
6	16	8/17/2021	15 (59)	16 (61)	2 (5)	2 (5)	NNW	WNW	25-75	25-75	None	None
6	17	8/17/2021	16 (61)	18 (64)	2 (5)	4 (8)	WNW	NW	25-75	25-75	None	None
6	18	8/17/2021	18 (64)	20 (68)	4 (9)	4 (8)	NW	WNW	25-75	25-75	None	None
6	19	8/17/2021	23 (73)	24 (75)	2 (5)	3 (7)	NE	Е	25-75	25-75	None	None
6	20	8/17/2021	24 (75)	25 (77)	3 (7)	4 (8)	Е	W	25-75	25-75	None	None
6	21	8/17/2021	26 (79)	27 (81)	4 (8)	3 (6)	Е	W	25-75	25-75	None	None
6	22	8/17/2021	27 (81)	28 (82)	3 (6)	2 (5)	W	SW	25-75	0-25	None	None
6	23	8/17/2021	28 (82)	28 (82)	4 (8)	3 (7)	SW	ESE	0-25	0-25	None	None
6	24	8/17/2021	27 (81)	25 (77)	3 (7)	3 (7)	ESE	ESE	25-75	0-25	None	None

Attachment A. Weather data from each survey during the bird use study in the proposed Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021–February 2022.

		,			-		1		-			
Survey	D. S. LID	D L -	-	erature (°E)		Speed	Wind D	irection		Cover	Precip	itation
Event	Point ID	Date		(°F)		(mph)	611			رة) ا	611	
_			Start	End	Start	End	Start	End	Start	End	Start	End
7	1	9/14/2021	27 (81)	28 (82)	6 (13)	9 (20)	SSW	SSW	75-100	75-100	None	None
7	2	9/14/2021	28 (82)	29 (84)	9 (20)	10 (23)	SSW	SW	75-100	75-100	None	None
7	3	9/14/2021	29 (84)	29 (84)	9 (21)	7 (16)	SW	SW	75-100	75-100	None	Rain
7	4	9/14/2021	24 (75)	23 (73)	7 (16)	7 (15)	WSW	SW	75-100	75-100	None	None
7	5	9/14/2021	23 (73)	23 (73)	7 (15)	3 (7)	SW	WSW	75-100	75-100	None	None
7	6	9/15/2021	15 (59)	15 (59)	4 (8)	2 (5)	W	W	25-75	25-75	None	None
7	7	9/15/2021	16 (61)	18 (64)	3 (6)	4 (8)	W	WNW	25-75	25-75	None	None
7	8	9/15/2021	18 (64)	19 (66)	4 (8)		W	WNW	25-75	25-75	None	None
			` ′			4 (8)						
7	9	9/15/2021	20 (68)	21 (70)	4 (8)	3 (6)	S	W	75-100	25-75	None	None
7	10	9/15/2021	23 (73)	23 (73)	3 (7)	0 (0)	NW	NW	75-100	75-100	None	None
7	11	9/15/2021	23 (73)	23 (73)	0 (0)	4 (8)	NW	Е	25-75	25-75	None	None
7	12	9/15/2021	23 (73)	23 (73)	4 (8)	3 (7)	NW	NW	25-75	25-75	None	None
7	13	9/15/2021	22 (72)	22 (72)	4 (8)	3 (7)	NW	NW	25-75	25-75	None	None
7	14	9/15/2021	22 (72)	21 (70)	3 (7)	4 (10)	NNW	NNW	25-75	25-75	None	None
7	15	9/15/2021	20 (68)	19 (66)	4 (10)	3 (6)	NNW	NW	25-75	25-75	None	None
7	16	9/16/2021	11 (52)	12 (54)	2 (5)	2 (5)	ESE	ESE	25-75	25-75	None	None
7	17	9/16/2021	12 (54)		2 (5)		ESE	SE	25-75	25-75		
				14 (57)		4 (9)					None	None
7	18	9/16/2021	17 (63)	17 (63)	3 (6)	2 (5)	SE	SE	25-75	25-75	None	None
7	19	9/16/2021	23 (73)	23 (73)	4 (9)	2 (5)	SE	ESE	25-75	25-75	None	None
7	20	9/16/2021	24 (75)	24 (75)	2 (5)	3 (6)	SE	ESE	25-75	25-75	None	None
7	21	9/16/2021	24 (75)	24 (75)	4 (10)	2 (5)	S	S	25-75	25-75	None	None
7	22	9/16/2021	26 (79)	26 (79)	3 (7)	4 (10)	S	S	25-75	25-75	None	None
7	23	9/16/2021	26 (79)	24 (75)	1 (3)	6 (13)	SE	SSE	25-75	25-75	None	None
7	24	9/16/2021	24 (75)	24 (75)	6 (13)	4 (9)	SSE	SE	25-75	25-75	None	None
8	1	10/12/2021	21 (70)	21 (70)	7 (15)	8 (18)	SW	SW	75-100	75-100	None	None
8		10/12/2021					SW	SW	75-100 75-100	75-100 75-100	None	None
	2		21 (70)	20 (68)	8 (18)	8 (17)						
8	3	10/12/2021	20 (68)	20 (68)	8 (17)	6 (13)	SW	SW	75-100	75-100	None	None
8	4	10/12/2021	20 (68)	20 (68)	6 (13)	4 (9)	SW	SW	75-100	75-100	None	None
8	5	10/13/2021	16 (61)	16 (61)	3 (7)	3 (6)	WSW	WSW	0-25	0-25	None	None
8	6	10/13/2021	17 (63)	18 (64)	3 (7)	4 (9)	WSW	WSW	0-25	0-25	None	None
8	7	10/13/2021	18 (64)	19 (66)	4 (9)	4 (8)	SW	SW	0-25	0-25	None	None
8	8	10/13/2021	19 (66)	21 (70)	6 (14)	5 (12)	SW	SW	0-25	25-75	None	None
8	9	10/13/2021	21 (70)	21 (70)	5 (12)	4 (9)	SW	SW	25-75	25-75	None	None
8	10	10/13/2021	21 (70)	22 (72)	4 (9)	5 (12)	SW	SW	25-75	25-75	None	None
8	11	10/13/2021	22 (72)	22 (72)	4 (8)	3 (6)	SW	SW	25-75	25-75	None	None
8	12	10/13/2021	22 (72)	20 (68)	3 (6)	2 (5)	SW	SW	25-75	0-25	None	None
8	13	10/14/2021	17 (63)	17 (63)	4 (8)	3 (7)	S	SSW	75-100	75-100	None	None
8	14	10/14/2021	18 (64)	19 (66)	4 (8)	4 (8)	S	S	75-100	75-100	None	None
8	15	10/14/2021	20 (68)	22 (72)	4 (8)	4 (9)	S	SSW	75-100	25-75	None	None
8	16	10/14/2021	22 (72)	23 (73)	4 (10)	4 (10)	SSW	SSW	75-100	75-100	None	None
8	17	10/14/2021	23 (73)	24 (75)	4 (10)	5 (12)	SSW	SW	25-75	25-75	None	None
8	18	10/14/2021	25 (77)	25 (77)	4 (9)	5 (12)	SW	SW	25-75	25-75	None	None
8	19	10/14/2021	25 (77)	23 (73)	4 (10)	3 (7)	SW	WSW	75-100	75-100	None	None
8	20	10/14/2021	22 (72)	22 (72)	3 (7)	4 (10)	WSW	WSW	75-100	75-100	None	Rain
8	21	10/15/2021	13 (55)	14 (57)	3 (6)	3 (6)	SE	Е	75-100	75-100	Drizzle	Drizzle
8	22	10/15/2021	14 (57)	14 (57)	2 (5)	0 (0)	Е	WSW	75-100	75-100	Drizzle	Drizzle
8	23	10/15/2021	15 (59)	15 (59)	1 (2)	1 (3)	Е	Ν	75-100	75-100	Drizzle	Drizzle
8	24	10/15/2021	14 (57)	14 (57)	1 (2)	1 (3)	Ν	NE	75-100	75-100	Drizzle	None
9	1	11/15/2021	2 (36)	2 (36)	6 (14)	6 (14)	WNW	WNW	75-100	75-100	None	None
9	2	11/15/2021	3 (37)	4 (39)	6 (14)	6 (14)	WNW	W	75-100	25-75	None	None
9	3	11/15/2021	4 (39)	4 (39)	6 (14)	7 (15)	W	W	25-75	25-75	None	None
9	4	11/15/2021	4 (39)	4 (37)	6 (13)	7 (15) 7 (15)	W	W	75-100	75-100	None	None
9												
	5	11/15/2021	3 (37)	3 (37)	7 (15)	4 (10)	W	W	25-75	25-75	None	None
9	6	11/16/2021	-2 (28)	0 (32)	1 (3)	3 (7)	W	W	25-75	25-75	None	None
9	7	11/16/2021	0 (32)	1 (34)	3 (7)	3 (6)	W	WNW	25-75	25-75	None	None
9	8	11/16/2021	1 (34)	3 (37)	3 (6)	3 (7)	W	W	25-75	25-75	None	None
9	9	11/16/2021	3 (37)	4 (39)	1 (3)	0 (0)	W	W	25-75	25-75	None	None
9	10	11/16/2021	5 (41)	6 (43)	0 (0)	1 (2)	S	S	25-75	25-75	None	None
9	11	11/16/2021	6 (43)	6 (43)	1 (2)	2 (5)	S	SE	25-75	25-75	None	None
9	13	11/16/2021	6 (43)	5 (41)	1 (2)	1 (3)	SSW	SSE	25-75	75-100	None	None
9	14	11/17/2021					S	S	75-100	75-100 75-100	Drizzle	Drizzle
			8 (46)	8 (46)	5 (12)	4 (10)						
9	15	11/17/2021	10 (50)	12 (54)	4 (9)	4 (9)	S	SSW	75-100	75-100	None	Drizzle
9	16	11/17/2021	12 (54)	13 (55)	4 (10)	5 (12)	SSW	SSW	75-100	75-100	Drizzle	None
9	17	11/17/2021	13 (55)	14 (57)	6 (14)	8 (17)	SSW	SSW	75-100	75-100	None	None
9	18	11/17/2021	14 (57)	15 (59)	8 (17)	7 (16)	SSW	SW	75-100	75-100	None	None
9	19	11/17/2021	15 (59)	15 (59)	7 (16)	6 (14)	SW	SSW	75-100	75-100	None	None
9	20	11/17/2021	16 (61)	14 (57)	7 (16)	8 (17)	SSW	SSW	75-100	75-100	Drizzle	None
9	12	11/18/2021	4 (39)	3 (37)	5 (12)	7 (15)	W	W	75-100 75-100	75-100	None	None
9	21								75-100 75-100	75-100 75-100		
		11/18/2021	3 (37)	2 (36)	4 (10)	4 (9)	WNW	W			None	None
9	22	11/18/2021	3 (37)	4 (39)	4 (9)	3 (7)	W	W	75-100	75-100	None	None
	<del>-</del> -			4 (00)	. 0 (7)	4 (0)	W	W	75-100	25-75	None	None
9 9	23 24	11/18/2021 11/18/2021	4 (39) 4 (39)	4 (39) 4 (39)	3 (7) 8 (17)	4 (8) 5 (12)	W	W	25-75	75-100	None	None

Attachment A. Weather data from each survey during the bird use study in the proposed Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021–February 2022.

			Tempe	erature	1	Speed				Cover		
Survey	Point ID	Date	-	(°F)		mph)	Wind D	irection		%)	Precip	itation
Event	1 0 15	Duic	Start	End	Start	End	Start	End	Start	End	Start	End
10	1	12/14/2021	-1 (30)	2 (36)	3 (6)	2 (5)	E	ESE	25-75	75-100	None	None
10	2	12/14/2021	3 (37)	5 (41)	2 (5)	3 (6)	ESE	E	25-75	25-75	None	None
10	3	12/14/2021	5 (41)	7 (45)	3 (6)	6 (13)	E	ESE	25-75	25-75	None	None
10	4	12/14/2021	6 (43)	7 (45) 7 (45)	6 (13)	4 (10)	E	ESE	25-75	25-75	None	None
10	5	12/14/2021	7 (45)	7 (45) 7 (45)	4 (10)	4 (8)	ESE	ESE	25-75	25-75	None	None
10	6	12/14/2021	7 (45) 7 (45)	7 (45) 7 (45)	5 (12)	4 (10)	ESE	ESE	25-75 25-75	25-75 25-75	None	None
10	7	12/14/2021	7 (45) 7 (45)	5 (41)	4 (10)	4 (9)	ESE	SE	25-75	25-75	None	None
10	8	12/14/2021	6 (43)	6 (43)	6 (14)	7 (16)	S	S	75-100	75-100	None	None
10	9	12/15/2021	7 (45)	7 (45)	6 (14)	7 (16) 7 (16)	S	S	75-100 75-100	75-100 75-100	None	None
10	10	12/15/2021					S	S	75-100 75-100	75-100 75-100		
			7 (45)	8 (46)	7 (16)	7 (16)	S	S	75-100 75-100	75-100 75-100	None	None
10	11	12/15/2021	9 (48)	10 (50)	7 (16)	7 (16)					None	None
10	12	12/15/2021	8 (46)	9 (48)	7 (16)	7 (16)	SSE	S	75-100	75-100	None	None
10	13	12/15/2021	10 (50)	11 (52)	6 (14)	6 (14)	S	S	75-100	75-100	None	None
10	14	12/15/2021	11 (52)	11 (52)	6 (14)	6 (13)	SSW	SSW	75-100	75-100	None	None
10	15	12/16/2021	14 (57)	14 (57)	13 (28)	15 (33)	SSW	SW	75-100	75-100	None	None
10	16	12/16/2021	14 (57)	15 (59)	15 (33)	13 (30)	SW	SW	75-100	75-100	None	None
10	17	12/16/2021	15 (59)	16 (61)	13 (30)	12 (26)	SW	SW	25-75	25-75	None	None
10	18	12/16/2021	17 (63)	15 (59)	13 (30)	11 (25)	SW	WSW	25-75	75-100	None	None
10	19	12/16/2021	17 (63)	15 (59)	12 (26)	11 (25)	WSW	WSW	75-100	75-100	None	None
10	20	12/16/2021	15 (59)	14 (57)	10 (22)	7 (16)	WSW	SW	75-100	25-75	None	None
10	21	12/16/2021	14 (57)	12 (54)	7 (16)	9 (21)	WSW	WSW	25-75	25-75	None	None
10	22	12/17/2021	-1 (30)	-1 (30)	3 (7)	4 (8)	WNW	WNW	25-75	25-75	None	None
10	23	12/17/2021	0 (32)	1 (34)	4 (9)	4 (10)	WNW	WNW	25-75	25-75	None	None
10	24	12/17/2021	1 (34)	2 (36)	4 (10)	2 (5)	WNW	WNW	25-75	25-75	None	None
11	1	1/10/2022	-10 (14)	-10 (14)	1 (3)	1 (2)	WNW	WNW	75-100	75-100	None	None
11	2	1/10/2022	-10 (14)	-10 (14)	1 (2)	0 (0)	WNW	WNW	75-100	75-100	None	None
11	3	1/10/2022	-10 (14)	-11 (12)	0 (0)	1 (3)	WNW	WNW	75-100	75-100	None	None
11	4	1/11/2022	-15 (5)	-14 (7)	3 (7)	2 (5)	WSW	SW	25-75	25-75	None	None
11	5	1/11/2022	-14 (7)	-12 (10)	2 (5)	6 (13)	SW	SSW	25-75	75-100	None	None
11	6	1/11/2022	-12 (10)	-11 (12)	4 (10)	4 (8)	SSW	SSW	75-100	75-100	None	None
11	7	1/11/2022	-9 (16)	-8 (18)	4 (8)	5 (12)	SSW	SSW	75-100	75-100	None	None
11	8	1/11/2022	-9 (16)	-8 (18)	5 (12)	4 (10)	SSW	SSW	25-75	25-75	None	None
11	9	1/11/2022	-8 (18)	-8 (18)	6 (13)	5 (12)	S	SSW	25-75	25-75	None	None
11	10	1/11/2022	-8 (18)	-8 (18)	5 (12)	5 (12)	S	S	25-75	75-100	None	None
11	11	1/12/2022	-1 (30)	-1 (30)	7 (15)	5 (12)	W	W	75-100	75-100	None	None
11	12	1/12/2022	0 (32)	1 (34)	5 (12)	6 (13)	W	W	75-100	75-100	None	None
11	13	1/12/2022	1 (34)	1 (34)	6 (13)	7 (15)	W	W	75-100	75-100	None	None
11	14	1/12/2022	1 (34)	1 (34)	7 (15)	6 (14)	W	W	75-100	75-100	None	None
11	15	1/12/2022	1 (34)	2 (36)	7 (15)	7 (15)	W	W	75-100	75-100	None	None
11	16	1/12/2022	2 (36)	2 (36)	6 (14)	7 (15)	W	W	75-100	75-100	None	None
11	17	1/12/2022	2 (36)	1 (34)	7 (15)	6 (13)	W	NW	75-100	75-100	None	None
11	18	1/13/2022	-2 (28)	-2 (28)	7 (15)	5 (12)	NNE	NNE	75-100	75-100	None	None
11	19	1/13/2022	-1 (30)	-1 (30)	6 (13)	6 (14)	NNE	NNE	75-100	75-100	None	None
11	20	1/13/2022	0 (32)	0 (32)	6 (13)	7 (16)	NE	NE	75-100	75-100	None	None
11	21	1/13/2022	0 (32)	0 (32)	7 (15)	7 (16) 7 (16)	NE	ENE	75-100	75-100	None	None
11	22	1/13/2022	0 (32)	0 (32)	7 (16)	7 (16) 7 (16)	ENE	N	75-100 75-100	75-100 75-100	None	None
11	23	1/13/2022	1 (34)	1 (34)			N	N	75-100 75-100	75-100 75-100	None	None
11	23 24	1/13/2022	1 (34)		6 (13)	6 (13)	NNW	N	75-100 75-100	75-100 75-100		
12	1	2/15/2022		0 (32)	6 (13)	4 (10)	SE	SE	75-100 75-100	75-100	None	None None
12	2	2/13/2022	-2 (28) 2 (36)	-5 (23) 3 (37)	6 (14) 12 (26)	7 (15) 10 (23)	SSW	SSW	75-100 75-100	75-100 75-100	None None	None
12	3	2/16/2022	2 (36) 5 (41)	3 (37) 7 (45)	9 (20)	9 (20)	SSW	SSW	75-100 75-100	75-100 75-100	None	None
12	3 4	2/16/2022	7 (45)	7 (45) 8 (46)	9 (20)	9 (20) 8 (18)	SSW	33VV S	75-100 75-100	75-100 75-100	None	None
12	<del>4</del> 5	2/16/2022	7 (45) 8 (46)	8 (46) 9 (48)	8 (17)	8 (18) 8 (18)	55 VV S	SSW	75-100 75-100	75-100 75-100		None
12	6	2/16/2022					SSW	SSW	75-100 75-100	75-100 75-100	None	
12			9 (48) 11 (52)	10 (50)	8 (17)	7 (15)	SSW	SSW	75-100 75-100		None	None
	7 Ω	2/16/2022	11 (52)	11 (52)	9 (20)	11 (24)				75-100 75-100	None	None
12	8	2/16/2022	10 (50)	10 (50)	10 (22)	10 (23)	SSW	SSW	75-100 75-100	75-100 75-100	None	None
12	9	2/16/2022	10 (50)	9 (48)	8 (18)	6 (13)	SSW	SSW	75-100	75-100	Drizzle	Rain
12	10	2/17/2022	2 (36)	0 (32)	1 (2)	2 (5)	NNE	NNE	75-100	75-100	Rain	None
12	11	2/17/2022	0 (32)	-1 (30)	1 (3)	1 (3)	NNE	N	75-100	75-100	None	None
12	12	2/17/2022	-1 (30)	-2 (28)	1 (3)	1 (3)	N	N	75-100	75-100	None	Drizzle
12	13	2/17/2022	-2 (28)	-2 (28)	1 (3)	2 (5)	N	N	75-100	75-100	None	None
12	14	2/17/2022	-2 (28)	-2 (28)	2 (5)	3 (6)	N	N	75-100	75-100	Drizzle	Snow
12	15	2/17/2022	-2 (28)	-3 (27)	3 (7)	4 (8)	N	N	75-100	75-100	Snow	Snow
12	16	2/17/2022	-3 (27)	-4 (25)	4 (8)	4 (8)	N	N	75-100	75-100	Snow	Snow
12	17	2/18/2022	-13 (9)	-13 (9)	4 (9)	4 (8)	WNW	WNW	25-75	25-75	None	None
12	18	2/18/2022	-12 (10)	-11 (12)	3 (6)	4 (8)	WNW	WNW	25-75	25-75	None	None
12	19	2/18/2022	-9 (16)	-9 (16)	4 (8)	4 (9)	WNW	WNW	25-75	25-75	None	None
12	20	2/18/2022	-8 (18)	-8 (18)	4 (9)	4 (9)	WNW	W	25-75	25-75	None	None
12	21	2/18/2022	-7 (19)	-6 (21)	3 (6)	4 (8)	WSW	SW	25-75	25-75	None	None
12	22	2/18/2022	-7 (19)	-6 (21)	4 (10)	6 (13)	SW	SW	0-25	25-75	None	None
12	23	2/18/2022	-6 (21)	-6 (21)	4 (10)	6 (13)	SW	SW	25-75	75-100	None	None
12	24	2/18/2022	-6 (21)	-7 (19)	5 (12)	6 (14)	SSW	S	25-75	25-75	None	None





Attachment B. Data tables of large birds from the large and small bird use study in the proposed Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021–February 2022.

Table B-1. Group counts, observation counts, and relative abundance, by season, for each species and family observed during the large bird use surveys in the Riverbend Wind

Energy Project area, Sanilac County, Michigan, March 2021–February 2022

		Energy Project dred	i	g: Mar-			er: Jun-			: Sep-N	ov	Winte	er: Dec-	Feb	Al	ll Seasor	ns
Family (Description)	Common Name	Scientific Name	# Groups	# Obs	Rel. Abund. (%)	# Groups	# Obs	Rel. Abund. (%)	# Groups	# Obs	Rel. Abund. (%)	# Groups	# Obs	Rel. Abund. (%)	# Groups	s # Obs	Rel. Abund. (%)
	Canada Goose	Branta canadensis	27	80	10.0	3	28	3.8	15	112	8.0	10	91	12.6	55	311	8.5
Anatidae	Wood Duck	Aix sponsa	1	2	0.2	0	0	0.0	0	0	0.0	0	0	0.0	1	2	0.1
(Ducks, Geese, & Swans)	Mallard	Anas platyrhynchos	4	16	2.0	1	2	0.3	0	0	0.0	0	0	0.0	5	18	0.5
		Family Subtotal:	32	98	12.2	4	30	4.0	15	112	8.0	10	91	12.6	61	331	9.0
Dla soci soci al soci	Wild Turkey	Meleagris gallopavo	9	44	5.5	8	17	2.3	3	21	1.5	6	48	6.7	26	130	3.5
Phasianidae (Grouse & Allies)	Ring-necked Pheasant	Phasianus colchicus	3	4	0.5	4	8	1.1	1	2	0.1	0	0	0.0	8	14	0.4
(Orouse & Ailles)		Family Subtotal:	12	48	6.0	12	25	3.4	4	23	1.6	6	48	6.7	34	144	3.9
0 1 1:1	Rock Pigeon	Columba livia	31	85	10.6	19	61	8.2	39	321	22.8	39	269	37.4	128	736	20.0
Columbidae (Pigeons & Doves)	Mourning Dove	Zenaida macroura	55	81	10.1	148	347	46.5	207	690	49.1	76	231	32.1	486	1349	36.7
(Figeoris & Doves)		Family Subtotal:	86	166	20.7	167	408	54.7	246	1011	71.9	115	500	69.4	614	2085	56.8
Gruidae	Sandhill Crane	Antigone canadensis	3	49	6.1	6	35	4.7	2	6	0.4	0	0	0.0	11	90	2.5
(Cranes)		Family Subtotal:	3	49	6.1	6	35	4.7	2	6	0.4	0	0	0.0	11	90	2.5
Charadriidae	Killdeer	Charadrius vociferus	73	108	13.5	46	51	6.8	17	25	1.8	0	0	0.0	136	184	5.0
(Plovers)		Family Subtotal:	73	108	13.5	46	51	6.8	17	25	1.8	0	0	0.0	136	184	5.0
	Ring-billed Gull	Larus delawarensis	0	0	0.0	0	0	0.0	2	6	0.4	0	0	0.0	2	6	0.2
Laridae	Herring Gull	Larus argentatus	6	9	1.1	0	0	0.0	1	3	0.2	0	0	0.0	7	12	0.3
(Gulls & Allies)		Family Subtotal:	6	9	1.1	0	0	0.0	3	9	0.6	0	0	0.0	9	18	0.5
	Great Blue Heron	Ardea herodias	3	3	0.4	4	4	0.5	3	3	0.2	0	0	0.0	10	10	0.3
Ardeidae (Herons & Allies)	Green Heron	Butorides virescens	1	1	0.1	0	0	0.0	0	0	0.0	0	0	0.0	1	1	0.0
(Helolis & Allies)		Family Subtotal:	4	4	0.5	4	4	0.5	3	3	0.2	0	0	0.0	11	11	0.3
Cathartidae	Turkey Vulture	Cathartes aura	170	281	35.1	89	143	19.2	85	150	10.7	0	0	0.0	344	574	15.6
(Vultures)		Family Subtotal:	170	281	35.1	89	143	19.2	85	150	10.7	0	0	0.0	344	574	15.6
	Northern Harrier	Circus hudsonius	0	0	0.0	0	0	0.0	1	1	0.1	3	3	0.4	4	4	0.1
	Sharp-shinned Hawk	Accipiter striatus	2	2	0.2	0	0	0.0	2	2	0.1	0	0	0.0	4	4	0.1
	Cooper's Hawk	Accipiter cooperii	0	0	0.0	4	4	0.5	1	1	0.1	0	0	0.0	5	5	0.1
Accipitridae (Hawks, Eagles, & Kites)	Bald Eagle	Haliaeetus leucocephalus	2	2	0.2	4	4	0.5	3	4	0.3	10	16	2.2	19	26	0.7
(Hawks, Lagies, & Klies)	Red-tailed Hawk	Buteo jamaicensis	27	29	3.6	35	36	4.8	45	45	3.2	51	52	7.2	158	162	4.4
	Rough-legged Hawk	Buteo lagopus	0	0	0.0	0	0	0.0	0	0	0.0	6	6	8.0	6	6	0.2
		Family Subtotal:	31	33	4.1	43	44	5.9	52	53	3.8	70	77	10.7	196	207	5.6
Strigidae	Great Horned Owl	Bubo virginianus	0	0	0.0	1	1	0.1	0	0	0.0	0	0	0.0	1	1	0.0
(Owls)		Family Subtotal:	0	0	0.0	1	1	0.1	0	0	0.0	0	0	0.0	1	1	0.0
Dioides	Northern Flicker	Colaptes auratus	2	2	0.2	0	0	0.0	1	1	0.1	1	1	0.1	4	4	0.1
Picidae (Woodpeckers)	Pileated Woodpecker	Dryocopus pileatus	0	0	0.0	0	0	0.0	1	1	0.1	0	0	0.0	1	1	0.0
[1100apeckers]		Family Subtotal:	2	2	0.2	0	0	0.0	2	2	0.1	1	1	0.1	5	5	0.1
Falconidae	American Kestrel	Falco sparverius	3	3	0.4	5	5	0.7	12	12	0.9	3	3	0.4	23	23	0.6
(Falcons)		Family Subtotal:	3	3	0.4	5	5	0.7	12	12	0.9	3	3	0.4	23	23	0.6
		Total:	422	801	100.0	377	746	100.0	441	1406	100.0	205	720	100.0	1445	3673	100.0
		Species Diversity:		18			15			19			10			24	

Table B-2. Complete list of large bird species observed in the Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021—February 2022

Common Name	Scientific Name	Family	Incidental Observations Only
Canada Goose	Branta canadensis		
Wood Duck	Aix sponsa	Anatidae	
Mallard	Anas platyrhynchos	Andridae	
Common Merganser	Mergus merganser		*
Wild Turkey	Meleagris gallopavo	Phasianidae	
Ring-necked Pheasant	Phasianus colchicus	rnasianiaae	
Rock Pigeon	Columba livia	Columbidae	
Mourning Dove	Zenaida macroura	Columbiade	
Sandhill Crane	Antigone canadensis	Gruidae	
Killdeer	Charadrius vociferus	Charadriidae	
Ring-billed Gull	Larus delawarensis	l avida a	
Herring Gull	Larus argentatus	Laridae	
Great Blue Heron	Ardea herodias	Ardoidae	
Green Heron	Butorides virescens	Ardeidae	
Turkey Vulture	Cathartes aura	Cathartidae	
Northern Harrier	Circus hudsonius		
Sharp-shinned Hawk	Accipiter striatus		
Cooper's Hawk	Accipiter cooperii	A a a ina ikwi al ay a	
Bald Eagle	Haliaeetus leucocephalus	Accipitridae	
Red-tailed Hawk	Buteo jamaicensis		
Rough-legged Hawk	Buteo lagopus		
Great Horned Owl	Bubo virginianus	Christial at a	
Snowy Owl	Bubo scandiacus	Strigidae	*
Northern Flicker	Colaptes auratus	Disister -	
Pileated Woodpecker	Dryocopus pileatus	Picidae	
American Kestrel	Falco sparverius	Falconidae	

Table B-3. Use and frequency of occurrence, by season, for each species and family observed during the large bird use surveys in the proposed Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021–February 2022

E-mails.	ргоросса жисела	end Wind Energy Project		Use (obser						requency	у	
Family (Description)	Common Name	Scientific Name	Spring	Summer	Fall	Winter	Total	Spring	Summer	Fall	Winter	Total
	Canada Goose	Branta canadensis	1.14	0.39	1.58	1.28	1.10	0.26	0.04	0.18	0.04	0.13
Anatidae	Wood Duck	Aix sponsa	0.03	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	< 0.01
(Ducks, Geese, & Swans)	Mallard	Anas platyrhynchos	0.23	0.03	0.00	0.00	0.06	0.06	0.01	0.00	0.00	0.02
,		Family Subtotal:	1.40	0.42	1.58	1.28	1.17	0.30	0.06	0.18	0.04	0.14
51	Wild Turkey	Meleagris gallopavo	0.63	0.24	0.30	0.68	0.46	0.13	0.08	0.04	0.06	0.08
Phasianidae (Grouse & Allies)	Ring-necked Pheasant	Phasianus colchicus	0.06	0.11	0.03	0.00	0.05	0.04	0.06	0.01	0.00	0.03
(8.8888 8.769)		Family Subtotal:	0.69	0.35	0.32	0.68	0.51	0.17	0.13	0.06	0.06	0.10
Cali mala i al ara	Rock Pigeon	Columba livia	1.21	0.86	4.52	3.79	2.60	0.31	0.23	0.34	0.37	0.31
Columbidae (Pigeons & Doves)	Mourning Dove	Zenaida macroura	1.16	4.89	9.72	3.25	4.77	0.49	0.87	0.87	0.65	0.72
(i.igee.ie a. 2 e i e.j		Family Subtotal:	2.37	5.75	14.24	7.04	7.37	0.66	0.90	0.94	0.85	0.84
Gruidae	Sandhill Crane	Antigone canadensis	0.70	0.49	0.08	0.00	0.32	0.04	0.07	0.03	0.00	0.04
(Cranes)		Family Subtotal:	0.70	0.49	0.08	0.00	0.32	0.04	0.07	0.03	0.00	0.04
Charadriidae	Killdeer	Charadrius vociferus	1.54	0.72	0.35	0.00	0.65	0.57	0.39	0.18	0.00	0.29
(Plovers)		Family Subtotal:	1.54	0.72	0.35	0.00	0.65	0.57	0.39	0.18	0.00	0.29
l and also	Ring-billed Gull	Larus delawarensis	0.00	0.00	0.08	0.00	0.02	0.00	0.00	0.03	0.00	0.01
Laridae (Gulls & Allies)	Herring Gull	Larus argentatus	0.13	0.00	0.04	0.00	0.04	0.06	0.00	0.01	0.00	0.02
(		Family Subtotal:	0.13	0.00	0.13	0.00	0.06	0.06	0.00	0.04	0.00	0.02
Audoides	Great Blue Heron	Ardea herodias	0.04	0.06	0.04	0.00	0.04	0.04	0.06	0.04	0.00	0.04
Ardeidae (Herons & Allies)	Green Heron	Butorides virescens	0.01	0.00	0.00	0.00	< 0.01	0.01	0.00	0.00	0.00	< 0.01
		Family Subtotal:	0.06	0.06	0.04	0.00	0.04	0.06	0.06	0.04	0.00	0.04
Cathartidae	Turkey Vulture	Cathartes aura	4.01	2.01	2.11	0.00	2.03	0.74	0.61	0.37	0.00	0.43
(Vultures)		Family Subtotal:	4.01	2.01	2.11	0.00	2.03	0.74	0.61	0.37	0.00	0.43
	Northern Harrier	Circus hudsonius	0.00	0.00	0.01	0.04	0.01	0.00	0.00	0.01	0.04	0.01
	Sharp-shinned Hawk	Accipiter striatus	0.03	0.00	0.03	0.00	0.01	0.03	0.00	0.03	0.00	0.01
Accipitridae	Cooper's Hawk	Accipiter cooperii	0.00	0.06	0.01	0.00	0.02	0.00	0.06	0.01	0.00	0.02
(Hawks, Eagles, &	Bald Eagle	Haliaeetus leucocephalus	0.03	0.06	0.06	0.23	0.09	0.03	0.06	0.04	0.13	0.06
Kites)	Red-tailed Hawk	Buteo jamaicensis	0.41	0.51	0.63	0.73	0.57	0.36	0.38	0.44	0.59	0.44
	Rough-legged Hawk	Buteo lagopus	0.00	0.00	0.00	0.08	0.02	0.00	0.00	0.00	0.08	0.02
		Family Subtotal:	0.47	0.62	0.75	1.08	0.73	0.41	0.48	0.52	0.69	0.53
Strigidae	Great Horned Owl	Bubo virginianus	0.00	0.01	0.00	0.00	< 0.01	0.00	0.01	0.00	0.00	< 0.01
(Owls)		Family Subtotal:	0.00	0.01	0.00	0.00	< 0.01	0.00	0.01	0.00	0.00	< 0.01
Dioida -	Northern Flicker	Colaptes auratus	0.03	0.00	0.01	0.01	0.01	0.03	0.00	0.01	0.01	0.01
Picidae (Woodpeckers)	Pileated Woodpecker	Dryocopus pileatus	0.00	0.00	0.01	0.00	< 0.01	0.00	0.00	0.01	0.00	< 0.01
,		Family Subtotal:	0.03	0.00	0.03	0.01	0.02	0.03	0.00	0.03	0.01	0.02
Falconidae	American Kestrel	Falco sparverius	0.04	0.07	0.17	0.04	0.08	0.04	0.06	0.13	0.04	0.07
(Falcons)		Family Subtotal:	0.04	0.07	0.17	0.04	0.08	0.04	0.06	0.13	0.04	0.07
		Total:	11.44	10.51	19.80	10.14	12.98	1.00	1.00	1.00	0.99	1.00
		Standard Error:	1.01	1.02	2.41	1.68	0.85			-		

Table B-4. Use of each species and family observed at each point during the large bird use surveys in the proposed Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021–February 2022

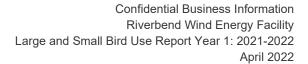
Family		ach species and family o		Use by P			ne laig	C Dila c	JJC JUI V	C 7 3 111 11	ne prop	osca k	IVCIDCII	- Willia	Lileigy	TTOJCC	i dica, i	Jannac	Coom	, , , , , , , , , , , , , , , , , , ,	gan, m	arch 20	21 100	ioury 2	<i>,</i>		
(Description)	Common Name	Scientific Name	# Points	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	Canada Goose	Branta canadensis	20	0.50	1.83		3.58	0.17	2.25	0.08	0.92		6.75	1.92	0.83	3.58	0.90		0.25	0.25	0.33	0.17	0.25	0.17		0.67	0.73
Anatidae	Wood Duck	Aix sponsa	1					0.17																			
(Ducks, Geese, & Swans)	Mallard	Anas platyrhynchos	5					0.17								0.67	0.20		0.25		0.25						
,		Family Subtotal:	20	0.50	1.83		3.58	0.50	2.25	0.08	0.92		6.75	1.92	0.83	4.25	1.10		0.50	0.25	0.58	0.17	0.25	0.17		0.67	0.73
	Wild Turkey	Meleagris gallopavo	11	0.67	2.58	0.58	0.58		1.33			0.17			0.25	0.50				0.08						0.33	4.09
Phasianidae (Grouse & Allies)	Ring-necked Pheasant	Phasianus colchicus	7		0.17	0.17		0.33							0.08		0.20				0.08					0.17	
(0.0000 0.700)		Family Subtotal:	14	0.67	2.75	0.75	0.58	0.33	1.33			0.17			0.33	0.50	0.20			0.08	0.08					0.50	4.09
	Rock Pigeon	Columba livia	22	1.33	2.00	1.08	0.42	2.50	2.50	1.50	7.33	0.67	19.17	2.75	1.50	1.25	1.30	4.30	2.42	0.17	2.33	0.33	2.00	2.33		3.08	
Columbidae (Pigeons & Doves)	Mourning Dove	Zenaida macroura	24	2.50	4.50	1.58	3.17	7.17	3.50	8.08	4.58	1.25	4.92	4.33	10.33	6.33	2.00	3.90	8.67	3.08	3.67	3.42	4.33	5.25	4.08	7.08	6.18
(1.1900110 at 20100)		Family Subtotal:	24	3.83	6.50	2.67	3.58	9.67	6.00	9.58	11.92	1.92	24.08	7.08	11.83	7.58	3.30	8.20	11.08	3.25	6.00	3.75	6.33	7.58	4.08	10.17	6.18
Gruidae	Sandhill Crane	Antigone canadensis	8		0.83		1.92			0.17			3.50	0.08			0.20						0.17				0.73
(Cranes)		Family Subtotal:	8		0.83		1.92			0.17			3.50	0.08			0.20						0.17				0.73
Charadriidae	Killdeer	Charadrius vociferus	24	0.25	0.42	1.42	0.33	0.83	0.50	0.33	0.17	0.08	0.92	0.17	0.17	0.67	1.20	1.30	0.33	1.17	0.92	1.00	0.50	1.50	1.00	0.25	0.36
(Plovers)		Family Subtotal:	24	0.25	0.42	1.42	0.33	0.83	0.50	0.33	0.17	0.08	0.92	0.17	0.17	0.67	1.20	1.30	0.33	1.17	0.92	1.00	0.50	1.50	1.00	0.25	0.36
	Ring-billed Gull	Larus delawarensis	2	0.25																0.25							
Laridae (Gulls & Allies)	Herring Gull	Larus argentatus	5			0.25				0.08		0.17	0.33								0.17						
		Family Subtotal:	7	0.25		0.25				0.08		0.17	0.33							0.25	0.17						
	Great Blue Heron	Ardea herodias	9					0.17	0.08						0.08			0.10		0.08	0.08	0.08		0.08	0.08		
Ardeidae (Herons & Allies)	Green Heron	Butorides virescens	1					0.08																			
(1.10.0.10 00.7 0.100)		Family Subtotal:	9					0.25	0.08						0.08			0.10		0.08	0.08	0.08		0.08	0.08		
Cathartidae	Turkey Vulture	Cathartes aura	24	1.58	0.58	0.67	1.00	0.75	0.67	1.83	2.83	2.58	2.67	2.75	0.67	2.17	5.10	1.70	2.75	0.92	5.42	1.67	2.83	3.17	1.42	1.25	2.18
(Vultures)		Family Subtotal:	24	1.58	0.58	0.67	1.00	0.75	0.67	1.83	2.83	2.58	2.67	2.75	0.67	2.17	5.10	1.70	2.75	0.92	5.42	1.67	2.83	3.17	1.42	1.25	2.18
	Northern Harrier	Circus hudsonius	4		80.0					80.0	0.08								0.08								
	Sharp-shinned Hawk	Accipiter striatus	4				0.08					0.08		0.08		0.08											
Accipitridae	Cooper's Hawk	Accipiter cooperii	5							0.08	0.08	0.08					0.10									0.08	
(Hawks, Eagles, &	Bald Eagle	Haliaeetus leucocephalus	12	0.17						0.17	0.08		0.50	0.17		0.25		0.20	0.08		80.0		0.08	0.33		0.08	
Kites)	Red-tailed Hawk	Buteo jamaicensis	24	0.67	0.25	0.50	0.42	0.58	0.50	0.58	0.75	0.67	0.58	0.42	0.33	0.67	0.30	0.20	0.58	0.83	0.58	0.92	0.58	0.83	0.50	0.67	0.73
	Rough-legged Hawk	Buteo lagopus	6	0.08					0.08										0.08			0.08	0.08				0.09
		Family Subtotal:	24	0.92	0.33	0.50	0.50	0.58	0.58	0.92	1.00	0.83	1.08	0.67	0.33	1.00	0.40	0.40	0.83	0.83	0.67	1.00	0.75	1.17	0.50	0.83	0.82
Strigidae	Great Horned Owl	Bubo virginianus	1				0.08																				
(Owls)		Family Subtotal:	1				0.08																				
	Northern Flicker	Colaptes auratus	4					0.08									0.10			0.08		0.08					
Picidae (Woodpeckers)	Pileated Woodpecker	Dryocopus pileatus	1															0.10									
(modapodnom)		Family Subtotal:	5					0.08									0.10	0.10		0.08		0.08					
Falconidae	American Kestrel	Falco sparverius	12					0.08	0.17	0.08		0.17	0.08		0.17	0.33		0.10				0.17	0.17	0.25			0.18
(Falcons)		Family Subtotal:	12					0.08	0.17	0.08		0.17	0.08		0.17	0.33		0.10				0.17	0.17	0.25			0.18
			Total:	8.00	13.25	6.25	11.58	13.08	11.58	13.08	16.83	5.92	39.42	12.67	14.42	16.50	11.60	11.90	15.50	6.92	13.92	7.92	11.00	13.92	7.08	13.67	15.27
		Stan	dard Error:	1.31	2.41	1.67	4.65	3.46	4.52	3.06	5.05	1.40	9.77	3.23	2.98	4.62	3.27	2.79	5.89	1.71	3.05	1.64	2.38	4.00	1.88	3.01	4.14
		Specie	s Diversity:	10	10	8	10	13	10	12	9	10	10	9	10	11	11	9	10	10	11	10	10	9	5	10	9
		Family	y Diversity:	7	7	6	8	9	8	8	5	7	8	6	8	7	8	7	5	9	8	8	7	7	5	6	8

Table B-5. Frequency of occurrence of each species and family observed at each point during the large bird use surveys in the proposed Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021—February 2022

Family		0 1 117 11											Freq	uency by	Point Nu	mber										
(Description)	Common Name	Scientific Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	Canada Goose	Branta canadensis	0.17	0.25		0.17	0.08	0.17	0.08	0.17		0.33	0.17	0.17	0.33	0.10		0.08	0.08	0.17	0.08	0.08	0.08		0.25	0.09
Anatidae (Ducks, Geese, &	Wood Duck	Aix sponsa					0.08																			
Swans)	Mallard	Anas platyrhynchos					0.08								0.08	0.10		0.08		0.08						
		Family Subtotal:	0.17	0.25		0.17	0.25	0.17	0.08	0.17		0.33	0.17	0.17	0.33	0.20		0.17	0.08	0.17	0.08	0.08	0.08		0.25	0.09
Phasianidae	Wild Turkey	Meleagris gallopavo	0.17	0.33	0.25	0.08		0.25			0.08			0.08	0.17				0.08						0.17	0.18
(Grouse & Allies)	Ring-necked Pheasant	Phasianus colchicus		0.08	0.08		0.08							0.08		0.20				0.08					0.08	
		Family Subtotal:	0.17	0.42	0.33	0.08	0.08	0.25			0.08			0.17	0.17	0.20			0.08	0.08					0.17	0.18
Columbidae	Rock Pigeon	Columba livia	0.25	0.25	0.25	0.08	0.25	0.33	0.42	0.67	0.08	0.58	0.50	0.33	0.08	0.20	0.70	0.58	0.08	0.50	0.08	0.42	0.50		0.33	
(Pigeons & Doves)	Mourning Dove	Zenaida macroura	0.75	0.75	0.58	0.58	0.75	0.58	0.67	0.58	0.67	0.83	0.67	0.83	0.92	0.60	0.70	0.92	0.67	0.83	0.75	0.83	0.33	0.83	0.75	0.91
		Family Subtotal:	0.83	0.75	0.75	0.67	0.83	0.75	0.92	0.92	0.75	1.00	0.92	0.92	0.92	0.60	1.00	1.00	0.67	0.83	0.75	1.00	0.75	0.83	0.83	0.91
Gruidae	Sandhill Crane	Antigone canadensis		0.17		0.08			80.0			0.08	0.08			0.10						0.08				0.18
(Cranes)		Family Subtotal:		0.17		0.08			0.08			0.08	0.08			0.10						0.08				0.18
Charadriidae	Killdeer	Charadrius vociferus	0.17	0.25	0.33	0.08	0.25	0.25	0.25	0.17	0.08	0.42	0.17	0.17	0.17	0.60	0.30	0.25	0.42	0.33	0.42	0.33	0.58	0.42	0.25	0.27
(Plovers)		Family Subtotal:	0.17	0.25	0.33	0.08	0.25	0.25	0.25	0.17	0.08	0.42	0.17	0.17	0.17	0.60	0.30	0.25	0.42	0.33	0.42	0.33	0.58	0.42	0.25	0.27
Laridae	Ring-billed Gull	Larus delawarensis	0.08																0.08							
(Gulls & Allies)	Herring Gull	Larus argentatus			0.08				80.0		0.08	0.08								0.08						
		Family Subtotal:	0.08		0.08				0.08		0.08	0.08							0.08	0.08						
Ardeidae	Great Blue Heron	Ardea herodias					0.17	0.08						0.08			0.10		0.08	0.08	0.08		0.08	0.08		
(Herons & Allies)	Green Heron	Butorides virescens					0.08																			
		Family Subtotal:					0.25	0.08						0.08			0.10		0.08	0.08	0.08		0.08	0.08		
Cathartidae	Turkey Vulture	Cathartes aura	0.42	0.17	0.17	0.25	0.33	0.25	0.33	0.42	0.58	0.58	0.58	0.25	0.42	0.20	0.50	0.42	0.42	0.58	0.58	0.58	0.67	0.58	0.42	0.55
(Vultures)		Family Subtotal:	0.42	0.17	0.17	0.25	0.33	0.25	0.33	0.42	0.58	0.58	0.58	0.25	0.42	0.20	0.50	0.42	0.42	0.58	0.58	0.58	0.67	0.58	0.42	0.55
	Northern Harrier	Circus hudsonius		80.0					0.08	0.08								0.08								
	Sharp-shinned Hawk	Accipiter striatus				0.08					0.08		0.08		0.08											
Accipitridae	Cooper's Hawk	Accipiter cooperii							80.0	0.08	0.08					0.10									0.08	
(Hawks, Eagles, & Kites)	Bald Eagle	Haliaeetus leucocephalus	0.08						0.17	0.08		0.08	0.17		0.17		0.20	0.08		0.08		0.08	0.25		0.08	
KIIOSJ	Red-tailed Hawk	Buteo jamaicensis	0.42	0.25	0.50	0.33	0.58	0.42	0.58	0.58	0.50	0.50	0.25	0.33	0.25	0.30	0.20	0.58	0.58	0.42	0.75	0.42	0.42	0.42	0.42	0.55
	Rough-legged Hawk	Buteo lagopus	0.08					0.08										0.08			0.08	80.0				0.09
		Family Subtotal:	0.50	0.33	0.50		0.58	0.42	0.75	0.75	0.67	0.50	0.50	0.33	0.42	0.40	0.30	0.75	0.58	0.50	0.83	0.50	0.58	0.42	0.50	0.55
Strigidae	Great Horned Owl	Bubo virginianus				0.08																				
(Owls)		Family Subtotal:				0.08																				
Picidae	Northern Flicker	Colaptes auratus					0.08									0.10			0.08		0.08					
(Woodpeckers)	Pileated Woodpecker	Dryocopus pileatus															0.10									
		Family Subtotal:					0.08									0.10	0.10		0.08		0.08					
Falconidae	American Kestrel	Falco sparverius					0.08	0.17	0.08		0.17	0.08		0.17	0.08		0.10				0.17	0.08	0.25			0.18
(Falcons)		Family Subtotal:					0.08	0.17	0.08		0.17	0.08		0.17	0.08		0.10				0.17	0.08	0.25			0.18

Table B-6. Flight height characteristics of each species and family observed during the large bird use surveys in the proposed Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021—February 2022

							# (%) wit	hin Flight Height Ca	tegories		
Family (Description)	Common Name	Scientific Name	# Groups Flying	# Obs Flying	Flying Use	% Obs Flying	< 35 m (115 ft)	RSZ: 35 - 200 m (115 - 656 ft)	> 200 m (656 ft)	Use in RSZ	Frequency in RSZ
	Canada Goose	Branta canadensis	41	219	0.77	70.4	162 (74.0)	57 (26.0)	0 (0.0)	0.20	0.03
Anatidae	Wood Duck	Aix sponsa	1	2	0.01	100.0	2 (100.0)	0 (0.0)	0 (0.0)		
(Ducks, Geese, & Swans)	Mallard	Anas platyrhynchos	4	16	0.06	88.9	16 (100.0)	0 (0.0)	0 (0.0)		
3waris)		Family Subtotal:	46	237	0.84	71.6	180 (75.9)	57 (24.1)	0 (0.0)	0.20	0.03
DI	Wild Turkey	Meleagris gallopavo	1	1	< 0.01	0.8	1 (100.0)	0 (0.0)	0 (0.0)		
Phasianidae	Ring-necked Pheasant	Phasianus colchicus	0	0	0.00	0.0	O (-)	O (-)	0 (-)		
(Grouse & Allies)		Family Subtotal:	1	1	< 0.01	0.7	1 (100.0)	0 (0.0)	0 (0.0)		
Columbidae	Rock Pigeon	Columba livia	84	448	1.58	60.9	448 (100.0)	0 (0.0)	0 (0.0)		
(Pigeons &	Mourning Dove	Zenaida macroura	287	681	2.41	50.5	673 (98.8)	8 (1.2)	0 (0.0)	0.03	0.01
Doves)		Family Subtotal:	371	1129	3.99	54.1	1121 (99.3)	8 (0.7)	0 (0.0)	0.03	0.01
Gruidae	Sandhill Crane	Antigone canadensis	8	81	0.29	90.0	39 (48.1)	42 (51.9)	0 (0.0)	0.15	< 0.01
(Cranes)		Family Subtotal:	8	81	0.29	90.0	39 (48.1)	42 (51.9)	0 (0.0)	0.15	< 0.01
Charadriidae	Killdeer	Charadrius vociferus	102	137	0.48	74.5	134 (97.8)	2 (1.5)	1 (0.7)	0.01	< 0.01
(Plovers)		Family Subtotal:	102	137	0.48	74.5	134 (97.8)	2 (1.5)	1 (0.7)	0.01	< 0.01
	Ring-billed Gull	Larus delawarensis	2	6	0.02	100.0	6 (100.0)	0 (0.0)	0 (0.0)		
Laridae	Herring Gull	Larus argentatus	7	12	0.04	100.0	10 (83.3)	2 (16.7)	0 (0.0)	0.01	< 0.01
(Gulls & Allies)		Family Subtotal:	9	18	0.06	100.0	16 (88.9)	2 (11.1)	0 (0.0)	0.01	< 0.01
	Great Blue Heron	Ardea herodias	10	10	0.04	100.0	9 (90.0)	1 (10.0)	0 (0.0)	< 0.01	< 0.01
Ardeidae	Green Heron	Butorides virescens	1	1	< 0.01	100.0	1 (100.0)	0 (0.0)	0 (0.0)		
(Herons & Allies)		Family Subtotal:	11	11	0.04	100.0	10 (90.9)	1 (9.1)	0 (0.0)	< 0.01	< 0.01
Cathartidae	Turkey Vulture	Cathartes aura	332	554	1.96	96.5	187 (33.8)	389 (70.2)	26 (4.7)	1.37	0.34
(Vultures)		Family Subtotal:	332	554	1.96	96.5	187 (33.8)	389 (70.2)	26 (4.7)	1.37	0.34
,	Northern Harrier	Circus hudsonius	4	4	0.01	100.0	4 (100.0)	0 (0.0)	0 (0.0)		
	Sharp-shinned Hawk	Accipiter striatus	4	4	0.01	100.0	2 (50.0)	2 (50.0)	0 (0.0)	0.01	0.01
Accipitridae	Cooper's Hawk	Accipiter cooperii	4	4	0.01	80.0	1 (25.0)	3 (75.0)	0 (0.0)	0.01	0.01
(Hawks, Eagles, &	Bald Eagle	Haliaeetus leucocephalus	16	17	0.06	65.4	10 (58.8)	12 (70.6)	0 (0.0)	0.04	0.04
Kites)	Red-tailed Hawk	Buteo jamaicensis	104	107	0.38	66.0	74 (69.2)	33 (30.8)	2 (1.9)	0.12	0.10
	Rough-legged Hawk	Buteo lagopus	4	4	0.01	66.7	4 (100.0)	0 (0.0)	0 (0.0)		
		Family Subtotal:	136	140	0.49	67.6	95 (67.9)	50 (35.7)	2 (1.4)	0.18	0.15
Strigidae	Great Horned Owl	Bubo virginianus	1	1	< 0.01	100.0	1 (100.0)	0 (0.0)	0 (0.0)		
(Owls)		Family Subtotal:	1	1	< 0.01	100.0	1 (100.0)	0 (0.0)	0 (0.0)		
	Northern Flicker	Colaptes auratus	4	4	0.01	100.0	4 (100.0)	0 (0.0)	0 (0.0)		
Picidae	Pileated Woodpecker	Dryocopus pileatus	1	1	< 0.01	100.0	1 (100.0)	0 (0.0)	0 (0.0)		
(Woodpeckers)		Family Subtotal:	5	5	0.02	100.0	5 (100.0)	0 (0.0)	0 (0.0)		
Falconidae	American Kestrel	Falco sparverius	20	20	0.07	87.0	20 (100.0)	0 (0.0)	0 (0.0)		
(Falcons)		Family Subtotal:	20	20	0.07	87.0	20 (100.0)	0 (0.0)	0 (0.0)		
		Total	1042	2334	8.25	63.5	1809 (77.5)	551 (23.6)	29 (1.2)	1.95	0.44





Attachment C. Data tables of small birds from the large and small bird use study in the proposed Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021–February 2022.

Table C-1. Group counts, observation counts, and relative abundance, by season, for each species and family observed during the small bird use surveys in the Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021–February 2022

		Energy Project area	ı, sanıla	c Cou	nty, Mic	nigan, <i>i</i> v	narch 2	2021-FE	bruary								
			Sprir	ng: Mar–	May	Sumn	ner: Jun-	-Aug	Fal	l: Sep-No	v	Winte	er: Dec-	Feb	A	II Season	ıs
Family	Common Name	Scientific Name			Rel.			Rel.			Rel.			Rel.			Rel.
(Description)	Common Hame	Seremme Hame	# Groups	# Obs	Abund.	# Groups	# Obs	Abund.	# Groups	# Obs	Abund.	# Groups	# Obs	Abund.	# Groups	s # Obs	Abund.
					(%)			(%)			(%)			(%)			(%)
	Red-bellied Woodpecker	Melanerpes carolinus	0	0	0.0	1	1	0.1	2	2	0.1	2	2	0.1	5	5	0.1
Picidae	Downy Woodpecker	Dryobates pubescens	2	2	0.2	4	4	0.4	4	4	0.1	5	5	0.4	15	15	0.2
(Woodpeckers)		, ,				0	0		_	E		1	1				
(,,	Hairy Woodpecker	Dryobates villosus	0	0	0.0	0		0.0	5	5	0.2	'	•	0.1	6	6	0.1
		Family Subtotal:	2	2	0.2	5	5	0.5	11	11	0.3	8	8	0.6	26	26	0.4
	Eastern Kingbird	Tyrannus tyrannus	0	0	0.0	7	8	0.7	0	0	0.0	0	0	0.0	7	8	0.1
Tyrannidae	Eastern Wood-Pewee	Contopus virens	0	0	0.0	0	0	0.0	1	3	0.1	0	0	0.0	1	3	< 0.1
(Flycatchers)		·				7											
		Family Subtotal:	0	0	0.0	/	8	0.7	1	3	0.1	0	0	0.0	8	11	0.2
Vireonidae	Red-eyed Vireo	Vireo olivaceus	0	0	0.0	1	1	0.1	0	0	0.0	0	0	0.0	1	1	< 0.1
(Vireos)		Family Subtotal:	0	0	0.0	1	1	0.1	0	0	0.0	0	0	0.0	1	1	< 0.1
Laniidae	Northern Shrike	Lanius borealis	0	0	0.0	0	0	0.0	0	0	0.0	1	1	0.1	1	1	< 0.1
(Shrikes)						0			0				•		,	1	
(,		Family Subtotal:	0	0	0.0	U	0	0.0	-	0	0.0	1	1	0.1	1		< 0.1
Corvidae	Blue Jay	Cyanocitta cristata	10	11	0.9	6	6	0.6	41	46	1.4	22	30	2.2	79	93	1.3
(Crows & Allies)		Family Subtotal:	10	11	0.9	6	6	0.6	41	46	1.4	22	30	2.2	79	93	1.3
Paridae	Black-capped Chickadee	Poecile atricapillus	1	2	0.2	0	0	0.0	2	4	0.1	1	2	0.1	4	8	0.1
(Chickadees &	Black capped chickage	·	•														
Titmice)		Family Subtotal:	1	2	0.2	0	0	0.0	2	4	0.1	1	2	0.1	4	8	0.1
Alaudidae	Horned Lark	Eremophila alpestris	34	53	4.4	22	28	2.6	52	108	3.3	37	76	5.5	145	265	3.8
(Larks)		Family Subtotal:	34	53	4.4	22	28	2.6	52	108	3.3	37	76	5.5	145	265	3.8
	Tree Swallow	Tachycineta bicolor	3	4	0.3	4	10	0.9	2	3	0.1	0	0	0.0	9	17	0.2
Hirundinidae		,															
(Swallows)	Barn Swallow	Hirundo rustica	30	50	4.2	114	177	16.5	2	11	0.3	0	0	0.0	146	238	3.4
		Family Subtotal:	33	54	4.5	118	187	17.5	4	14	0.4	0	0	0.0	155	255	3.7
	Golden-crowned Kinglet	Regulus satrapa	0	0	0.0	0	0	0.0	4	12	0.4	0	0	0.0	4	12	0.2
Regulidae	_		0	0	0.0	0	0	0.0	1	3	0.1	0	0	0.0	1	3	< 0.1
(Kinglets)	Ruby-crowned Kinglet	Corthylio calendula	U	U	0.0	U	U	0.0	'	3	0.1	U	U	0.0	'	3	< 0.1
		Family Subtotal:	0	0	0.0	0	0	0.0	5	15	0.5	0	0	0.0	5	15	0.2
Sittidae	White-breasted Nuthatch	Sitta carolinensis	0	0	0.0	0	0	0.0	0	0	0.0	2	2	0.1	2	2	< 0.1
(Nuthatches)		Family Subtotal:	0	0	0.0	0	0	0.0	0	0	0.0	2	2	0.1	2	2	< 0.1
	5 F	•													1		
Mimidae	Brown Thrasher	Toxostoma rufum	1	1	0.1	2	2	0.2	0	0	0.0	0	0	0.0	3	3	< 0.1
(Thrashers & Allies)		Family Subtotal:	1	1	0.1	2	2	0.2	0	0	0.0	0	0	0.0	3	3	< 0.1
Sturnidae	European Starling	Sturnus vulgaris	39	484	40.6	0	0	0.0	105	2772	85.3	45	1068	77.1	189	4324	62.7
(Starlings)	·	Family Subtotal:	39	484	40.6	0	0	0.0	105	2772	85.3	45	1068	77.1	189	4324	62.7
, ,,		· · · · · · · · · · · · · · · · · · ·				-											
Turdidaa	Eastern Bluebird	Sialia sialis	0	0	0.0	0	0	0.0	1	4	0.1	0	0	0.0	1	4	0.1
Turdidae (Thrushes)	American Robin	Turdus migratorius	126	214	17.9	100	123	11.5	12	25	8.0	0	0	0.0	238	362	5.2
(1111031103)		Family Subtotal:	126	214	17.9	100	123	11.5	13	29	0.9	0	0	0.0	239	366	5.3
	Illanias Caramani					1	1		7	21		1			9		
Passeridae	House Sparrow	Passer domesticus	0	0	0.0	Į.	ı	0.1	/	31	1.0	ı	4	0.3	9	36	0.5
(Old World Sparrows)		Family Subtotal:	0	0	0.0	1	1	0.1	7	31	1.0	1	4	0.3	9	36	0.5
	House Finch	Haemorhous mexicanus	2	3	0.3	0	0	0.0	0	0	0.0	0	0	0.0	2	3	< 0.1
Fringillidae	American Goldfinch	Spinus tristis	5	8	0.7	28	38	3.6	10	18	0.6	0	0	0.0	43	64	0.9
(Finches)		·															
		Family Subtotal:	7	11	0.9	28	38	3.6	10	18	0.6	0	0	0.0	45	67	1.0
Calcariidae	Snow Bunting	Plectrophenax nivalis	0	0	0.0	0	0	0.0	2	16	0.5	1	19	1.4	3	35	0.5
(Longspurs & Allies)		Family Subtotal:	0	0	0.0	0	0	0.0	2	16	0.5	1	19	1.4	3	35	0.5
	Grasshopper Sparrow	Ammodramus savannarum	0	0	0.0	0	0	0.0	1	2	0.1	0	0	0.0	1	2	< 0.1
															· ·	_	
	Chipping Sparrow	Spizella passerina	1	1	0.1	0	0	0.0	0	0	0.0	0	0	0.0	1	I	< 0.1
	Field Sparrow	Spizella pusilla	11	18	1.5	19	24	2.2	7	13	0.4	0				55	0.8
	American Tree Sparrow	Spizelloides arborea	0	0									0	0.0	37		
Passerellidae	·			U	0.0	0	0	0.0	4	12	0.4	45	0 93	0.0 6.7	37 49	105	1.5
(Sparrows & Allies)	Dark avad lunca	lunco hyemalis	0									45	93	6.7	49		
	Dark-eyed Junco	Junco hyemalis	0	0	0.0	0	0	0.0	10	25	0.8	45 22	93 78	6.7 5.6	49 32	103	1.5
	Dark-eyed Junco White-crowned Sparrow	Junco hyemalis Zonotrichia leucophrys	0									45	93	6.7	49		
	,	,		0	0.0	0	0	0.0	10	25	0.8	45 22	93 78	6.7 5.6	49 32	103	1.5
	White-crowned Sparrow	Zonotrichia leucophrys	0	0	0.0	0	0	0.0	10 2	25 4	0.8 0.1	45 22 0	93 78 0	6.7 5.6 0.0	49 32 2	103 4	1.5 0.1
	White-crowned Sparrow Savannah Sparrow	Zonotrichia leucophrys Passerculus sandwichensis Melospiza melodia	0 0	0 0 0	0.0 0.0 0.0 0.0	0 0 2 3	0 0 2 3	0.0 0.0 0.2 0.3	10 2 0 0	25 4 0 0	0.8 0.1 0.0 0.0	45 22 0 0	93 78 0 0	6.7 5.6 0.0 0.0 0.0	49 32 2 2 3	103 4 2 3	1.5 0.1 < 0.1 < 0.1
	White-crowned Sparrow Savannah Sparrow Song Sparrow	Zonotrichia leucophrys Passerculus sandwichensis Melospiza melodia Family Subtotal:	0 0 0 12	0 0 0 0	0.0 0.0 0.0 0.0 1.6	0 0 2 3 <b>24</b>	0 0 2 3 <b>29</b>	0.0 0.0 0.2 0.3 <b>2.7</b>	10 2 0 0	25 4 0 0 56	0.8 0.1 0.0 0.0 1.7	45 22 0 0 0 0	93 78 0 0 0 171	6.7 5.6 0.0 0.0 0.0 12.3	49 32 2 2 2 3 127	103 4 2 3 <b>275</b>	1.5 0.1 < 0.1 < 0.1 <b>4.0</b>
	White-crowned Sparrow Savannah Sparrow	Zonotrichia leucophrys Passerculus sandwichensis Melospiza melodia	0 0	0 0 0	0.0 0.0 0.0 0.0	0 0 2 3	0 0 2 3	0.0 0.0 0.2 0.3	10 2 0 0	25 4 0 0	0.8 0.1 0.0 0.0	45 22 0 0	93 78 0 0	6.7 5.6 0.0 0.0 0.0	49 32 2 2 3	103 4 2 3	1.5 0.1 < 0.1 < 0.1
	White-crowned Sparrow Savannah Sparrow Song Sparrow	Zonotrichia leucophrys Passerculus sandwichensis Melospiza melodia Family Subtotal:	0 0 0 12	0 0 0 0	0.0 0.0 0.0 0.0 1.6	0 0 2 3 <b>24</b>	0 0 2 3 <b>29</b>	0.0 0.0 0.2 0.3 <b>2.7</b>	10 2 0 0	25 4 0 0 56	0.8 0.1 0.0 0.0 1.7	45 22 0 0 0 0	93 78 0 0 0 171	6.7 5.6 0.0 0.0 0.0 12.3	49 32 2 2 2 3 127	103 4 2 3 <b>275</b>	1.5 0.1 < 0.1 < 0.1 <b>4.0</b>
lotaridos	White-crowned Sparrow Savannah Sparrow Song Sparrow  Eastern Meadowlark Baltimore Oriole	Zonotrichia leucophrys Passerculus sandwichensis Melospiza melodia Family Subtotal: Sturnella magna Icterus galbula	0 0 0 12 0	0 0 0 0 0 19 0 2	0.0 0.0 0.0 0.0 1.6 0.0	0 0 2 3 <b>24</b> 2	0 0 2 3 <b>29</b> 2	0.0 0.0 0.2 0.3 <b>2.7</b> 0.2 0.0	10 2 0 0 <b>24</b> 0	25 4 0 0 <b>56</b> 0	0.8 0.1 0.0 0.0 1.7 0.0 0.0	45 22 0 0 0 0 <b>67</b> 0	93 78 0 0 0 171	6.7 5.6 0.0 0.0 0.0 12.3 0.0	49 32 2 2 3 127 2	103 4 2 3 <b>275</b> 2 2	1.5 0.1 < 0.1 < 0.1 <b>4.0</b> < 0.1 < 0.1
Icteridae (Blackbirds & Allies)	White-crowned Sparrow Savannah Sparrow Song Sparrow  Eastern Meadowlark Baltimore Oriole Red-winged Blackbird	Zonotrichia leucophrys Passerculus sandwichensis Melospiza melodia Family Subtotal: Sturnella magna Icterus galbula Agelaius phoeniceus	0 0 0 12 0 1 136	0 0 0 0 19 0 2 206	0.0 0.0 0.0 0.0 1.6 0.0 0.2 17.3	0 0 2 3 <b>24</b> 2 0	0 0 2 3 <b>29</b> 2 0 596	0.0 0.0 0.2 0.3 <b>2.7</b> 0.2 0.0 55.7	10 2 0 0 24	25 4 0 0 <b>56</b> 0 0	0.8 0.1 0.0 0.0 1.7 0.0 0.0 3.2	45 22 0 0 0 67 0 0	93 78 0 0 0 171 0 0	6.7 5.6 0.0 0.0 0.0 12.3 0.0 0.0	49 32 2 2 3 127 2 1 327	103 4 2 3 <b>275</b> 2 2 907	1.5 0.1 < 0.1 < 0.1 <b>4.0</b> < 0.1 < 0.1 13.1
Icteridae (Blackbirds & Allies)	White-crowned Sparrow Savannah Sparrow Song Sparrow  Eastern Meadowlark Baltimore Oriole Red-winged Blackbird Brown-headed Cowbird	Zonotrichia leucophrys Passerculus sandwichensis Melospiza melodia Family Subtotal: Sturnella magna Icterus galbula	0 0 0 12 0 1 136 22	0 0 0 0 0 19 0 2	0.0 0.0 0.0 0.0 1.6 0.0	0 0 2 3 <b>24</b> 2	0 0 2 3 <b>29</b> 2 0 596 25	0.0 0.0 0.2 0.3 <b>2.7</b> 0.2 0.0	10 2 0 0 <b>24</b> 0	25 4 0 0 56 0 0 105 6	0.8 0.1 0.0 0.0 1.7 0.0 0.0	45 22 0 0 0 0 <b>67</b> 0	93 78 0 0 0 171 0	6.7 5.6 0.0 0.0 0.0 12.3 0.0	49 32 2 2 3 127 2	103 4 2 3 <b>275</b> 2 2	1.5 0.1 < 0.1 < 0.1 4.0 < 0.1 < 0.1 13.1 1.5
	White-crowned Sparrow Savannah Sparrow Song Sparrow  Eastern Meadowlark Baltimore Oriole Red-winged Blackbird	Zonotrichia leucophrys Passerculus sandwichensis Melospiza melodia Family Subtotal: Sturnella magna Icterus galbula Agelaius phoeniceus	0 0 0 12 0 1 136	0 0 0 0 19 0 2 206	0.0 0.0 0.0 0.0 1.6 0.0 0.2 17.3	0 0 2 3 <b>24</b> 2 0	0 0 2 3 <b>29</b> 2 0 596	0.0 0.0 0.2 0.3 <b>2.7</b> 0.2 0.0 55.7	10 2 0 0 <b>24</b> 0	25 4 0 0 <b>56</b> 0 0	0.8 0.1 0.0 0.0 1.7 0.0 0.0 3.2	45 22 0 0 0 67 0 0	93 78 0 0 0 171 0 0	6.7 5.6 0.0 0.0 0.0 12.3 0.0 0.0	49 32 2 2 3 127 2 1 327	103 4 2 3 <b>275</b> 2 2 907	1.5 0.1 < 0.1 < 0.1 <b>4.0</b> < 0.1 < 0.1 13.1
	White-crowned Sparrow Savannah Sparrow Song Sparrow  Eastern Meadowlark Baltimore Oriole Red-winged Blackbird Brown-headed Cowbird	Zonotrichia leucophrys Passerculus sandwichensis Melospiza melodia Family Subtotal: Sturnella magna Icterus galbula Agelaius phoeniceus Molothrus ater	0 0 0 12 0 1 136 22	0 0 0 0 19 0 2 206 72	0.0 0.0 0.0 0.0 1.6 0.0 0.2 17.3 6.0	0 0 2 3 <b>24</b> 2 0 171 9	0 0 2 3 <b>29</b> 2 0 596 25	0.0 0.0 0.2 0.3 <b>2.7</b> 0.2 0.0 55.7 2.3	10 2 0 0 24 0 0 20 1	25 4 0 0 56 0 0 105 6	0.8 0.1 0.0 0.0 1.7 0.0 0.0 3.2 0.2	45 22 0 0 0 67 0 0	93 78 0 0 0 171 0 0 0	6.7 5.6 0.0 0.0 0.0 12.3 0.0 0.0 0.0	49 32 2 2 3 127 2 1 327 32	103 4 2 3 <b>275</b> 2 2 907 103	1.5 0.1 < 0.1 < 0.1 4.0 < 0.1 < 0.1 13.1 1.5
	White-crowned Sparrow Savannah Sparrow Song Sparrow  Eastern Meadowlark Baltimore Oriole Red-winged Blackbird Brown-headed Cowbird Common Grackle	Zonotrichia leucophrys Passerculus sandwichensis Melospiza melodia Family Subtotal: Sturnella magna Icterus galbula Agelaius phoeniceus Molothrus ater Quiscalus quiscula Family Subtotal:	0 0 0 12 0 1 136 22 17	0 0 0 0 19 0 2 206 72 46	0.0 0.0 0.0 0.0 1.6 0.0 0.2 17.3 6.0 3.9 27.3	0 0 2 3 <b>24</b> 2 0 171 9 4	0 0 2 3 29 2 0 596 25 12 635	0.0 0.0 0.2 0.3 2.7 0.2 0.0 55.7 2.3 1.1	10 2 0 0 24 0 0 20 1 1	25 4 0 0 56 0 0 105 6 8 119	0.8 0.1 0.0 0.0 1.7 0.0 0.0 3.2 0.2 0.2 3.7	45 22 0 0 0 67 0 0 0 0	93 78 0 0 171 0 0 0 0 0 0	6.7 5.6 0.0 0.0 0.0 12.3 0.0 0.0 0.0 0.0 0.0	49 32 2 2 3 127 2 1 327 32 22 384	103 4 2 3 <b>275</b> 2 2 907 103 66 <b>1080</b>	1.5 0.1 < 0.1 < 0.1 < 0.1 4.0 < 0.1 < 0.1 13.1 1.5 1.0
(Blackbirds & Allies)	White-crowned Sparrow Savannah Sparrow Song Sparrow  Eastern Meadowlark Baltimore Oriole Red-winged Blackbird Brown-headed Cowbird Common Grackle  Cape May Warbler	Zonotrichia leucophrys Passerculus sandwichensis Melospiza melodia Family Subtotal: Sturnella magna Icterus galbula Agelaius phoeniceus Molothrus ater Quiscalus quiscula Family Subtotal: Setophaga tigrina	0 0 0 12 0 1 136 22	0 0 0 0 19 0 2 206 72 46 326	0.0 0.0 0.0 0.0 1.6 0.0 0.2 17.3 6.0 3.9 27.3	0 0 2 3 24 2 0 171 9 4 186	0 0 2 3 <b>29</b> 2 0 596 25 12 <b>635</b>	0.0 0.0 0.2 0.3 2.7 0.2 0.0 55.7 2.3 1.1 59.3	10 2 0 0 24 0 0 20 1 1 22 1	25 4 0 0 <b>56</b> 0 0 105 6 8 <b>119</b>	0.8 0.1 0.0 0.0 1.7 0.0 0.0 3.2 0.2 0.2 0.1	45 22 0 0 0 67 0 0 0 0 0 0 0 0	93 78 0 0 0 171 0 0 0 0 0 0	6.7 5.6 0.0 0.0 0.0 12.3 0.0 0.0 0.0 0.0 0.0	49 32 2 2 3 127 2 1 327 32 22	103 4 2 3 275 2 2 907 103 66	1.5 0.1 < 0.1 < 0.1 4.0 < 0.1 < 0.1 13.1 1.5 1.0 15.7
(Blackbirds & Allies)  Parulidae	White-crowned Sparrow Savannah Sparrow Song Sparrow  Eastern Meadowlark Baltimore Oriole Red-winged Blackbird Brown-headed Cowbird Common Grackle	Zonotrichia leucophrys Passerculus sandwichensis Melospiza melodia Family Subtotal: Sturnella magna Icterus galbula Agelaius phoeniceus Molothrus ater Quiscalus quiscula Family Subtotal:	0 0 0 12 0 1 136 22 17	0 0 0 0 19 0 2 206 72 46	0.0 0.0 0.0 0.0 1.6 0.0 0.2 17.3 6.0 3.9 27.3	0 0 2 3 <b>24</b> 2 0 171 9 4	0 0 2 3 29 2 0 596 25 12 635	0.0 0.0 0.2 0.3 2.7 0.2 0.0 55.7 2.3 1.1	10 2 0 0 24 0 0 20 1 1	25 4 0 0 56 0 0 105 6 8 119	0.8 0.1 0.0 0.0 1.7 0.0 0.0 3.2 0.2 0.2 3.7	45 22 0 0 0 67 0 0 0 0	93 78 0 0 171 0 0 0 0 0 0	6.7 5.6 0.0 0.0 0.0 12.3 0.0 0.0 0.0 0.0 0.0	49 32 2 2 3 127 2 1 327 32 22 384	103 4 2 3 <b>275</b> 2 2 907 103 66 <b>1080</b>	1.5 0.1 < 0.1 < 0.1 < 0.1 4.0 < 0.1 < 0.1 13.1 1.5 1.0
(Blackbirds & Allies)	White-crowned Sparrow Savannah Sparrow Song Sparrow  Eastern Meadowlark Baltimore Oriole Red-winged Blackbird Brown-headed Cowbird Common Grackle  Cape May Warbler	Zonotrichia leucophrys Passerculus sandwichensis Melospiza melodia Family Subtotal: Sturnella magna Icterus galbula Agelaius phoeniceus Molothrus ater Quiscalus quiscula Family Subtotal: Setophaga tigrina	0 0 0 12 0 1 136 22 17	0 0 0 0 19 0 2 206 72 46 326	0.0 0.0 0.0 0.0 1.6 0.0 0.2 17.3 6.0 3.9 27.3	0 0 2 3 24 2 0 171 9 4 186	0 0 2 3 <b>29</b> 2 0 596 25 12 <b>635</b>	0.0 0.0 0.2 0.3 2.7 0.2 0.0 55.7 2.3 1.1 59.3	10 2 0 0 24 0 0 20 1 1 22 1	25 4 0 0 <b>56</b> 0 0 105 6 8 <b>119</b>	0.8 0.1 0.0 0.0 1.7 0.0 0.0 3.2 0.2 0.2 0.1	45 22 0 0 0 67 0 0 0 0 0 0 0 0	93 78 0 0 0 171 0 0 0 0 0 0	6.7 5.6 0.0 0.0 0.0 12.3 0.0 0.0 0.0 0.0 0.0	49 32 2 2 3 127 2 1 327 32 22 384	103 4 2 3 <b>275</b> 2 2 907 103 66 <b>1080</b>	1.5 0.1 < 0.1 < 0.1 4.0 < 0.1 < 0.1 13.1 1.5 1.0 15.7
(Blackbirds & Allies)  Parulidae	White-crowned Sparrow Savannah Sparrow Song Sparrow  Eastern Meadowlark Baltimore Oriole Red-winged Blackbird Brown-headed Cowbird Common Grackle  Cape May Warbler Yellow Warbler	Zonotrichia leucophrys Passerculus sandwichensis Melospiza melodia Family Subtotal: Sturnella magna Icterus galbula Agelaius phoeniceus Molothrus ater Quiscalus quiscula Family Subtotal: Setophaga tigrina	0 0 0 12 0 1 136 22 17 176 0	0 0 0 0 19 0 2 206 72 46 326 0	0.0 0.0 0.0 0.0 1.6 0.0 0.2 17.3 6.0 3.9 27.3	0 0 2 3 24 2 0 171 9 4 186 0	0 0 2 3 <b>29</b> 2 0 596 25 12 <b>635</b> 0	0.0 0.0 0.2 0.3 2.7 0.2 0.0 55.7 2.3 1.1 59.3	10 2 0 0 24 0 0 20 1 1 22 1 0 1	25 4 0 0 56 0 0 105 6 8 119 4	0.8 0.1 0.0 0.0 1.7 0.0 0.0 3.2 0.2 0.2 0.1 0.0	45 22 0 0 0 67 0 0 0 0 0 0 0 0 0	93 78 0 0 0 171 0 0 0 0 0 0 0	6.7 5.6 0.0 0.0 0.0 12.3 0.0 0.0 0.0 0.0 0.0 0.0	49 32 2 2 3 127 2 1 327 32 22 384 1 1	103 4 2 3 275 2 2 907 103 66 1080 4	1.5 0.1 < 0.1 < 0.1 4.0 < 0.1 < 0.1 13.1 1.5 1.0 15.7 0.1 < 0.1 < 0.1
(Blackbirds & Allies)  Parulidae	White-crowned Sparrow Savannah Sparrow Song Sparrow  Eastern Meadowlark Baltimore Oriole Red-winged Blackbird Brown-headed Cowbird Common Grackle  Cape May Warbler Yellow Warbler Unidentified Warbler	Zonotrichia leucophrys Passerculus sandwichensis Melospiza melodia Family Subtotal: Sturnella magna Icterus galbula Agelaius phoeniceus Molothrus ater Quiscalus quiscula Family Subtotal: Setophaga tigrina Setophaga petechia - Family Subtotal:	0 0 0 12 0 1 136 22 17 176 0 1	0 0 0 19 0 2 206 72 46 326 0 1 0	0.0 0.0 0.0 0.0 1.6 0.0 0.2 17.3 6.0 3.9 27.3 0.0 0.1	0 0 2 3 24 2 0 171 9 4 186 0 0	0 0 2 3 <b>29</b> 2 0 596 25 12 <b>635</b> 0 0	0.0 0.0 0.2 0.3 2.7 0.2 0.0 55.7 2.3 1.1 59.3 0.0 0.0	10 2 0 0 24 0 0 20 1 1 22 1 0 1 2 2	25 4 0 0 56 0 105 6 8 119 4 0 2	0.8 0.1 0.0 0.0 1.7 0.0 0.0 3.2 0.2 0.2 3.7 0.1 0.0 0.1 0.2	45 22 0 0 0 67 0 0 0 0 0 0	93 78 0 0 0 171 0 0 0 0 0 0 0 0 0 0	6.7 5.6 0.0 0.0 0.0 12.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	49 32 2 2 3 127 2 1 327 32 22 384 1 1 1 1 3	103 4 2 3 275 2 2 907 103 66 1080 4 1 2 7	1.5 0.1 < 0.1 < 0.1 4.0 < 0.1 < 0.1 13.1 1.5 1.0 15.7 0.1 < 0.1 < 0.1 0.1
(Blackbirds & Allies)  Parulidae	White-crowned Sparrow Savannah Sparrow Song Sparrow  Eastern Meadowlark Baltimore Oriole Red-winged Blackbird Brown-headed Cowbird Common Grackle  Cape May Warbler Yellow Warbler Unidentified Warbler  Scarlet Tanager	Zonotrichia leucophrys Passerculus sandwichensis Melospiza melodia Family Subtotal:  Sturnella magna Icterus galbula Agelaius phoeniceus Molothrus ater Quiscalus quiscula Family Subtotal:  Setophaga tigrina Setophaga petechia - Family Subtotal: Piranga olivacea	0 0 0 12 0 1 136 22 17 176 0 1 0	0 0 0 19 0 2 206 72 46 326 0 1 0 1	0.0 0.0 0.0 1.6 0.0 0.2 17.3 6.0 3.9 27.3 0.0 0.1 0.0	0 0 2 3 24 2 0 171 9 4 186 0 0 0	0 0 2 3 29 2 0 596 25 12 635 0 0	0.0 0.0 0.2 0.3 2.7 0.2 0.0 55.7 2.3 1.1 59.3 0.0 0.0 0.0 0.0	10 2 0 0 24 0 0 20 1 1 22 1 0 1 22	25 4 0 0 56 0 105 6 8 119 4 0 2 6	0.8 0.1 0.0 0.0 1.7 0.0 0.0 3.2 0.2 0.2 3.7 0.1 0.0 0.1 0.2	45 22 0 0 0 0 67 0 0 0 0 0 0 0 0 0 0 0 0	93 78 0 0 0 171 0 0 0 0 0 0 0 0 0 0	6.7 5.6 0.0 0.0 0.0 12.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	49 32 2 2 3 127 2 1 327 32 22 384 1 1 1 1 3	103 4 2 3 275 2 907 103 66 1080 4 1 2 7	1.5 0.1 < 0.1 < 0.1 4.0 < 0.1 < 0.1 13.1 1.5 1.0 15.7 0.1 < 0.1 < 0.1 < 0.1
(Blackbirds & Allies)  Parulidae (Wood-Warblers)	White-crowned Sparrow Savannah Sparrow Song Sparrow  Eastern Meadowlark Baltimore Oriole Red-winged Blackbird Brown-headed Cowbird Common Grackle  Cape May Warbler Yellow Warbler Unidentified Warbler	Zonotrichia leucophrys Passerculus sandwichensis Melospiza melodia Family Subtotal: Sturnella magna Icterus galbula Agelaius phoeniceus Molothrus ater Quiscalus quiscula Family Subtotal: Setophaga tigrina Setophaga petechia - Family Subtotal:	0 0 0 12 0 1 136 22 17 176 0 1	0 0 0 19 0 2 206 72 46 326 0 1 0	0.0 0.0 0.0 0.0 1.6 0.0 0.2 17.3 6.0 3.9 27.3 0.0 0.1	0 0 2 3 24 2 0 171 9 4 186 0 0	0 0 2 3 <b>29</b> 2 0 596 25 12 <b>635</b> 0 0	0.0 0.0 0.2 0.3 2.7 0.2 0.0 55.7 2.3 1.1 59.3 0.0 0.0	10 2 0 0 24 0 0 20 1 1 22 1 0 1 2 2	25 4 0 0 56 0 105 6 8 119 4 0 2	0.8 0.1 0.0 0.0 1.7 0.0 0.0 3.2 0.2 0.2 3.7 0.1 0.0 0.1 0.2	45 22 0 0 0 67 0 0 0 0 0 0	93 78 0 0 0 171 0 0 0 0 0 0 0 0 0 0	6.7 5.6 0.0 0.0 0.0 12.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	49 32 2 2 3 127 2 1 327 32 22 384 1 1 1 1 3	103 4 2 3 275 2 2 907 103 66 1080 4 1 2 7	1.5 0.1 < 0.1 < 0.1 4.0 < 0.1 < 0.1 13.1 1.5 1.0 15.7 0.1 < 0.1 < 0.1 0.1
(Blackbirds & Allies)  Parulidae (Wood-Warblers)  Cardinalidae	White-crowned Sparrow Savannah Sparrow Song Sparrow  Eastern Meadowlark Baltimore Oriole Red-winged Blackbird Brown-headed Cowbird Common Grackle  Cape May Warbler Yellow Warbler Unidentified Warbler  Scarlet Tanager	Zonotrichia leucophrys Passerculus sandwichensis Melospiza melodia Family Subtotal:  Sturnella magna Icterus galbula Agelaius phoeniceus Molothrus ater Quiscalus quiscula Family Subtotal:  Setophaga tigrina Setophaga petechia - Family Subtotal: Piranga olivacea	0 0 0 12 0 1 136 22 17 176 0 1 0	0 0 0 19 0 2 206 72 46 326 0 1 0 1	0.0 0.0 0.0 1.6 0.0 0.2 17.3 6.0 3.9 27.3 0.0 0.1 0.0	0 0 2 3 24 2 0 171 9 4 186 0 0 0	0 0 2 3 29 2 0 596 25 12 635 0 0	0.0 0.0 0.2 0.3 2.7 0.2 0.0 55.7 2.3 1.1 59.3 0.0 0.0 0.0 0.0	10 2 0 0 24 0 0 20 1 1 22 1 0 1 22	25 4 0 0 56 0 105 6 8 119 4 0 2 6	0.8 0.1 0.0 0.0 1.7 0.0 0.0 3.2 0.2 0.2 3.7 0.1 0.0 0.1 0.2	45 22 0 0 0 0 67 0 0 0 0 0 0 0 0 0 0 0 0	93 78 0 0 0 171 0 0 0 0 0 0 0 0 0 0	6.7 5.6 0.0 0.0 0.0 12.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	49 32 2 2 3 127 2 1 327 32 22 384 1 1 1 1 3	103 4 2 3 275 2 907 103 66 1080 4 1 2 7	1.5 0.1 < 0.1 < 0.1 4.0 < 0.1 < 0.1 13.1 1.5 1.0 15.7 0.1 < 0.1 < 0.1 < 0.1
(Blackbirds & Allies)  Parulidae (Wood-Warblers)	White-crowned Sparrow Savannah Sparrow Song Sparrow  Eastern Meadowlark Baltimore Oriole Red-winged Blackbird Brown-headed Cowbird Common Grackle  Cape May Warbler Yellow Warbler Unidentified Warbler  Scarlet Tanager Northern Cardinal Indigo Bunting	Zonotrichia leucophrys Passerculus sandwichensis Melospiza melodia Family Subtotal: Sturnella magna Icterus galbula Agelaius phoeniceus Molothrus ater Quiscalus quiscula Family Subtotal: Setophaga tigrina Setophaga petechia - Family Subtotal: Piranga olivacea Cardinalis cardinalis Passerina cyanea	0 0 0 12 0 1 136 22 17 176 0 1 0 1 10 1	0 0 0 0 19 0 2 206 72 46 326 0 1 0 1	0.0 0.0 0.0 0.0 1.6 0.0 0.2 17.3 6.0 3.9 27.3 0.0 0.1 0.0 0.1 1.0 0.2	0 0 2 3 24 2 0 171 9 4 186 0 0 0	0 0 2 3 29 2 0 596 25 12 635 0 0	0.0 0.0 0.2 0.3 2.7 0.2 0.0 55.7 2.3 1.1 59.3 0.0 0.0 0.0 0.0 0.1	10 2 0 0 24 0 0 20 1 1 22 1 0 1 2 2 0 0	25 4 0 0 56 0 105 6 8 119 4 0 2 6 0	0.8 0.1 0.0 0.0 1.7 0.0 0.0 3.2 0.2 0.2 3.7 0.1 0.0 0.1 0.2 0.0 0.1 0.0	45 22 0 0 0 67 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	93 78 0 0 0 171 0 0 0 0 0 0 0 0 0 0 0 0 0 0	6.7 5.6 0.0 0.0 0.0 12.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	49 32 2 2 3 127 2 1 327 32 22 384 1 1 1 3 1 22	103 4 2 3 275 2 907 103 66 1080 4 1 2 7	1.5 0.1 < 0.1 < 0.1 4.0 < 0.1 < 0.1 13.1 1.5 1.0 15.7 0.1 < 0.1 < 0.1 0.1 < 0.1 < 0.1
(Blackbirds & Allies)  Parulidae (Wood-Warblers)  Cardinalidae	White-crowned Sparrow Savannah Sparrow Song Sparrow  Eastern Meadowlark Baltimore Oriole Red-winged Blackbird Brown-headed Cowbird Common Grackle  Cape May Warbler Yellow Warbler Unidentified Warbler Scarlet Tanager Northern Cardinal	Zonotrichia leucophrys Passerculus sandwichensis Melospiza melodia Family Subtotal: Sturnella magna Icterus galbula Agelaius phoeniceus Molothrus ater Quiscalus quiscula Family Subtotal: Setophaga tigrina Setophaga petechia - Family Subtotal: Piranga olivacea Cardinalis cardinalis Passerina cyanea Spiza americana	0 0 0 12 0 1 136 22 17 176 0 1 0 1 10 1 0 0	0 0 0 0 19 0 2 206 72 46 326 0 1 0 1	0.0 0.0 0.0 0.0 1.6 0.0 0.2 17.3 6.0 3.9 27.3 0.0 0.1 0.0 0.1 1.0 0.2 0.0	0 0 2 3 24 2 0 171 9 4 186 0 0 0 0	0 0 2 3 <b>29</b> 2 0 596 25 12 <b>635</b> 0 0 0 <b>0</b>	0.0 0.0 0.2 0.3 2.7 0.2 0.0 55.7 2.3 1.1 59.3 0.0 0.0 0.0 0.0 0.1 0.1	10 2 0 0 24 0 0 20 1 1 22 1 0 2 2 0 0 0	25 4 0 0 56 0 105 6 8 119 4 0 2 6 0	0.8 0.1 0.0 0.0 1.7 0.0 0.0 3.2 0.2 0.2 3.7 0.1 0.0 0.1 0.2 0.0 0.1 0.0 0.0	45 22 0 0 0 67 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	93 78 0 0 0 171 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	6.7 5.6 0.0 0.0 0.0 12.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	49 32 2 2 3 127 2 1 327 32 22 384 1 1 1 22 2 1	103 4 2 3 275 2 2 907 103 66 1080 4 1 2 7 1 24 3 1	1.5 0.1 < 0.1 < 0.1 4.0 < 0.1 < 0.1 13.1 1.5 1.0 15.7 0.1 < 0.1 < 0.1 0.1 < 0.1 < 0.1 < 0.1
(Blackbirds & Allies)  Parulidae (Wood-Warblers)  Cardinalidae	White-crowned Sparrow Savannah Sparrow Song Sparrow  Eastern Meadowlark Baltimore Oriole Red-winged Blackbird Brown-headed Cowbird Common Grackle  Cape May Warbler Yellow Warbler Unidentified Warbler  Scarlet Tanager Northern Cardinal Indigo Bunting	Zonotrichia leucophrys Passerculus sandwichensis Melospiza melodia Family Subtotal: Sturnella magna Icterus galbula Agelaius phoeniceus Molothrus ater Quiscalus quiscula Family Subtotal: Setophaga tigrina Setophaga petechia - Family Subtotal: Piranga olivacea Cardinalis cardinalis Passerina cyanea	0 0 0 12 0 1 136 22 17 176 0 1 0 1 10 1	0 0 0 0 19 0 2 206 72 46 326 0 1 0 1	0.0 0.0 0.0 0.0 1.6 0.0 0.2 17.3 6.0 3.9 27.3 0.0 0.1 0.0 0.1 1.0 0.2	0 0 2 3 24 2 0 171 9 4 186 0 0 0	0 0 2 3 29 2 0 596 25 12 635 0 0 0	0.0 0.0 0.2 0.3 2.7 0.2 0.0 55.7 2.3 1.1 59.3 0.0 0.0 0.0 0.0 0.1	10 2 0 0 24 0 0 20 1 1 22 1 0 1 2 2 0 0	25 4 0 0 56 0 105 6 8 119 4 0 2 6 0	0.8 0.1 0.0 0.0 1.7 0.0 0.0 3.2 0.2 0.2 3.7 0.1 0.0 0.1 0.2 0.0 0.1 0.0	45 22 0 0 0 67 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	93 78 0 0 0 171 0 0 0 0 0 0 0 0 0 0 0 0 0 0	6.7 5.6 0.0 0.0 0.0 12.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	49 32 2 2 3 127 2 1 327 32 22 384 1 1 1 22 2	103 4 2 3 275 2 907 103 66 1080 4 1 2 7	1.5 0.1 < 0.1 < 0.1 4.0 < 0.1 < 0.1 13.1 1.5 1.0 15.7 0.1 < 0.1 < 0.1 0.1 < 0.1 < 0.1
(Blackbirds & Allies)  Parulidae (Wood-Warblers)  Cardinalidae	White-crowned Sparrow Savannah Sparrow Song Sparrow  Eastern Meadowlark Baltimore Oriole Red-winged Blackbird Brown-headed Cowbird Common Grackle  Cape May Warbler Yellow Warbler Unidentified Warbler  Scarlet Tanager Northern Cardinal Indigo Bunting	Zonotrichia leucophrys Passerculus sandwichensis Melospiza melodia Family Subtotal: Sturnella magna Icterus galbula Agelaius phoeniceus Molothrus ater Quiscalus quiscula Family Subtotal: Setophaga tigrina Setophaga petechia - Family Subtotal: Piranga olivacea Cardinalis cardinalis Passerina cyanea Spiza americana	0 0 0 12 0 1 136 22 17 176 0 1 0 1 10 1 0 0	0 0 0 0 19 0 2 206 72 46 326 0 1 0 1	0.0 0.0 0.0 0.0 1.6 0.0 0.2 17.3 6.0 3.9 27.3 0.0 0.1 0.0 0.1 1.0 0.2 0.0	0 0 2 3 24 2 0 171 9 4 186 0 0 0 0	0 0 2 3 <b>29</b> 2 0 596 25 12 <b>635</b> 0 0 0 <b>0</b>	0.0 0.0 0.2 0.3 2.7 0.2 0.0 55.7 2.3 1.1 59.3 0.0 0.0 0.0 0.0 0.1 0.1	10 2 0 0 24 0 0 20 1 1 22 1 0 2 2 0 0 0	25 4 0 0 56 0 105 6 8 119 4 0 2 6 0	0.8 0.1 0.0 0.0 1.7 0.0 0.0 3.2 0.2 0.2 3.7 0.1 0.0 0.1 0.2 0.0 0.1 0.0 0.0	45 22 0 0 0 67 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	93 78 0 0 0 171 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	6.7 5.6 0.0 0.0 0.0 12.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	49 32 2 2 3 127 2 1 327 32 22 384 1 1 1 22 2 1	103 4 2 3 275 2 2 907 103 66 1080 4 1 2 7 1 24 3 1	1.5 0.1 < 0.1 < 0.1 4.0 < 0.1 < 0.1 13.1 1.5 1.0 15.7 0.1 < 0.1 < 0.1 0.1 < 0.1 < 0.1 < 0.1

Table B-2. Complete list of small bird species observed in the Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021—February 2022

Common Name	Scientific Name	-	Incidental Observations Onl
		Family	incluental Observations On
Red-bellied Woodpecker	Melanerpes carolinus	Dieider	
Downy Woodpecker	Dryobates pubescens	Picidae	
Hairy Woodpecker	Dryobates villosus		
Eastern Kingbird	Tyrannus tyrannus	Tyrannidae	
Eastern Wood-Pewee	Contopus virens		
Red-eyed Vireo	Vireo olivaceus	Vireonidae	
Northern Shrike	Lanius borealis	Laniidae	
Blue Jay	Cyanocitta cristata	Corvidae	
American Crow	Corvus brachyrhynchos	00171440	*
Black-capped Chickadee	Poecile atricapillus	Paridae	
Horned Lark	Eremophila alpestris	Alaudidae	
Tree Swallow	Tachycineta bicolor	Hirundinidae	
Barn Swallow	Hirundo rustica	Hironamiade	
Golden-crowned Kinglet	Regulus satrapa	D II -l	
Ruby-crowned Kinglet	Corthylio calendula	Regulidae	
White-breasted Nuthatch	Sitta carolinensis	Sittidae	
Brown Thrasher	Toxostoma rufum	Mimidae	
European Starling	Sturnus vulgaris	Sturnidae	
Eastern Bluebird	Sialia sialis		
American Robin	Turdus migratorius	Turdidae	
House Sparrow	Passer domesticus	Passeridae	
House Finch	Haemorhous mexicanus	1 433011440	
American Goldfinch	Spinus tristis	Fringillidae	
Snow Bunting	Plectrophenax nivalis	Calcariidae	
Grasshopper Sparrow	Ammodramus savannarum	Calcallado	
Chipping Sparrow	Spizella passerina		
Field Sparrow	Spizella pusilla		
American Tree Sparrow	Spizelloides arborea	Passerellidae	
Dark-eyed Junco	Junco hyemalis		
White-crowned Sparrow	Zonotrichia leucophrys		
Savannah Sparrow	Passerculus sandwichensis		
Song Sparrow	Melospiza melodia		
Eastern Meadowlark	Sturnella magna		
Baltimore Oriole	Icterus galbula		
Red-winged Blackbird	Agelaius phoeniceus	Icteridae	
Brown-headed Cowbird	Molothrus ater		
Common Grackle	Quiscalus quiscula		
Cape May Warbler	Setophaga tigrina	Parulidae	
Yellow Warbler	Setophaga petechia		
Scarlet Tanager	Piranga olivacea		
Northern Cardinal	Cardinalis cardinalis	Complication	
Indigo Bunting	Passerina cyanea	Cardinalidae	
Dickcissel	Spiza americana		

Table C-3. Use and frequency of occurrence, by season, for each species and family observed during the small bird use surveys in the Riverbend Wind Energy
Project area, Sanilac County, Michigan, March 2021–February 2022

		Project area, Sanilac Co	Inty, MIC				2022			_		
Family (Description)	Common Name	Scientific Name				olot/survey)				Frequency		
(Description)			Spring	Summer	Fall	Winter	Total	Spring	Summer	Fall	Winter	Total
	Red-bellied Woodpecker	Melanerpes carolinus	0.00	0.01	0.03	0.03	0.02	0.00	0.01	0.03	0.01	0.01
Picidae	Downy Woodpecker	Dryobates pubescens	0.03	0.06	0.06	0.07	0.05	0.03	0.06	0.06	0.07	0.05
(Woodpeckers)	Hairy Woodpecker	Dryobates villosus	0.00	0.00	0.07	0.01	0.02	0.00	0.00	0.07	0.01	0.02
		Family Subtotal:	0.03	0.07	0.15	0.11	0.09	0.03	0.07	0.15	0.08	0.08
Tyrannidae	Eastern Kingbird	Tyrannus tyrannus	0.00	0.11	0.00	0.00	0.03	0.00	0.08	0.00	0.00	0.02
(Flycatchers)	Eastern Wood-Pewee	Contopus virens	0.00	0.00	0.04	0.00	0.01	0.00	0.00	0.01	0.00	< 0.01
		Family Subtotal:	0.00	0.11	0.04	0.00	0.04	0.00	0.08	0.01	0.00	0.02
Vireonidae	Red-eyed Vireo	Vireo olivaceus	0.00	0.01	0.00	0.00	< 0.01	0.00	0.01	0.00	0.00	< 0.01
(Vireos)		Family Subtotal:	0.00	0.01	0.00	0.00	< 0.01	0.00	0.01	0.00	0.00	< 0.01
Laniidae	Northern Shrike	Lanius borealis	0.00	0.00	0.00	0.01	< 0.01	0.00	0.00	0.00	0.01	< 0.01
(Shrikes)		Family Subtotal:	0.00	0.00	0.00	0.01	< 0.01	0.00	0.00	0.00	0.01	< 0.01
Corvidae	Blue Jay	Cyanocitta cristata	0.16	0.08	0.64	0.42	0.33	0.14	0.07	0.46	0.28	0.24
(Crows & Allies)		Family Subtotal:	0.16	0.08	0.64	0.42	0.33	0.14	0.07	0.46	0.28	0.24
Paridae	Black-capped Chickadee	Poecile atricapillus	0.03	0.00	0.06	0.03	0.03	0.01	0.00	0.03	0.01	0.01
(Chickadees & Titmice)		Family Subtotal:	0.03	0.00	0.06	0.03	0.03	0.01	0.00	0.03	0.01	0.01
Alaudidae	Horned Lark	Eremophila alpestris	0.76	0.39	1.50	1.06	0.93	0.34	0.25	0.58	0.31	0.37
(Larks)		Family Subtotal:	0.76	0.39	1.50	1.06	0.93	0.34	0.25	0.58	0.31	0.37
	Tree Swallow	Tachycineta bicolor	0.06	0.14	0.04	0.00	0.06	0.04	0.06	0.01	0.00	0.03
Hirundinidae (Swallows)	Barn Swallow	Hirundo rustica	0.71	2.46	0.15	0.00	0.83	0.21	0.64	0.03	0.00	0.22
V		Family Subtotal:	0.77	2.60	0.19	0.00	0.89	0.23	0.67	0.04	0.00	0.23
	Golden-crowned Kinglet	Regulus satrapa	0.00	0.00	0.17	0.00	0.04	0.00	0.00	0.06	0.00	0.01
Regulidae (Kinglets)	Ruby-crowned Kinglet	Corthylio calendula	0.00	0.00	0.04	0.00	0.01	0.00	0.00	0.01	0.00	< 0.01
(1191010)		Family Subtotal:	0.00	0.00	0.21	0.00	0.05	0.00	0.00	0.06	0.00	0.01
Sittidae	White-breasted Nuthatch	Sitta carolinensis	0.00	0.00	0.00	0.03	0.01	0.00	0.00	0.00	0.03	0.01
(Nuthatches)		Family Subtotal:	0.00	0.00	0.00	0.03	0.01	0.00	0.00	0.00	0.03	0.01
Mimidae	Brown Thrasher	Toxostoma rufum	0.01	0.03	0.00	0.00	0.01	0.01	0.03	0.00	0.00	0.01
(Thrashers & Allies)		Family Subtotal:	0.01	0.03	0.00	0.00	0.01	0.01	0.03	0.00	0.00	0.01
Sturnidae	European Starling	Sturnus vulgaris	6.91	0.00	38.50	14.83	15.12	0.41	0.00	0.61	0.38	0.35
(Starlings)		Family Subtotal:	6.91	0.00	38.50	14.83	15.12	0.41	0.00	0.61	0.38	0.35
	Eastern Bluebird	Sialia sialis	0.00	0.00	0.06	0.00	0.01	0.00	0.00	0.01	0.00	< 0.01
Turdidae	American Robin	Turdus migratorius	3.06	1.71	0.35	0.00	1.27	0.90	0.78	0.11	0.00	0.44
(Thrushes)		Family Subtotal:	3.06	1.71	0.40	0.00	1.28	0.90	0.78	0.13	0.00	0.45
Passeridae	House Sparrow	Passer domesticus	0.00	0.01	0.43	0.06	0.13	0.00	0.01	0.08	0.01	0.03
(Old World Sparrows)		Family Subtotal:	0.00	0.01	0.43	0.06	0.13	0.00	0.01	0.08	0.01	0.03
	House Finch	Haemorhous mexicanus	0.04	0.00	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.01
Fringillidae	American Goldfinch	Spinus tristis	0.11	0.53	0.25	0.00	0.22	0.07	0.29	0.14	0.00	0.13
(Finches)		Family Subtotal:	0.16	0.53	0.25	0.00	0.23	0.09	0.29	0.14	0.00	0.13
Calcariidae	Snow Bunting	Plectrophenax nivalis	0.00	0.00	0.22	0.26	0.12	0.00	0.00	0.03	0.01	0.01
(Longspurs & Allies)	onew berning	Family Subtotal:	0.00	0.00	0.22	0.26	0.12	0.00	0.00	0.03	0.01	0.01
	Grasshopper Sparrow	Ammodramus savannarum	0.00	0.00	0.03	0.00	0.01	0.00	0.00	0.01	0.00	< 0.01
	Chipping Sparrow	Spizella passerina	0.00	0.00	0.00	0.00	< 0.01	0.00	0.00	0.00	0.00	< 0.01
	Field Sparrow	Spizella pusilla	0.26	0.33	0.18	0.00	0.19	0.14	0.26	0.08	0.00	0.12
	American Tree Sparrow	Spizelloides arborea	0.00	0.00	0.17	1.29	0.17	0.00	0.00	0.06	0.47	0.12
Passerellidae	Dark-eyed Junco	Junco hyemalis	0.00	0.00	0.35	1.08	0.36	0.00	0.00	0.00	0.25	0.13
(Sparrows & Allies)	•	,		0.00								
	White-crowned Sparrow Savannah Sparrow	Zonotrichia leucophrys Passerculus sandwichensis	0.00	0.00	0.06	0.00	0.01	0.00	0.00	0.03	0.00	0.01
	·		0.00	0.03	0.00	0.00	0.01	0.00	0.03	0.00	0.00	0.01
	Song Sparrow	Melospiza melodia	0.00 <b>0.27</b>	0.04	0.00	2.38	0.01	0.00	0.04	0.00	0.60	0.01
	Eastern Meadowlark	Sturnella magna	0.27	0.40	0.00	0.00	0.98	0.00	0.33	0.26	0.00	< 0.01
		•	0.00	0.03								
	Baltimore Oriole	Icterus galbula			0.00	0.00	0.01	0.01	0.00	0.00	0.00	< 0.01
Icteridae (Blackbirds & Allies)	Red-winged Blackbird	Agelaius phoeniceus	2.94	8.28	1.46	0.00	3.17	0.69	0.89	0.17	0.00	0.43
(=.20.00.00 & / 11100)	Brown-headed Cowbird	Molothrus ater	1.03	0.35	0.08	0.00	0.36	0.23	0.10	0.01	0.00	0.08
	Common Grackle	Quiscalus quiscula	0.66	0.17	0.11	0.00	0.23	0.23	0.04	0.01	0.00	0.07
		Family Subtotal:	4.66	8.82	1.65	0.00	3.78	0.74	0.89	0.19	0.00	0.45
	Cape May Warbler	Setophaga tigrina	0.00	0.00	0.06	0.00	0.01	0.00	0.00	0.01	0.00	< 0.01
Parulidae (Wood-Warblers)	Yellow Warbler	Setophaga petechia	0.01	0.00	0.00	0.00	< 0.01	0.01	0.00	0.00	0.00	< 0.01
(vvoou-vvuibleis)	Unidentified Warbler	-	0.00	0.00	0.03	0.00	0.01	0.00	0.00	0.01	0.00	< 0.01
		Family Subtotal:	0.01	0.00	0.08	0.00	0.02	0.01	0.00	0.03	0.00	0.01
	Scarlet Tanager	Piranga olivacea	0.01	0.00	0.00	0.00	< 0.01	0.01	0.00	0.00	0.00	< 0.01
Cardinalidae	Northern Cardinal	Cardinalis cardinalis	0.17	0.07	0.03	0.07	80.0	0.11	0.07	0.03	0.07	0.07
(Cardinals & Allies)	Indigo Bunting	Passerina cyanea	0.03	0.01	0.00	0.00	0.01	0.01	0.01	0.00	0.00	0.01
	Dickcissel	Spiza americana	0.00	0.01	0.00	0.00	< 0.01	0.00	0.01	0.00	0.00	< 0.01
		Family Subtotal:	0.21	0.10	0.03	0.07	0.10	0.13	0.10	0.03	0.07	0.08
												1.00
		Total:	17.04	14.86	45.14	19.25	24.12	1.00	1.00	1.00	0.99	1.00

Table B-4. Use of each species and family observed at each point during the small bird use surveys in the proposed Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021—February 2022

	4. Use of each species and	d family observed at each	l l		Point Nu			,	6	поросс														,			
Family (Description)	Common Name	Scientific Name	# Points	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	Red-bellied Woodpecker	Melanerpes carolinus	4	Ė	0.17							•	10			10		10	10		0.08	- 17	20			0.08	0.09
Pioidao	Downy Woodpecker	Dryobates pubescens	8		0.33			0.08		0.08										0.08	0.00	0.08			0.17	0.17	0.27
Picidae (Woodpeckers)	Hairy Woodpecker	Dryobates villosus	6		0.00		0.08	0.00		0.00	0.08						0.09			0.08		0.08		0.08	0.17	0.17	0.27
	rially Woodpecker	Family Subtotal:	13		0.50		0.08	0.08		0.08	0.08						0.09			0.17	0.08	0.17		0.08	0.17	0.25	0.24
	Forton Kondolad	,					0.08			0.08	0.08						0.09			0.17	0.08		0.00	0.08	0.17	0.25	0.36
Tyrannidae	Eastern Kingbird	Tyrannus tyrannus	5		0.08			0.17														0.08	0.08				0.27
(Flycatchers)	Eastern Wood-Pewee	Contopus virens	1					0.25																			
		Family Subtotal:	5		0.08			0.42														0.08	0.08				0.27
Vireonidae	Red-eyed Vireo	Vireo olivaceus	1					80.0																			
(Vireos)		Family Subtotal:	1					0.08																			
Laniidae	Northern Shrike	Lanius borealis	1													80.0											
(Shrikes)		Family Subtotal:	1													0.08											
Corvidae	Blue Jay	Cyanocitta cristata	23	0.17	0.58	0.17	0.25	0.58	0.17	0.17	0.08	0.50		0.08	0.33	0.33	0.36	0.33	80.0	0.50	0.17	0.83	0.42	0.08	0.50	0.50	0.64
(Crows & Allies)		Family Subtotal:	23	0.17	0.58	0.17	0.25	0.58	0.17	0.17	0.08	0.50		0.08	0.33	0.33	0.36	0.33	0.08	0.50	0.17	0.83	0.42	0.08	0.50	0.50	0.64
Paridae	Black-capped Chickadee	Poecile atricapillus	4	0.17		0.17		0.17												0.17							
(Chickadees & Titmice)		Family Subtotal:	4	0.17		0.17		0.17												0.17							
A law saliadasa	Horned Lark	Eremophila alpestris	23	0.67	0.50	0.50	0.67	0.17	1.17	0.83	1.58	0.75	1.25	1.17	0.33		0.45	0.42	2.42	1.00	1.17	0.50	0.75	2.83	0.42	1.25	1.45
Alaudidae (Larks)	Homed Edik																										
(==)		Family Subtotal:	23	0.67	0.50	0.50	0.67	0.17	1.17	0.83	1.58	0.75	1.25	1.17	0.33		0.45	0.42	2.42	1.00	1.17	0.50	0.75	2.83	0.42	1.25	1.45
Hirundinidae	Tree Swallow	Tachycineta bicolor	6	١.		0.08							80.0							0.25	0.50				0.08		0.45
(Swallows)	Barn Swallow	Hirundo rustica	24	0.83	1.42	0.83	0.58	0.75	0.33	0.92	0.83	0.17	3.08	0.58	0.42	0.58	0.45	0.67	0.08	0.25	0.50	0.17	0.67	0.42	0.50	0.67	4.55
		Family Subtotal:	24	0.83	1.42	0.92	0.58	0.75	0.33	0.92	0.83	0.17	3.17	0.58	0.42	0.58	0.45	0.67	80.0	0.50	1.00	0.17	0.67	0.42	0.58	0.67	5.00
Regulidas	Golden-crowned Kinglet	Regulus satrapa	4	0.25				0.50	0.17							0.08											
Regulidae (Kinglets)	Ruby-crowned Kinglet	Corthylio calendula	1					0.25																			
,		Family Subtotal:	4	0.25				0.75	0.17							0.08											
Sittidae	White-breasted Nuthatch	Sitta carolinensis	2					0.08				0.08															
(Nuthatches)		Family Subtotal:	2					0.08				0.08															
Mimidao	Brown Thrasher	Toxostoma rufum	2							0.08																0.17	
Mimidae (Thrashers & Allies)	biowii iiilasiici		2							0.08																0.17	
	F Cl. F	Family Subtotal:		00.00	0.17	00.00	1.00	1400	10.77		17.50	10.40	00.50	0.00	05.00	1/05	1 / 00	10.50	4.50	10.75	0.00	44.00	5.50	05.77	10.17		5.00
Sturnidae (Starlings)	European Starling	Sturnus vulgaris	24	20.08	3.17	20.00	1.00	14.92		14.08	17.58		28.50	8.83	25.00	16.25	16.09	12.50	4.58	13.75	9.92	46.00		35.67		0.25	5.09
(Sidilings)		Family Subtotal:	24	20.08	3.17	20.00	1.00	14.92	13.67	14.08	17.58	10.42	28.50	8.83	25.00	16.25	16.09	12.50	4.58	13.75	9.92	46.00	5.58	35.67	19.17	0.25	5.09
Turdidae	Eastern Bluebird	Sialia sialis	1								0.33																
(Thrushes)	American Robin	Turdus migratorius	24	1.42	2.83	1.08	1.08	1.83	1.08	0.83	0.50	1.50	0.58	0.58	0.50	1.42	1.55	1.75	0.92	1.33	1.67	2.17	0.58	0.92	1.08	1.58	1.64
		Family Subtotal:	24	1.42	2.83	1.08	1.08	1.83	1.08	0.83	0.83	1.50	0.58	0.58	0.50	1.42	1.55	1.75	0.92	1.33	1.67	2.17	0.58	0.92	1.08	1.58	1.64
Passeridae	House Sparrow	Passer domesticus	6	0.08						0.08	0.58		1.58				0.36			0.33							
(Old World Sparrows)		Family Subtotal:	6	0.08						0.08	0.58		1.58				0.36			0.33							
	House Finch	Haemorhous mexicanus	2										0.08														0.18
Fringillidae	American Goldfinch	Spinus tristis	18	0.17	0.17			0.33	0.25	0.17	0.17			0.17	0.17	0.33	0.55	0.17	0.17	0.17	1.00	0.50		0.08		0.17	0.73
(Finches)		Family Subtotal:	19	0.17	0.17			0.33	0.25	0.17	0.17		0.08	0.17	0.17	0.33	0.55	0.17	0.17	0.17	1.00	0.50		0.08		0.17	0.91
Calcariidae	Snow Bunting	Plectrophenax nivalis	3		0.33																					1.00	1.73
(Longspurs & Allies)	Silow borning		3		0.33																						
( - 34	0	Family Subtotal:			0.33						0.17															1.00	1.73
	Grasshopper Sparrow	Ammodramus savannarum	1								0.17																
	Chipping Sparrow	Spizella passerina	1																	0.08							
	Field Sparrow	Spizella pusilla	20		0.25	0.17	0.17		0.25	0.08	0.42	0.17	0.17	80.0	80.0	0.08	0.09	0.42	0.33		0.67	0.17	0.25	0.42	0.08	0.25	
Passerellidae	American Tree Sparrow	Spizelloides arborea	20	0.08	80.0		0.58	0.42	0.50	0.33	0.67		0.17	0.08	0.17	80.0		0.75		0.75	1.50	0.83	0.50	0.50	0.25	0.33	0.18
(Sparrows & Allies)	Dark-eyed Junco	Junco hyemalis	16		0.17	0.58	0.58	0.25	0.50		0.92	0.42	0.42	0.25		0.67	0.64	0.42			0.67	1.17				0.50	0.55
•	White-crowned Sparrow	Zonotrichia leucophrys	2																						0.17		0.18
	Savannah Sparrow	Passerculus sandwichensis	2				0.08	0.08																			
	Song Sparrow	Melospiza melodia	3				0.08	80.0										0.08									
		Family Subtotal:	24	0.08	0.50	0.75	1.50	0.83	1.25	0.42	2.17	0.58	0.75	0.42	0.25	0.83	0.73	1.67	0.33	0.83	2.83	2.17	0.75	0.92	0.50	1.08	0.91
	Eastern Meadowlark	Sturnella magna	1								0.17																
	Baltimore Oriole	Icterus galbula	1 1																				0.17				
1.1.22				0.02	0.02	1 17	E 22	2.02	4.50	1 22	2 40	0.77	11.75	1 75	0.17	1.02	4 72	E 22	2.00	1 /7	2 40	1.02		2.50	1.02	1.00	1 10
Icteridae (Blackbirds & Allies)	Red-winged Blackbird	Agelaius phoeniceus	24	0.83	9.83	1.17	5.33	3.83	4.50	1.33	2.42	0.67	11.75	1.75	2.17	1.83	4.73	5.33	3.08	1.67	3.42	1.83	1.17	2.50	1.83	1.92	1.18
LOUGH CO OF THEODY	Brown-headed Cowbird	Molothrus ater	18	0.08	80.0	0.50	0.17	0.58	0.75	0.08	0.42	0.50	1.00	0.33	0.50		1.27			0.17	0.58		0.58	0.42	0.67		
	Common Grackle	Quiscalus quiscula	14					0.17	0.17	1.33		0.42	0.08			0.17	0.45			0.67		0.17	0.17	0.17	0.17	1.17	0.27
		Family Subtotal:	24	0.92	9.92	1.67	5.50	4.58	5.42	2.75	3.00	1.58	12.83	2.08	2.67	2.00	6.45	5.33	3.08	2.50	4.00	2.00	2.08	3.08	2.67	3.08	1.45
	Cape May Warbler	Setophaga tigrina	1																	0.33							
Parulidae	Yellow Warbler	Setophaga petechia	1																							80.0	
(Wood-Warblers)	Unidentified Warbler	-	1																							0.17	
		Family Subtotal:	2																	0.33						0.25	
	Scarlet Tanager	Piranga olivacea	1																								0.09
	Northern Cardinal	Cardinalis cardinalis	12	0.33	0.08	0.17	0.08	0.17				0.17			0.08		0.09	0.08		0.25		0.33			0.17		
Cardinalidae			2	3.33	5.00	3.17	5.00	J.17				J.17			0.00		3.07	0.08		J.2J		0.00			J.17		0.18
(Cardinals & Allies)	Indigo Bunting	Passerina cyanea	,													0.00		0.00									U.16
	Dickcissel	Spiza americana														0.08									•		
		Family Subtotal:	14	0.33	80.0	0.17	0.08	0.17				0.17			80.0	0.08	0.09	0.17		0.25		0.33			0.17		0.27
			Total:	25.17	20.08	25.42	10.75	25.75	23.50	20.42	26.92	15.75	48.75	13.92	29.75	22.00	27.18	23.00	11.67	21.83	21.83	54.92	10.92	44.08	25.25	10.25	19.73
		Stan	dard Error:	11.07	9.66	17.24	4.46	5.80	7.69	8.41	11.94	10.23	12.91	4.94	19.61	7.90	12.86	8.53	3.25	9.24	8.02	39.94	5.55	23.67	11.78	2.07	2.59
		Specie	Diversity:	13	16	12	14	22	13	14	16	12	13	11	11	13	14	13	8	18	13	15	12	12	14	16	19

Table B-5. Frequency of occurrence of each species and family observed at each point during the small bird use surveys in the proposed Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021–February 2022

			F	b D	- ! L NI																					
Family (Description)	Common Name	Scientific Name	rrequer 1	ncy by P	oint Num	iber 4		6	7	۰		10	11	12	12	14	15	14	17	10	10	20	21	22	23	24
( , . ,	Red-bellied Woodpecker	Melanerpes carolinus		0.08	3	4	5	•	7	8	9	10	11	12	13	14	15	16	17	0.08	19	20	21	22	0.08	0.09
Picidae	Downy Woodpecker	Dryobates pubescens		0.33			0.08		0.08										0.08	0.00	0.08			0.17	0.17	0.27
(Woodpeckers)	Hairy Woodpecker	Dryobates villosus				0.08				0.08						0.09			0.08		0.08		0.08			
	riany riscapsonsi	Family Subtotal:		0.33		0.08	0.08		0.08	0.08						0.09			0.17	0.08	0.17		0.08	0.17	0.25	0.36
	Eastern Kingbird	Tyrannus tyrannus		0.08			0.08														0.08	0.08				0.18
Tyrannidae	Eastern Wood-Pewee	Contopus virens					80.0																			
(Flycatchers)		Family Subtotal:		0.08			0.17														0.08	0.08				0.18
Vireonidae	Red-eyed Vireo	Vireo olivaceus					0.08																			
(Vireos)		Family Subtotal:					0.08																			
Laniidae	Northern Shrike	Lanius borealis													0.08											
(Shrikes)		Family Subtotal:													0.08											
Corvidae	Blue Jay	Cyanocitta cristata	0.17	0.50	0.17	0.17	0.33	0.17	0.17	0.08	0.33		80.0	0.33	0.33	0.27	0.25	0.08	0.42	80.0	0.33	0.25	0.08	0.50	0.33	0.27
(Crows & Allies)		Family Subtotal:	0.17	0.50	0.17	0.17	0.33	0.17	0.17	0.08	0.33		0.08	0.33	0.33	0.27	0.25	0.08	0.42	0.08	0.33	0.25	0.08	0.50	0.33	0.27
Paridae	Black-capped Chickadee	Poecile atricapillus	0.08		0.08		0.08												0.08							
(Chickadees & Titmice)		Family Subtotal:	0.08		0.08		0.08												0.08							
Alaudidae (Larks)	Horned Lark	Eremophila alpestris	0.25	0.25	0.33	0.25	80.0	0.42	0.42	0.50	0.25	0.58	0.67	0.17		0.36	0.25	0.75	0.25	0.50	0.42	0.50	0.58	0.25	0.50	0.36
(EURS)	T 0 "	Family Subtotal:	0.25	0.25	0.33	0.25	80.0	0.42	0.42	0.50	0.25	0.58	0.67	0.17		0.36	0.25	0.75	0.25	0.50	0.42	0.50	0.58	0.25	0.50	0.36
Hirundinidae	Tree Swallow	Tachycineta bicolor	٥٥٢	0.05	0.08	0.22	0.17	0.00	0.05	0.22	0.00	0.08	0.05	0.17	0.22	0.10	0.05	0.00	0.17	0.08	0.00	0.22	0.05	0.08	0.17	0.18
(Swallows)	Barn Swallow	Hirundo rustica	0.25	0.25	0.25	0.33	0.17	80.0	0.25	0.33	0.08	0.33	0.25	0.17	0.33	0.18	0.25	80.0	0.17	0.17	80.0	0.33	0.25	0.17	0.17	0.36
-	Golden-crowned Kinglet	Family Subtotal:	0.25	0.25	0.33	0.33	0.17	0.08	0.25	0.33	0.08	0.33	0.25	0.17	0.33	0.18	0.25	0.08	0.25	0.17	0.08	0.33	0.25	0.25	0.17	0.45
Regulidae	Ruby-crowned Kinglet	Regulus satrapa Corthylio calendula	0.06				0.08	0.06							0.06											
(Kinglets)	Roby-crowned kingler	Family Subtotal:	0.08				0.08	0.08							0.08											
Sittidae	White-breasted Nuthatch	Sitta carolinensis	0.00				0.08	0.00			0.08				0.06											
(Nuthatches)	Willia Biodaliod Normalem	Family Subtotal:					0.08				0.08															
Mimidae	Brown Thrasher	Toxostoma rufum					0.00		0.08		0.00														0.17	
(Thrashers & Allies)		Family Subtotal:							0.08																0.17	
Sturnidae	European Starling	Sturnus vulgaris	0.33	0.25	0.33	0.17	0.50	0.42	0.42	0.42	0.17	0.50	0.25	0.42	0.33	0.27	0.42	0.25	0.50	0.50	0.42	0.17	0.58	0.33	0.08	0.36
(Starlings)	, april of	Family Subtotal:	0.33	0.25	0.33	0.17	0.50	0.42	0.42	0.42	0.17	0.50	0.25	0.42	0.33	0.27	0.42	0.25	0.50	0.50	0.42	0.17	0.58	0.33	0.08	0.36
	Eastern Bluebird	Sialia sialis								0.08																
Turdidae (Thrushes)	American Robin	Turdus migratorius	0.50	0.50	0.42	0.42	0.58	0.42	0.42	0.42	0.50	0.25	0.25	0.42	0.50	0.45	0.50	0.42	0.50	0.42	0.50	0.33	0.42	0.58	0.50	0.45
(ITIIOSTIES)		Family Subtotal:	0.50	0.50	0.42	0.42	0.58	0.42	0.42	0.50	0.50	0.25	0.25	0.42	0.50	0.45	0.50	0.42	0.50	0.42	0.50	0.33	0.42	0.58	0.50	0.45
Passeridae	House Sparrow	Passer domesticus	0.08						80.0	0.08		0.25				0.09			0.08							
(Old World Sparrows)		Family Subtotal:	0.08						0.08	0.08		0.25				0.09			0.08							
Frie william	House Finch	Haemorhous mexicanus										80.0														0.09
Fringillidae (Finches)	American Goldfinch	Spinus tristis	0.08	80.0			0.25	0.17	80.0	0.08			80.0	80.0	0.25	0.18	0.08	0.08	0.17	0.50	0.33		80.0		0.08	0.36
		Family Subtotal:	0.08	80.0			0.25	0.17	80.0	0.08		0.08	80.0	80.0	0.25	0.18	0.08	0.08	0.17	0.50	0.33		80.0		0.08	0.36
Calcariidae	Snow Bunting	Plectrophenax nivalis		80.0																					0.08	0.09
(Longspurs & Allies)		Family Subtotal:		0.08																					0.08	0.09
	Grasshopper Sparrow	Ammodramus savannarum								0.08																
	Chipping Sparrow	Spizella passerina																	0.08							
	Field Sparrow	Spizella pusilla		0.17	80.0	0.08		0.17	0.08	0.08	0.08	0.17	80.0	80.0	0.08	0.09	0.25	0.17		0.42	0.17	0.17	0.25	0.08	0.17	
Passerellidae	American Tree Sparrow	Spizelloides arborea	0.08	80.0		0.17	0.17	0.25	0.17	0.08		80.0	80.0	80.0	0.08		0.25		0.17	0.33	0.17	0.17	0.25	0.08	0.25	0.18
(Sparrows & Allies)	Dark-eyed Junco	Junco hyemalis		80.0	0.17	0.17	80.0	80.0		0.17	0.17	80.0	80.0		0.17	0.18	0.08			0.17	0.17				0.17	0.18
	White-crowned Sparrow	Zonotrichia leucophrys																						0.08		0.09
	Savannah Sparrow	Passerculus sandwichensis				80.0	80.0																			
	Song Sparrow	Melospiza melodia				0.08	80.0										0.08									
		Family Subtotal:	0.08	0.33	0.25	0.58	0.33	0.42	0.25	0.25	0.25	0.33	0.25	0.17	0.33	0.27	0.58	0.17	0.25	0.75	0.33	0.33	0.50	0.25	0.50	0.36
	Eastern Meadowlark	Sturnella magna								0.08																
	Baltimore Oriole	Icterus galbula																				80.0				
Icteridae (Blackbirds & Allies)	Red-winged Blackbird	Agelaius phoeniceus	0.42	0.33	0.33	0.42	0.50	0.42	0.50	0.42	0.33	0.33	0.42	0.42	0.50	0.55	0.58	0.58	0.42	0.58	0.17	0.33	0.50	0.50	0.50	0.36
(blackbilds & Alles)	Brown-headed Cowbird	Molothrus ater	0.08	80.0	80.0	0.08	0.25	80.0	80.0	0.08	0.08	0.17	80.0	80.0		0.18			0.08	0.17		80.0	0.17	0.08		
	Common Grackle	Quiscalus quiscula					80.0	80.0	0.17		0.17	80.0			0.08	0.18			0.08		0.08	80.0	80.0	0.08	0.25	0.18
	Congliterity	Family Subtotal:	0.42	0.33	0.33	0.42	0.58	0.42	0.50	0.42	0.33	0.42	0.42	0.42	0.50	0.55	0.58	0.58	0.50	0.67	0.17	0.42	0.50	0.50	0.58	0.36
	Cape May Warbler	Setophaga tigrina																	0.08						0.00	
Parulidae (Wood-Warblers)	Yellow Warbler	Setophaga petechia																							80.0	
(Jou maibleis)	Unidentified Warbler	-																	0.00						0.08	
-	Condat T	Family Subtotal:																	0.08						0.17	0.00
	Scarlet Tanager	Piranga olivacea	0.05	0.00	0.00	0.00	0.17				0.17			0.00		0.00	0.00		0.05		0.17			0.17		0.09
Cardinalidae	Northern Cardinal	Cardinalis cardinalis	0.25	0.08	0.08	0.08	0.17				0.17			0.08		0.09	0.08		0.25		0.17			0.17		0.00
(Cardinals & Allies)	Indigo Bunting	Passerina cyanea													0.00		80.0									0.09
	Dickcissel	Spiza americana													0.08						6.1-					0.00
		Family Subtotal:	0.25	0.08	0.08	0.08	0.17				0.17			0.08	0.08	0.09	0.17		0.25		0.17			0.17		0.09

Table C-6. Flight height characteristics of each species and family observed during the small bird use surveys in the proposed Riverbend Wind Energy Project area, Sanilac County, Michigan, March 2021—February 2022

			icnigan, Ma	arch 2021-	February 2	1022	# (0/)!41-:	Flimbt Haimbt Oa			
Family (Description)	Common Name	Scientific Name	# Groups Flying	# Obs Flying	Flying Use	% Obs Flying	# (%) within < 35 m (115 ft)	Flight Height Ca RSZ: 35 - 200 m (115 - 656 ft)	_	Use in RSZ	Frequenc in RSZ
	Red-bellied Woodpecker	Melanerpes carolinus	5	5	0.02	100.0	5 (100.0)	0 (0.0)	0 (0.0)		
Picidae	Downy Woodpecker	Dryobates pubescens	15	15	0.05	100.0	15 (100.0)	0 (0.0)	0 (0.0)		
(Woodpeckers)	Hairy Woodpecker	Dryobates villosus	6	6	0.02	100.0	6 (100.0)	0 (0.0)	0 (0.0)		
		Family Subtotal:	26	26	0.09	100.0	26 (100.0)	0 (0.0)	0 (0.0)		
	Eastern Kingbird	Tyrannus tyrannus	4	4	0.01	50.0	4 (100.0)	0 (0.0)	0 (0.0)		
Tyrannidae (Flycatchers)	Eastern Wood-Pewee	Contopus virens	1	3	0.01	100.0	3 (100.0)	0 (0.0)	0 (0.0)		
(Hyculchels)		Family Subtotal:	5	7	0.02	63.6	7 (100.0)	0 (0.0)	0 (0.0)		
Vireonidae	Red-eyed Vireo	Vireo olivaceus	1	1	< 0.01	100.0	1 (100.0)	0 (0.0)	0 (0.0)		
(Vireos)		Family Subtotal:	1	1	< 0.01	100.0	1 (100.0)	0 (0.0)	0 (0.0)		
Laniidae	Northern Shrike	Lanius borealis	1	1	< 0.01	100.0	1 (100.0)	0 (0.0)	0 (0.0)		
(Shrikes)		Family Subtotal:	1	1	< 0.01	100.0	1 (100.0)	0 (0.0)	0 (0.0)		
Corvidae	Blue Jay	Cyanocitta cristata	75	88	0.31	94.6	88 (100.0)	0 (0.0)	0 (0.0)		
(Crows & Allies)		Family Subtotal:	75	88	0.31	94.6	88 (100.0)	0 (0.0)	0 (0.0)		
Paridae	Black-capped Chickadee	Poecile atricapillus	4	8	0.03	100.0	8 (100.0)	0 (0.0)	0 (0.0)		
Chickadees & Titmice)		Family Subtotal:	4	8	0.03	100.0	8 (100.0)	0 (0.0)	0 (0.0)		
Alaudidae	Horned Lark	Eremophila alpestris	125	242	0.85	91.3	242 (100.0)	0 (0.0)	0 (0.0)		
(Larks)		Family Subtotal:	125	242	0.85	91.3	242 (100.0)	0 (0.0)	0 (0.0)		
	Tree Swallow	Tachycineta bicolor	6	13	0.05	76.5	13 (100.0)	0 (0.0)	0 (0.0)		
Hirundinidae (Swallows)	Barn Swallow	Hirundo rustica	139	219	0.77	92.0	219 (100.0)	0 (0.0)	0 (0.0)		
		Family Subtotal:	145	232	0.81	91.0	232 (100.0)	0 (0.0)	0 (0.0)		
Dog Wales	Golden-crowned Kinglet	Regulus satrapa	4	12	0.04	100.0	12 (100.0)	0 (0.0)	0 (0.0)		
Regulidae (Kinglets)	Ruby-crowned Kinglet	Corthylio calendula	1	3	0.01	100.0	3 (100.0)	0 (0.0)	0 (0.0)		
(1.11.1910.13)		Family Subtotal:	5	15	0.05	100.0	15 (100.0)	0 (0.0)	0 (0.0)		
Sittidae	White-breasted Nuthatch	Sitta carolinensis	2	2	0.01	100.0	2 (100.0)	0 (0.0)	0 (0.0)		
(Nuthatches)		Family Subtotal:	2	2	0.01	100.0	2 (100.0)	0 (0.0)	0 (0.0)		
Mimidae	Brown Thrasher	Toxostoma rufum	2	2	0.01	66.7	2 (100.0)	0 (0.0)	0 (0.0)		
(Thrashers & Allies)		Family Subtotal:	2	2	0.01	66.7	2 (100.0)	0 (0.0)	0 (0.0)		
Sturnidae	European Starling	Sturnus vulgaris	148	3388	11.85	78.4	3388 (100.0)	0 (0.0)	0 (0.0)		
(Starlings)		Family Subtotal:	148	3388	11.85	78.4	3388 (100.0)	0 (0.0)	0 (0.0)		
Ŧ - P.I	Eastern Bluebird	Sialia sialis	1	4	0.01	100.0	4 (100.0)	0 (0.0)	0 (0.0)		
Turdidae (Thrushes)	American Robin	Turdus migratorius	181	268	0.94	74.0	266 (99.3)	2 (0.7)	0 (0.0)	0.01	< 0.01
(**************************************		Family Subtotal:	182	272	0.95	74.3	270 (99.3)	2 (0.7)	0 (0.0)	0.01	< 0.01
Passeridae	House Sparrow	Passer domesticus	9	36	0.13	100.0	36 (100.0)	0 (0.0)	0 (0.0)		
(Old World Sparrows)		Family Subtotal:	9	36	0.13	100.0	36 (100.0)	0 (0.0)	0 (0.0)		
Et a 200 de a	House Finch	Haemorhous mexicanus	2	3	0.01	100.0	3 (100.0)	0 (0.0)	0 (0.0)		
Fringillidae (Finches)	American Goldfinch	Spinus tristis	40	58	0.20	90.6	58 (100.0)	0 (0.0)	0 (0.0)		
(**************************************		Family Subtotal:	42	61	0.21	91.0	61 (100.0)	0 (0.0)	0 (0.0)		
Calcariidae	Snow Bunting	Plectrophenax nivalis	3	35	0.12	100.0	35 (100.0)	0 (0.0)	0 (0.0)		
(Longspurs & Allies)		Family Subtotal:	3	35	0.12	100.0	35 (100.0)	0 (0.0)	0 (0.0)		
	Grasshopper Sparrow	Ammodramus savannarum	1	2	0.01	100.0	2 (100.0)	0 (0.0)	0 (0.0)		
	Chipping Sparrow	Spizella passerina	1	1	< 0.01	100.0	1 (100.0)	0 (0.0)	0 (0.0)		
	Field Sparrow	Spizella pusilla	34	51	0.18	92.7	51 (100.0)	0 (0.0)	0 (0.0)		
	American Tree Sparrow	Spizelloides arborea	46	102	0.36	97.1	102 (100.0)	0 (0.0)	0 (0.0)		
Passerellidae (Sparrows & Allies)	Dark-eyed Junco	Junco hyemalis	30	96	0.34	93.2	96 (100.0)	0 (0.0)	0 (0.0)		
(-	White-crowned Sparrow	Zonotrichia leucophrys	2	4	0.01	100.0	4 (100.0)	0 (0.0)	0 (0.0)		
	Savannah Sparrow	Passerculus sandwichensis	2	2	0.01	100.0	2 (100.0)	0 (0.0)	0 (0.0)		
	Song Sparrow	Melospiza melodia	3	3	0.01	100.0	3 (100.0)	0 (0.0)	0 (0.0)		
		Family Subtotal:	119	261	0.91	94.9	261 (100.0)	0 (0.0)	0 (0.0)		
	Eastern Meadowlark	Sturnella magna	2	2	0.01	100.0	2 (100.0)	0 (0.0)	0 (0.0)		
	Baltimore Oriole	Icterus galbula	1	2	0.01	100.0	2 (100.0)	0 (0.0)	0 (0.0)		
Icteridae	Red-winged Blackbird	Agelaius phoeniceus	232	662	2.31	73.0	616 (93.1)	46 (6.9)	0 (0.0)	0.16	0.01
(Blackbirds & Allies)	Brown-headed Cowbird	Molothrus ater	22	65	0.23	63.1	65 (100.0)	0 (0.0)	0 (0.0)		
	Common Grackle	Quiscalus quiscula	11	37	0.13	56.1	37 (100.0)	0 (0.0)	0 (0.0)		
		Family Subtotal:		768	2.69	71.1	722 (94.0)	46 (6.0)	0 (0.0)	0.16	0.01
	Cape May Warbler	Setophaga tigrina	1	4	0.01	100.0	4 (100.0)	0 (0.0)	0 (0.0)		
Parulidae	Yellow Warbler	Setophaga petechia	1	1	< 0.01	100.0	1 (100.0)	0 (0.0)	0 (0.0)		
(Wood-Warblers)	Unidentified Warbler		1	2	0.01	100.0	2 (100.0)	0 (0.0)	0 (0.0)		
		Family Subtotal:	3	7	0.02	100.0	7 (100.0)	0 (0.0)	0 (0.0)		
	Scarlet Tanager	Piranga olivacea	1	1	< 0.01	100.0	1 (100.0)	0 (0.0)	0 (0.0)		
	Northern Cardinal	Cardinalis cardinalis	19	21	0.07	87.5	21 (100.0)	0 (0.0)	0 (0.0)		
Cardinalidae	Indigo Bunting	Passerina cyanea	2	3	0.07	100.0	3 (100.0)	0 (0.0)	0 (0.0)		
(C)		·			0.00	0.0					
(Cardinals & Allies)	Dickcissel	Spiza americana	()								
(Cardinais & Allies)	Dickcissel	Spiza americana  Family Subtotal:	0 <b>22</b>	0 <b>25</b>	0.09	86.2	0 (-) <b>25 (100.0)</b>	0 (-) <b>0 (0.0)</b>	0 (-) <b>0 (0.0)</b>		

# Report on Riverbend Wind Energy Facility

- Phase 2 Presence/Absence Bat Acoustic Survey

Sanilac County, Michigan

Report date: October 18, 2021

# Prepared by:



Sanders Environmental Inc.

322 Borealis Way Bellefonte, Pennsylvania 16823

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**Appendix A**: US Fish and Wildlife Service (USFWS) Range-Wide Indiana Bat Survey Guidelines (March 23, 2020)

**Appendix B:** Study Plan

**Appendix C:** Completed Datasheets and Location Photographs

**Appendix D:** Echolocation Call Review – Janet Tyburec

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# **1.0 Executive Summary**

Sanders Environmental, Inc. (Sanders) was contracted to perform an acoustic bat survey to determine the presence or probable absence of the federally endangered Indiana bat (*Myotis sodalis*) and the federally threatened northern long-eared bat (*Myotis septentrionalis*) for the Riverbend Wind Energy Facility (Project) located in Sanilac County, Michigan.

Forty-nine sites were surveyed at two acoustic detector locations for four nights each for total of eight detector nights per site and 392 detector nights for the Project. Collectively, the detectors recorded 226,548 files containing bat calls that were processed and analyzed. Bat calls were recorded every night of the survey.

Automated analysis determined statistical probable presence of the Indiana bat at one site (Site 5) and the northern long-eared bat at two sites (Sites 5 and 41). In response, a manual review of the files classified to the respective species identification was conducted on the site nights where the Maximum Likelihood Estimator determined presence. All such files were manually identified as non-myotis, no federal species presence was found by this survey.

#### 2.0 Introduction

The Project is in the early stages of development process of the Riverbend Wind Energy Facility. The Project is proposed within an approximately 45,721-acre (185 square kilometers [km²]) focus area (Figure 1). The Project area is a mostly agricultural land. Forest in the Project area is fragmented along drainage areas and small woodlots among active agriculture.

This survey was undertaken per the United States Fish and Wildlife Service (USFWS) recommendations to survey for presence of Indiana bats and northern long-eared bats for the proposed Project. This report summarizes an acoustic survey for bats conducted by Sanders at the proposed Riverbend Wind Energy Facility in June and July2021.

#### 3.0 Methods

Surveys followed the methods outlined and described in the US Fish and Wildlife Service (USFWS) Range-Wide Indiana Bat Survey Guidelines – Appendix A (March 23, 2020) (USFWS Guidelines).

A Phase I desktop analysis as described in the USFWS Guidelines of the Project was conducted using Google Earth and National Land Cover Database (NLCD). This habitat assessment determined 24.4 square kilometers (km²) of potential summer habitat were located within the Project boundary. An acoustic study plan (Appendix B) was submitted to and approved by the USFWS (6/22/2021, Jennifer Wong, USFWS Biologist, Ecological Services; email).

#### **Personnel:**

Elise Merrill, a qualified and USFWS permitted bat surveyor with more than nine years of acoustic work, was present at all site selections and detector deployments. Qualitative analysis was completed by Elise Merrill. A second opinion was completed by Janet Tyburec, a wildlife biologist with thirty years of experience recording bat echolocation, including work with all *Myotis* species in the eastern US.

#### **Level of Effort:**

For summer bat surveys, one area acoustic sampling site, which requires eight detector nights, is required for each 123.5 ac (0.5 km²) of potential bat habitat (USFWS 2020). Therefore, forty-nine area sites of acoustic effort were needed to sample the potential bat habitat of the Project (Figure 1). Each site consisted of eight successful detector nights for a total of 392 detector nights of sampling.

## **Detector Deployment:**

Detectors were deployed in locations considered to be most effective in detecting threatened and endangered species of bat<sup>1</sup>. Sampling sites were initially selected from aerial imagery and are marked as sampled in Figure 1. Some proposed detector sites submitted in the study plan to the agencies shifted greater than 656 feet (ft; 200 meters [m]) due to land access and the conditions found by biologists onsite (Figure 1; Appendix B).

<sup>&</sup>lt;sup>1</sup> A recommendation from USFWS protocol "(d) at least 49 feet (15 meters) from known or suitable roosts (e.g., trees/snags, buildings, bridges, bat houses, cave or mine portal entrances)" was interpreted not to include trees unless they are known roosts. Otherwise, detectors would have needed to be placed 49 feet from forest edges, which would have limited both detections and available detector placement locations.

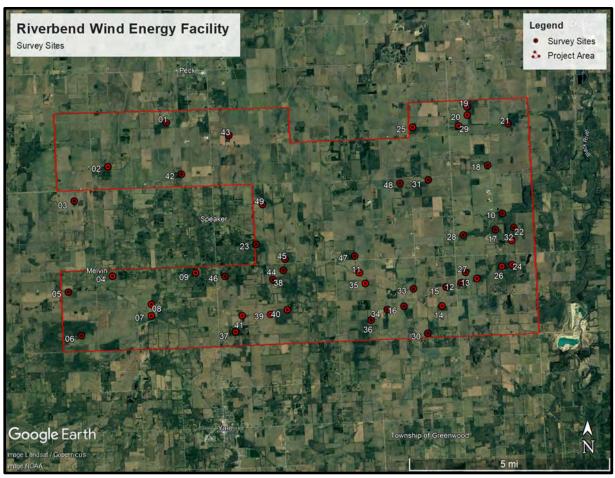


Figure 1: Presence/Absence acoustic bat survey locations within the Riverbend Project, Sanilac County, Michigan.

Detectors started recording 30 minutes prior to sunset and continued until 30 minutes after sunrise. Microphones were deployed at least 8.2 ft (2.5 m) above ground level and oriented approximately level with the ground's slope.

# **Equipment:**

A Wildlife Acoustics Song Meter SM4BAT FS recorder(detector) was deployed with an SMM-U2 cardioid microphone at each detector location. The detector settings for each deployment were set as follows:

Sampling Frequency: 384 kHz	Minimum Duration: 1.5ms	Trigger Level: 12db
High-Pass Filter: On	Maximum Duration: None	Trigger Window: 3 seconds
Input Gain: 12db	Trigger Frequency: 16kHz	Maximum Length: 5 seconds

All acoustic detectors were tested to ensure proper functioning by jingling keys or snapping fingers to elicit a response from the detector.

# **Kaleidoscope Pro Analysis:**

Files were recorded in full-spectrum, converted to zero-crossing, and analyzed by site by night with Kaleidoscope Pro (KPro). Files were processed using the USFWS approved KPro Bats of North America version 5.4.0 (classifier) at a neutral sensitivity setting (0 balanced).

Eight species of bats (Table 1) were considered by the classifier, the species were selected based on species ranges for the state of Michigan. To date, the current version of the Maximum Likelihood Estimator (MLE; the statistical methods used to confirm likely presence) has only been tested and approved for Indiana bats and northern long-eared bats by the US Geological Survey (USGS)<sup>2</sup>.

Table 1: Bat species used in the Kaleidoscope Pro analyses.

Common Bat Name	Scientific Bat Name	Species Code <sup>1</sup>
Big Brown Bat	Eptesicus fuscus	EPTFUS
Eastern Red Bat	Lasiurus borealis	LASBOR
Hoary Bat	Lasiurus cinereus	LASCIN
Silver-haired Bat	Lasionycteris noctivagans	LASNOC
Little Brown Bat	Myotis lucifugus	MYOLUC
Northern Long-eared Bat	Myotis septentrionalis	MYOSEP
Indiana Bat	Myotis sodalis	MYOSOD
Tri-colored Bat	Perimyotis subflavus	PERSUB

<sup>&</sup>lt;sup>1</sup> As output by Kaleidoscope Pro.

### **Qualitative Analysis:**

A qualitative, manual review was conducted on files used in the positive MLE determination for the Indiana bat and northern long-eared bat. This review was conducted by Elise Merrill as well as by an outside acoustic expert, Janet Tyburec of Bat Survey Solutions (BSS).

#### 4.0 Results

Forty-nine sites were surveyed with acoustic detectors at two locations for four nights each from June 25, 2021 through July 2, 2021 and July 19, 2021 through July 27, 2021.

<sup>&</sup>lt;sup>2</sup> The USGS has not tested and approved the current MLE for confirming the presence of any other bat species.

Photos of the detector deployment locations and datasheets for each detector can be found in Appendix C. Nights that did not meet the weather condition requirements described in the USFWS Guidelines were re-sampled and not included in the analysis.

# Kaleidoscope Pro Analysis Results

A total of 226,548 files containing calls (as determined by KPro) were recorded for the Project and analyzed by site by night. The bat species indicated as likely present by Kaleidoscope Pro Maximum Likelihood Estimator (MLE) can be found in Table 2. The KPro classifier results by site by night (files identified as containing calls that are then identified to species by the program) can be found in Table 3.

Table 2: Bat species indicated as likely present by the Kaleidoscope Pro (v5.4.0) Maximum Likelihood Estimator (MLE) at the Riverbend Facility, 2021.

Species	MLE Indicated Presence	Status	Sites Detected
Indiana Bat	Yes	Federally and State Endangered	5
Northern Long- eared Bat	Yes	Federally Threatened, Special Concern	5, 41
Little Brown Bat	Yes	Special Concern	3, 5-6, 11, 13-14, 18, 21-23, 25, 27-28, 34-36, 39, 42-43, 45-47
Tri-colored Bat	Yes	Special Concern	2
Big Brown Bat	Yes	None	1-49 (all sites)
Eastern Red Bat	Yes	None	1-49 (all sites)
Hoary Bat	Yes	None	1-49 (all sites)
Silver-haired Bat	Yes	None	13, 25, 38, 46, 48

Table 3: Bat species indicated as likely present by the Kaleidoscope Pro (v5.4.0) Maximum Likelihood Estimator (MLE) at the Riverbend Facility, 2021

	Esternious Estatistica (1722) at the first estatistical function of the first estatistics (1722) at the first estatistic function of the first estatistics (1722) at the first estatistic function of														
C:40	Nighta	Kaleidoscope Pro Maximum (v5.4.0) Likelihood Estimator Presence Results													
Site	Nights	EPTFUS	LASBOR	LASCIN	LASNOC	MYOLUC	MYOSEP	MYOSOD	PERSUB						
	1	0	0	0	1	1	1	1	1						
1	2	0	0	0	1	1	1	1	1						
1	3	0	0	0	1	1	1	1	1						
	4	0	0	0	1	1	1	1	1						
	1	0	0	0	1	1	1	1	1						
2	2	0	0	0	1	1	1	1	1						
	3	0	0	0	1	1	1	1	1						
	4	0	0	0	1	1	1	1	0.0000004						

G.1	NT: 14		Kaleidosco	pe Pro Maxii	mum (v5.4.0)	Likelihood Es	stimator Pres	ence Results	
Site	Nights	EPTFUS	LASBOR	LASCIN	LASNOC	MYOLUC	MYOSEP	MYOSOD	PERSUB
	1	0	0.3734819	0.3165475	1	0.0002091	1	1	1
3	2	0	0	0.0108888	1	0	1	1	1
3	3	0	0	0.0000722	1	0.0012659	1	1	1
	4	0	0	0	1	0.0000057	1	1	1
	1	0	0	0	1	1	1	1	1
4	2	0	0.0000345	0	1	1	1	1	1
4	3	0	0	0	1	1	1	1	1
	4	0	0	0	1	1	1	1	1
	1	0	0	1	1	1	0.0226446	0.8581439	1
5	2	0	0	1	1	0.0007453	1	1	1
5	3	0	0	0.0000004	1	1	0.0227984	0.7808627	1
	4	0	0	0	1	1	1	0.0002761	1
	1	0	0	1	1	0.0000005	1	1	1
6	2	0	0	1	1	0.0000266	1	1	1
6	3	0	0	0	1	0.0000001	1	1	1
	4	0	0	0	1	0.0009807	1	1	1
	1	0	0	1	1	1	1	1	1
7	2	0	0	0	1	1	1	1	1
_ ′	3	0	0	0.0739666	1	1	1	1	1
	4	0	0	0.0000019	1	1	1	1	1
	1	0	0	0	1	0.7733456	1	1	0.7644142
8	2	0	0	0.0000048	1	1	1	1	1
0	3	0	0	0	1	1	1	0.1357571	1
	4	0	0	0	1	1	1	1	1
	1	0	0	0	1	1	1	1	1
9	2	0	0	0.0000002	1	1	1	1	1
9	3	0	0	0.0136765	1	1	1	1	1
	4	0	0	0	1	1	1	1	1
	1	0	0	0	1	1	1	1	1
10	2	0	0	0	1	1	1	1	1
10	3	0	0	0	1	1	1	1	1
	4	0	0	0	1	1	1	1	1
	1	0	0	0	1	0	1	1	0.5346608
11	2	0	0	0.0003222	1	0.0863351	1	1	1
11	3	0	0	1	1	0.2232309	1	1	1
	4	0	0	0	1	0.0088152	1	1	1

Site	Nichta		Kaleidosco	pe Pro Maxii	mum (v5.4.0)	Likelihood Es	stimator Pres	ence Results	
Site	Nights	EPTFUS	LASBOR	LASCIN	LASNOC	MYOLUC	MYOSEP	MYOSOD	PERSUB
	1	0	0	1	1	1	1	1	1
10	2	0	0	0	0.8170616	1	1	1	1
12	3	0	0	0	1	1	1	1	1
	4	0	0	0	1	0.9063406	1	1	1
	1	0	0	0	1	0.002987	0.8605728	1	1
12	2	0	0	0	0.0002761	0.5288446	1	1	1
13	3	0	0	0	1	0.5874639	1	1	1
	4	0.0017205	0	0	1	1	1	0.4438592	1
	1	0	0	0	1	1	1	1	1
1.4	2	0	0	1	1	0.975469	1	1	1
14	3	0	0	0.1564383	0.8658579	0.0002781	1	1	1
	4	0	0	0	1	0.6730048	1	0.3316248	1
	1	0	0	0	1	1	1	1	1
15	2	0	0	0	1	1	1	1	1
13	3	0	0	1	1	1	1	1	1
	4	0	0	0	1	0.6749282	1	0.8534863	1
	1	0	0	0	1	1	1	1	1
16	2	0	0	0	1	0.3398449	0.2432294	0.8936275	1
10	3	0	0	0.062748	1	0.7021303	1	1	1
	4	0	0	1	1	0.0526938	1	1	1
	1	0	0	0	1	1	1	1	1
17	2	0	0	0	1	1	1	1	1
1 /	3	0	0	0	1	1	1	1	1
	4	0	0	0	1	1	1	1	1
	1	0	0	0	1	0	1	0.9579447	1
18	2	0	0	0	1	0	1	1	1
10	3	0	0	0	0.4056492	1	1	1	1
	4	0	0	0.000001	1	0.001725	1	1	1
	1	0	0	1	1	1	1	1	1
19	2	0	0	0	1	1	1	1	1
19	3	0.0088381	0	0	0.9716654	1	1	1	1
	4	0.0012565	0	0	1	1	1	1	1
	1	0	0	1	1	1	1	0.4401896	1
20	2	0	0	0	1	1	1	1	1
20	3	0.0224031	0	0	0.2867058	0.2192132	1	1	1
	4	0.000092	0	0	0.1035999	1	1	1	1

Site	Nighta		Kaleidosco	pe Pro Maxii	mum (v5.4.0)	Likelihood E	stimator Pres	ence Results	
Site	Nights	<b>EPTFUS</b>	LASBOR	LASCIN	LASNOC	MYOLUC	MYOSEP	MYOSOD	PERSUB
	1	0	0	0	1	0.3268565	1	1	1
21	2	0	0	1	1	0	1	1	1
21	3	0	0	0	1	1	1	1	1
	4	0	0	0.0302148	1	1	1	1	1
	1	0	0.0000586	1	1	1	1	1	0.4737634
22	2	0	0	0	1	1	1	1	1
22	3	0	0	0.0077497	1	1	1	1	1
	4	0	0	0.0115121	1	0.000715	1	1	1
	1	0	0	0	1	1	1	1	1
23	2	0	0	0	1	1	1	1	1
23	3	0	0	0.1741835	1	1	1	1	1
	4	0	0	0.0057918	1	0.010524	1	0.2441905	1
	1	0	0	0	1	1	0.1030495	1	1
24	2	0	0	0	1	0.162412	1	0.8006551	1
24	3	0	0	0	1	1	1	1	1
	4	1	0	0	0.9839413	1	1	1	1
	1	0	0	0	1	1	1	1	1
25	2	0	0	0	1	0.0000124	1	1	1
25	3	0	0	0	1	1	1	1	1
	4	0	0	0	0.0000005	0.1156167	1	1	1
	1	0	0	1	1	1	1	1	1
26	2	0	0	0.0000021	1	1	1	1	1
20	3	0	0	0	1	1	1	1	1
	4	0	0	0	0.4417326	1	1	1	1
	1	0	0	0	1	1	1	1	1
27	2	0	0	0.5517091	1	1	1	1	1
21	3	0	0	0	1	0.7472889	1	1	1
	4	0	0	0.1458939	1	0.0079647	1	1	1
	1	0	0	0	1	1	1	1	1
	2	0	0	0	1	0	1	1	1
28	3	0	0	0	1	0.7582967	1	1	1
	4	0	0	0	1	1	1	1	1
	5	0	0	0	1	0.4616495	1	1	1
	1	0	0	0	1	0.1940499	1	1	1
29	2	0	0	0	1	0.3610064	1	1	1
29	3	0	0	0	0.8993644	1	1	1	1
	4	0	0	0	0.1533223	1	1	1	1

Site	Ni abta		Kaleidosco	pe Pro Maxii	mum (v5.4.0)	Likelihood E	stimator Pres	ence Results	
Site	Nights	EPTFUS	LASBOR	LASCIN	LASNOC	MYOLUC	MYOSEP	MYOSOD	PERSUB
	1	0	0	0	1	1	1	1	1
30	2	0	0	0	1	0.1631207	1	1	1
30	3	0	0	0	1	1	1	1	1
	4	0	0	0	1	1	1	1	1
	1	0	0	0	1	1	1	1	1
31	2	0	0	0	1	1	1	1	1
31	3	0	0	0	1	1	1	1	1
	4	0	0	0	1	0.9959081	1	1	1
	1	0	0	0	1	1	1	1	1
32	2	0	0	0	1	1	1	1	1
32	3	0	0	0	1	1	1	1	1
	4	0.0219071	0	0	1	1	1	1	1
	1	0	0.0004576	0.5661794	1	1	1	1	1
33	2	0	0	0.0008066	1	1	1	1	1
33	3	0	0	1	1	0.7965726	1	1	1
	4	0	0	0.9998458	1	1	1	1	1
	1	0	0	0	1	1	1	1	1
34	2	0	0	0	1	0.7945288	1	1	1
34	3	0	0	0	1	1	1	1	1
	4	0	0	0	1	0	1	1	1
	1	0	0	0	1	0.9595692	1	1	1
35	2	0	0	0	1	1	1	1	1
33	3	0	0	0	1	1	1	1	1
	4	0	0	0	1	0.0144778	1	1	0.4099286
	1	0	0	0	1	1	1	1	1
36	2	0	0	0.0000046	1	0.0573362	1	1	1
30	3	0	0	1	1	1	1	1	1
	4	0	0	0.5943767	1	0.0047697	1	0.1750992	0.7741063
	1	0	0.0000094	0.0000003	1	0.949997	1	1	1
37	2	0	0	0	1	1	1	1	1
31	3	0	0	0	1	1	1	1	0.5279798
	4	0	0	0	1	1	1	1	1
	1	0	0	0	0	1	1	1	1
38	2	0	0	0	1	1	1	1	1
50	3	0	0	0.0060769	1	1	1	1	1
	4	0	0	0	1	1	1	1	1

Site	Nights	Kaleidoscope Pro Maximum (v5.4.0) Likelihood Estimator Presence Results											
Site		EPTFUS	LASBOR	LASCIN	LASNOC	MYOLUC	MYOSEP	MYOSOD	PERSUB				
39	1	0	0	0	1	1	1	1	1				
	2	0	0	0	1	1	1	1	1				
	3	0	0	0	1	1	1	1	1				
	4	0	0	0	1	0.0248716	1	1	0.2698203				
	1	0	0	0	1	1	1	1	1				
40	2	0	0	0	1	1	1	1	1				
40	3	0	0	0	1	1	1	1	1				
	4	0	0	0	1	1	1	1	1				
	1	0	0	0	1	0.4155146	0.8375359	1	1				
41	2	0	0	0.0999083	1	1	1	1	1				
41	3	0	0	0	1	0.3844506	0.0212528	1	1				
	4	0	0	0	1	1	1	1	1				
	1	0	0	0.0013626	1	0.1039768	1	1	0.9858687				
42	2	0	0	0.0504599	1	0	1	1	1				
42	3	0	0	0	1	0	1	1	1				
	4	0	0	0	1	0.0004249	1	1	1				
	1	0	0	0	1	0	1	1	1				
43	2	0	0	0	1	0.0160767	1	1	1				
43	3	0	0	0	1	0	1	1	1				
	4	0	0	0	1	0.895188	1	1	1				
	1	0	0	0	1	1	1	1	1				
44	2	0	0	0	1	1	1	1	1				
44	3	0	0	0	1	0.9718868	1	1	1				
	4	0	0.0010589	0	1	1	1	1	1				
	1	0	0	0	0.5465152	0.0030468	0.6350119	1	1				
45	2	0	0	0	1	0.9872508	1	1	1				
73	3	0	0	0	1	0.738125	1	1	1				
	4	0	0	0	1	0.8139604	1	1	1				
	1	0	0	0	1	1	1	1	1				
46	2	0	0	0	1	1	1	1	1				
70	3	0	0	0	1	0	1	1	1				
	4	0	0	0	0.0004807	0	1	1	1				
	1	0	0	0	1	0	1	1	1				
47	2	0	0	0	1	0	1	1	1				
7/	3	0	0	0	1	0	1	1	1				
	4	0	0	0	1	0	1	1	1				

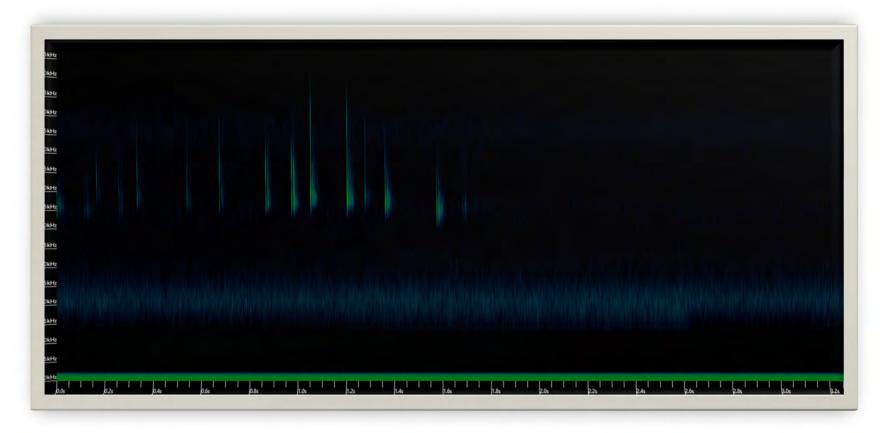
Site	Nights	Kaleidoscope Pro Maximum (v5.4.0) Likelihood Estimator Presence Results											
		EPTFUS	LASBOR	LASCIN	LASNOC	MYOLUC	MYOSEP	MYOSOD	PERSUB				
	1	0	0	0	1	1	1	1	1				
48	2	0	0	0	0.7725811	1	1	1	1				
40	3	0	0	0	0.0006964	0.7959408	1	1	1				
	4	0	0	0	1	0.990023	1	1	1				
	1	0	0	0	1	1	1	1	1				
40	2	0	0	0	1	1	1	1	1				
49	3	0	0	0	1	0.6247416	1	1	1				
	4	0	0	0	1	1	1	1	1				

#### **Qualitative Analysis Results**

Federal species MLE positives occurred at two sites, site 5 on two nights of sampling and Site 41 on one night. A manual review of the files from those nights identified as federal species was conducted. Sanders concludes that there is no visual confirmation of probable Indiana bats or northern long-eared bats on any of the nights. None of the calls that triggered MLE+ results appear to even be made by *myotis* genus bats. A second, more detailed, opinion was provided by Janet Tyburec (BSS) and can be found in Appendix D – Echolocation Call Review.

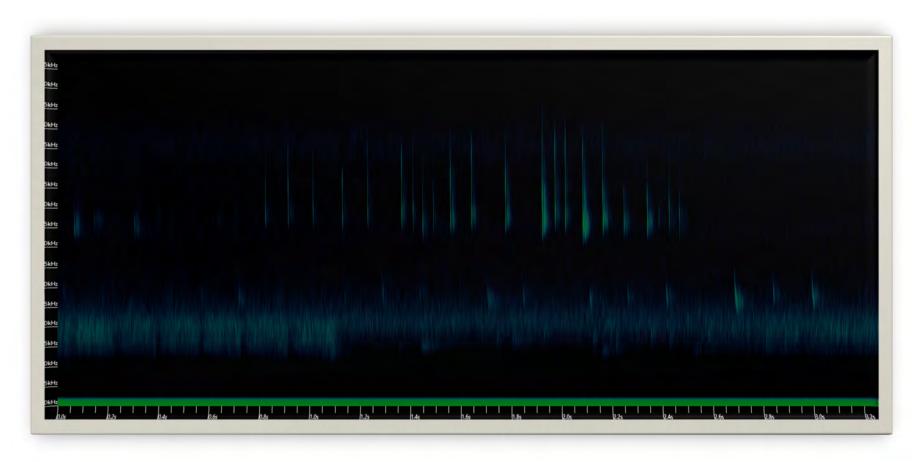
### Kpro Classified Files - Indiana bat

MLE determined probable presence of the Indiana bat (by Kpro) at site 5 was based off the 5 following files which primarily consisted of the eastern red bat.



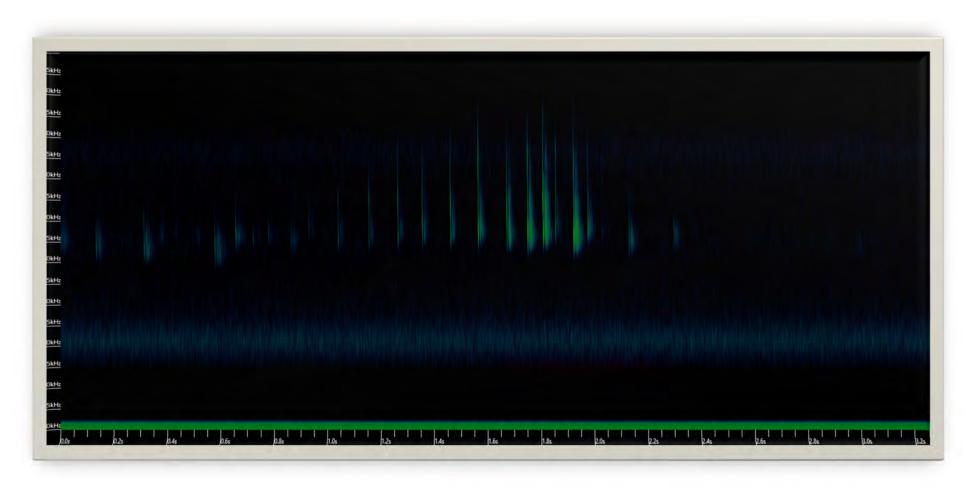
### S4U11087\_20210719\_213407\_000.00

This file contains an out-of-range eastern red bat emitting a search phase call type as it flew into detector range.



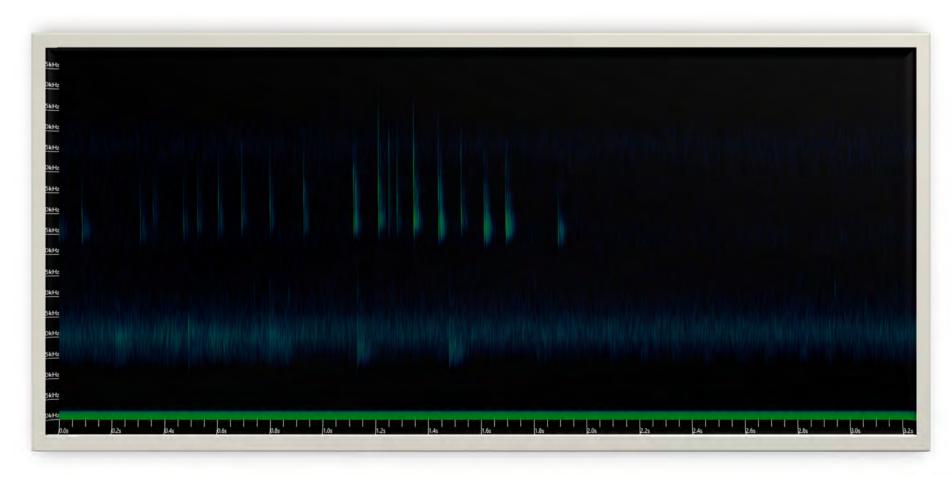
### S4U11087\_20210719\_214509\_000.00

This file contains two bats, both high and low frequency bats. When bats share the same air space, they may change their calling behavior is response to the presence of the other bat and is therefore unreliable for an autoclassification program. Based on the pulses recorded, the high frequency bat is likely an eastern red bat exhibiting search to investigative call types. The low frequency bat pulses are of poor quality and should be considered an unknown low frequency bat.



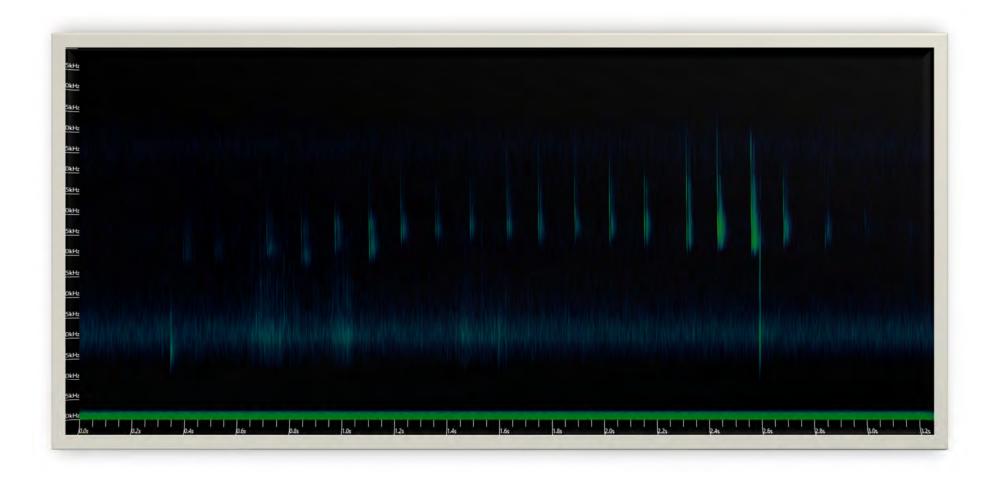
### S4U11087\_20210719\_211610\_000.00

This file contains a slightly out-of-range eastern red bat emitting a search phase call type and then switching to an approach phase call type as it flew into range.



# S4U11087\_20210719\_213335\_000.00

This file contains search phase and investigative pulses from an eastern red bat.

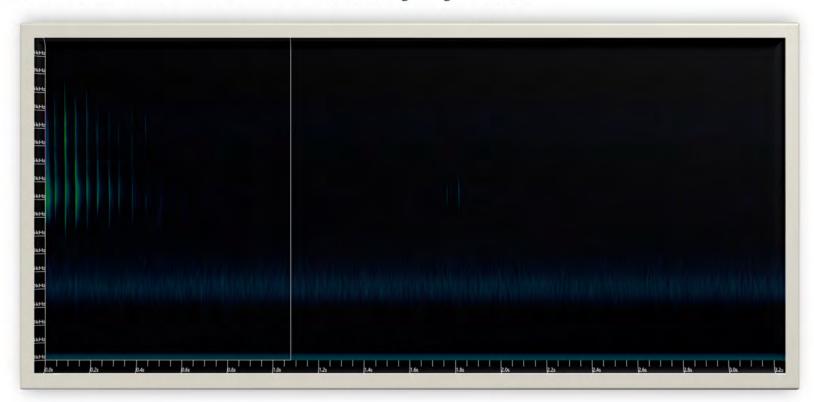


### S4U11087\_20210719\_213045\_000.00

This file contains an eastern red bat emitting a search phase call type.

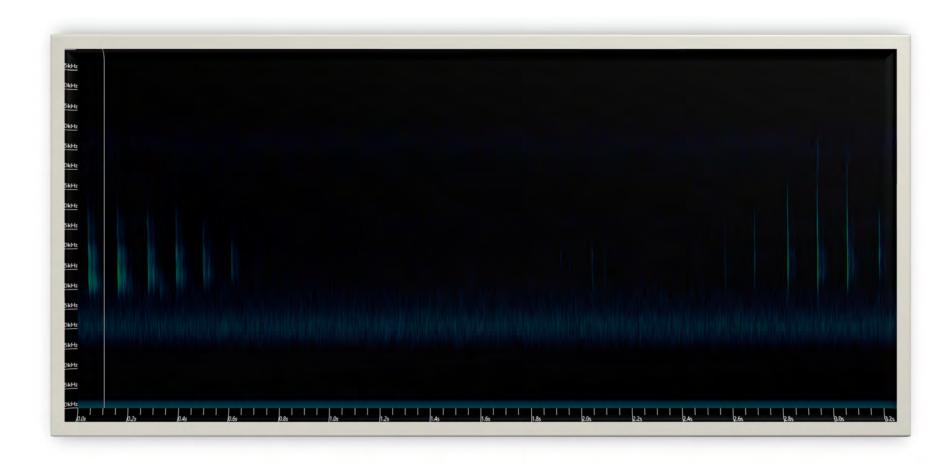
### Classified files - northern long-eared bat

MLE+ probable presence determination by KPro of northern long-eared bat at site 5 occurred on night 1 and night 3. Both determinations were based off of 1 file per night. The MLE+ probable presence determination at site 41 was based off of 2 files. Three of the files were eastern red bats and the remaining, a big brown bat.



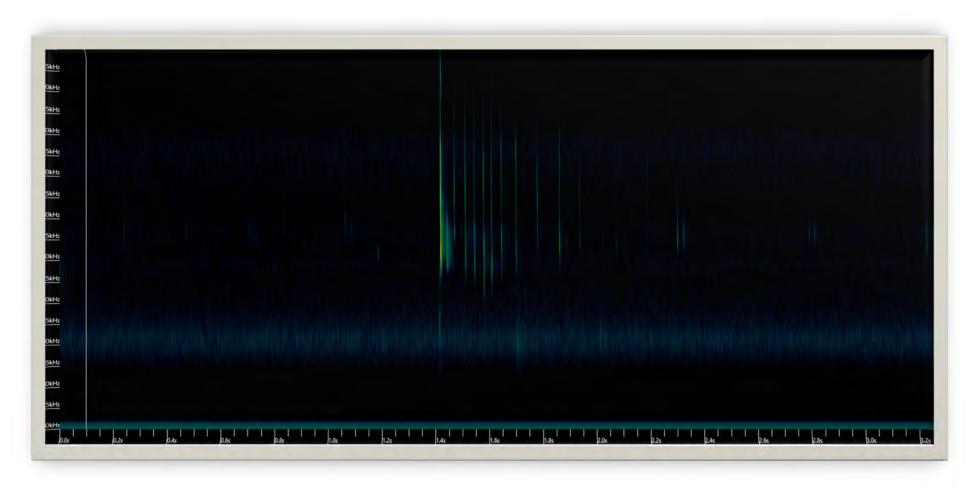
#### S4U10922\_20210717\_025858\_000.00

This file contains an approach phase sequence of the eastern red bat and is relatively short in length at 9 pulses. These 9 pulses occur in the first 0.4s of the file. There are two high-frequency pulses detected around 1.8s of this nearly 4 second file.



### S4U10922\_20210718\_232623\_000.00

This file contains echolocation pulses from a big brown. The bat was slightly out of range of the microphone therefore detected more ambient noise.



## S4U11109\_20210630\_035558\_000.00

This file contains approach phase calls from an eastern red bat as it approaches the microphone.



### S4U11101\_20210630\_040230\_000.00

This file contains approach phase to buzz feed call types as the eastern red bat flies into and then out of the microphone ran

#### 5.0 Conclusion

Forty-nine area sites were surveyed with acoustic detectors for eight successful detector nights per site for a total of 392 detector nights for the Project.

Automated analysis determined statistical probable presence of the Indiana bat at one site and the northern long-eared bat at two sites. In response, a manual review was conducted. The review concluded that the probable presence statistically determined for both species was incorrect as no files which triggered the MLE+ results were made by *myotis* genus bat species.

The USFWS approved KPro MLE indicated presence of common bat species for the Riverbend Wind Energy Facility (Table 3, Table 4).

# **6.0 References**

United States Fish and Wildlife Service (USFWS). 2020. *Range-wide Indiana Bat Survey Guidelines, Appendix H: Potential Hibernacula Survey Guidance.* March 2020.

Appendix A: US Fish and Wildlife Service (USFWS) Range-Wide Indiana Bat Survey Guidelines (March 23, 2020)

# U.S. Fish and Wildlife Service

# RANGE-WIDE INDIANA BAT SURVEY GUIDELINES





**March 2020** 



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### RANGE-WIDE INDIANA BAT SURVEY GUIDELINES

(modifications from the previous guidelines are in blue)

#### INTRODUCTION

The Indiana bat (*Myotis sodalis*) was originally listed as being in danger of extinction under the Endangered Species Preservation Act of 1966 (32 FR 4001, March 11, 1967), and is currently listed as endangered under the Endangered Species Act (ESA) of 1973, as amended. This survey protocol provides the U.S. Fish and Wildlife Service's (USFWS) recommended guidance on survey methods and outlines additional reporting requirements for surveyors.

The following guidance is designed to determine whether Indiana bats are present<sup>1</sup> or absent (P/A)<sup>2</sup> at a given site during the summer (May 15 to August 15; Table 1). The phased-approach, which includes coordination with the USFWS<sup>3</sup>, habitat assessments, and acoustic, mist-net, radio-tracking, emergence, "outer-tier project", and potential bat hibernacula surveys, supersedes <u>all</u> prior summer survey guidance. Future changes to this guidance may occur and will be posted on the USFWS Indiana bat survey guidance website

(http://www.fws.gov/midwest/endangered/mammals/inba/inbasummersurveyguidance.html). Please check this website to ensure use of the most current version of the guidance.

These protocols may be different from those designed for general bat monitoring as part of the North American Bat Monitoring Program (NABat)<sup>4</sup>. NABat surveys may be thought of as similar to breeding bird surveys and are not project-specific surveys in most cases. Information from NABat surveys can be considered as part of "best available" information when assessing whether there is already some existing information on presence of Indiana bats in the vicinity of a given project.

<u>NOTE</u>: These protocols can also be used for northern long-eared bat (NLEB) P/A summer surveys. The only differences from Indiana bat guidelines at present are 1) our definition of suitable summer habitat for NLEBs, 2) a weather-related exception in the northern portion of the NLEB range, and 3) that internal P/A surveys of potential hibernacula are not allowed for NLEB due to difficulty/low confidence in visually detecting their presence.

#### **OBJECTIVES**

The objectives of Indiana bat survey guidelines are to: (1) standardize range-wide survey procedures; (2) maximize the potential for detection/capture of Indiana bats at a minimum acceptable level of

<sup>&</sup>lt;sup>1</sup> The guidance are not intended to be rigorous enough to provide sufficient data to fully determine population size or structure.

<sup>&</sup>lt;sup>2</sup> Recognizing protocols are not 100% likely to detect Indiana bats when present and identification errors may occur.

<sup>&</sup>lt;sup>3</sup> Coordinate with the appropriate state natural resource agencies and any involved federal agency(ies) whenever "USFWS" coordination is listed. USFWS FO(s) may direct project sponsors to state agencies for existing occurrence information. Coordinate with your local USFWS FO(s) to understand the process for their area of jurisdiction.

<sup>&</sup>lt;sup>4</sup> Loeb et al. 2015 available at https://www.fort.usgs.gov/products/23886

effort; (3) make accurate presence/absence determinations; and (4) aid in conservation efforts for the species by identifying areas where the species is present.

#### BACKGROUND

In 2011, the USFWS developed a multi-agency team to determine whether improvements could be made to the 2007 Indiana Bat Mist-Net Protocols. The team included members of the four USFWS regions (Midwest, Northeast, Southeast, and Southwest) where Indiana bats are known to occur, representatives of state natural resource agencies from three of those four regions (Midwest, Northeast, and Southeast), and representatives from three federal agencies (U.S. Geological Survey (USGS), Department of Defense, and U.S. Forest Service). We obtained informal peer review of the draft guidelines in February 2012, gathered additional information in 2012, and made a revised version available for public comment in 2013 [78 FR 1879, January 9, 2013, and 78 FR 9409, February 8, 2013]. The USFWS implemented revised guidance in 2014. The USFWS made some additional revisions to the guidelines each year from 2015 to 2019. The USGS conducted initial independent testing of automated acoustic software programs during the winter of 2014-15 and continues to test new versions of available software using software testing procedures updated in January 2019<sup>5</sup>. The USFWS continues to make revisions to the guidelines each year as appropriate.

We considered the best available information for all aspects of the guidance. For example, please see our white paper<sup>6</sup> and 2018 addendum outlining the methodologies used to determine the minimum level of survey effort. The USFWS continues to work with local, State, and Federal biologists; scientific and academic institutions; commercial organizations; and other interested parties to collect additional data on the distribution, ecology, and biology of the Indiana bat and looks forward to receiving any additional pertinent information.

#### GENERAL PROCESS

Indiana bat surveys for some proposed projects will require modification (or clarification) of this guidance through coordination with the USFWS FO(s) responsible for the state(s) in which the project occurs<sup>7</sup>. If not already required by federal permit, federal action agencies and surveyors should develop a proposed survey study plan in coordination with the USFWS FO(s) so that all parties fully understand which methods will be deployed, what assumptions will be made, and what the various outcomes would be based on the results of each step. Project proponents may stop survey work at any point once an assumption or documentation of Indiana bat presence occurs. Pre-survey

<sup>&</sup>lt;sup>5</sup> Revised USFWS Software Testing Procedures are discussed at: <a href="https://www.fws.gov/midwest/Endangered/mammals/inba/surveys/pdf/USFWS\_Software\_Testing\_Procedures\_13Jang2019.pdf">https://www.fws.gov/midwest/Endangered/mammals/inba/surveys/pdf/USFWS\_Software\_Testing\_Procedures\_13Jang2019.pdf</a>

<sup>&</sup>lt;sup>6</sup> The white paper and 2018 addendum are available at: http://www.fws.gov/midwest/endangered/mammals/inba/inbasummersurveyguidance.html

<sup>&</sup>lt;sup>7</sup> For example, project sponsors for large acreage and/or landscape-scale projects that do not result in permanent habitat loss and would not pose an ongoing threat of lethal take, especially those proposed by land management agencies, may work with local USFWS FOs to apply different scales of surveys (broad vs. project-level) or different types of surveys, such as long-term monitoring results (e.g., forest-wide acoustic transect data) and/or targeted survey efforts (e.g., subsampling of large project areas), to address P/A concerns.

coordination typically will preclude the need for subsequent reviews of intermediate steps by USFWS FO(s) during the busy field season. An online directory of USFWS FO(s) is available at <a href="http://www.fws.gov/offices/">http://www.fws.gov/offices/</a>. Unless otherwise agreed to by the USFWS, negative P/A survey results obtained using this guidance are valid for a minimum of five years from their completion unless new information (e.g., other nearby surveys) suggest otherwise. If survey results are older than 5 years, please coordinate with the USFWS FO to discuss the pros and cons of conducting any additional surveys. If not already required by federal permit, please submit all results (negative or positive) from any phase to the USFWS FO(s). We strongly encourage this coordination as it improves the USFWS' understanding of (1) the level of survey effort underway and (2) the distribution of the species. A single report can be submitted at the end of all phases conducted for a given project.

USFWS FO-level coordination is also important during the survey planning process. The guidelines that are described in this document are designed to be implemented in typical habitats that are conducive to the standard survey techniques described herein. However, the USFWS recognizes that occasionally there may be some site-specific conditions in summer habitats or at potential hibernacula sites that do not lend themselves to being surveyed using the standard survey options (e.g., mist nets, acoustic detectors or harp traps) even though a site may otherwise meet the definition of suitable Indiana bat habitat. Therefore, we strongly encourage coordination with the FO(s) prior to using methods that may not be appropriate for site-specific habitat conditions.

Because surveys that result in the capture of Indiana bats result in take, such surveys should only be conducted by a qualified biologist<sup>9</sup>. Generally, a recovery permit for the Indiana bat authorizes the capture of bats for identification, and handling of bats for measurements, photography, and radio transmitter attachment; some (but not all) may also authorize entry into potential hibernacula to conduct internal surveys. Following this survey guidance will meet standard USFWS requirements; however, surveyors also need to ensure they meet all applicable state permitting and reporting requirements. Failure to follow the survey guidance, as written, and/or failure to follow a study plan which has received concurrence from the local USFWS FO(s), may result in a USFWS FO requesting additional survey effort.

The following provides a step-by-step outline of how Indiana bat summer surveys and/or potential hibernacula surveys should be conducted in 2020. Some of these steps can occur concurrently.

#### PHASE 1 – INITIAL PROJECT SCREENING

Step 1. Coordinate with the U.S. Fish and Wildlife Service Field Office(s)<sup>10</sup> regarding existing Indiana bat summer and/or winter occurrence information. [Projects located within known Indiana bat summer habitat and/or known hibernacula/spring-staging/fall-

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<sup>&</sup>lt;sup>8</sup> The timeframe may be reduced if significant habitat changes have occurred in the area or increased based on local information.

<sup>&</sup>lt;sup>9</sup> A qualified biologist is an individual who holds a USFWS Recovery Permit (Federal Fish and Wildlife Permit) for Indiana bats in the state/region in which they are surveying and/or has been authorized by the appropriate state agency to net and handle Indiana bats. Several USFWS offices maintain lists of qualified bat surveyors, and if working in one of those states with authorizations in lieu of a Recovery Permits, the individual will either need to be on that list or submit qualifications to receive USFWS approval prior to conducting any field work.

<sup>&</sup>lt;sup>10</sup> Coordinate with the appropriate state natural resource agencies and any involved Federal Action agencies whenever "USFWS" coordination is listed. USFWS FO(s) may direct project sponsors to state agencies for existing occurrence information. Coordinate with your local USFWS FO(s) to understand the process for their area of jurisdiction.

# swarming zones will not proceed to Phase 2 of this process unless the project meets the definition of an "outer-tier project" outlined in Appendix G.]

- a) If a project (located within or outside of a known maternity colony home range or spring-staging/fall-swarming zone of a known hibernaculum) is already covered under an existing Endangered Species Act (ESA) incidental take authorization (e.g., HCP, BO), then no further summer and/or potential hibernacula surveys are needed, follow the procedures previously authorized by the USFWS FO(s).
- b) If there are known Indiana bat occurrences (e.g., known roost trees, capture locations, foraging locations or hibernacula) within the project action area<sup>11</sup>; **OR**

if there are no known Indiana bat summer or spring/fall/winter occurrences within the proposed project area itself, but the project area is located within a known maternity colony home range and/or the spring-staging and fall-swarming zone of a known hibernaculum<sup>12</sup>; **OR** 

if the project is located outside a known maternity colony home range and/or spring-staging and fall-swarming zone of a hibernaculum, but is within the range of the Indiana bat (note this can change over time), then proceed to Step 2.

# Step 2. Conduct Habitat Assessment (Desktop or Field-based; see Appendix A and Appendix H).

- a) If suitable summer habitat and/or a potential hibernaculum(a) is present within the action area, then proceed to <u>Step 3</u>.
- b) If both suitable summer and winter habitat (i.e., potential hibernaculum) are absent within the action area, then no further P/A surveys are recommended; however, additional coordination with the USFWS FO(s) may be recommended if Indiana bats may be present in an action area during other seasons (e.g., spring and fall migration) and may be affected by the proposed project.

#### Step 3. Assess potential for adverse effects to Indiana bats.

- a) If the project is not anticipated to result in adverse effects to Indiana bats (as proposed), then no further summer and/or potential hibernacula surveys are recommended, coordinate with the USFWS FO(s).
- b) If the project may result in adverse effects to Indiana bats, but the impacts can be adequately assessed and conservation measures can be designed to minimize those effects without additional P/A information (this includes all proposed projects within known summer maternity colony home ranges and/or at known hibernacula and their

<sup>&</sup>lt;sup>11</sup> The "action area" is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. [50 CFR Section 402.02]

<sup>&</sup>lt;sup>12</sup> See USFWS Indiana Bat Section 7 and Section 10 Guidance for Wind Energy Projects (Questions 4 & 5) http://www.fws.gov/midwest/endangered/mammals/inba/WindEnergyGuidance.html

surrounding spring-staging and fall-swarming zones, but may include other areas as well), then no further surveys are recommended. Coordinate with the USFWS FO(s) regarding an assessment of the project's potential effects, development of conservation measures, determination of the need for any ESA incidental take authorization, and discussion of value of additional surveys.

c) If the project does not meet the conditions of 3a or 3b, then proceed to **Phase 2** and/or **Phase 5.** 

# PHASE 2 – SUMMER PRESENCE/ABSENCE SURVEYS (NETTING OR ACOUSTIC SURVEYS)<sup>13</sup>

Presence/probable absence of Indiana bats may be determined by conducting either Step 4 (mistnetting; see Appendix B) or Step 5 (acoustics; see Appendix C) as outlined below. It is the project proponent's choice as to which option to use, but they can only choose one method for each survey area unit (i.e., ≤123-acre area or 1-km section of linear project). Under no scenario can a project proponent use either mist-netting or acoustic Phase 2 surveys to challenge the other methods results. The USFWS accepts the results of either option and has no preference for methods. The USFWS FO(s) can discuss pros and cons of different approaches depending on project sponsor needs.

However, acoustics at the Phase 2 level of effort (LOE) (or otherwise agreed to with the USFWS FO) may be used as a coarse screening tool for conducting subsequent mist-netting at the Phase 2 LOE. For example, if NO high-frequency (HF) calls (≥35 kHz) are detected, then no netting is required within that 123-acre (non-linear) or 1-km (linear) survey area due to the probable MYSO absence. If ANY HF calls are detected, then mist-net at the Phase 2 LOE. Any project study plan that includes use of both acoustics and netting needs to be written clearly to avoid potential misunderstandings between the project proponent and the USFWS FO.

Also, Phase 2 acoustic results should be used to inform whether, when, and where to conduct any optional Phase 3 mist-netting. In this case, acoustics is the P/A method and if probable presence is detected (HF screen, automated/MLE, or manual vetting), then MYSO probable presence is established. Negative results from follow-up mist-netting (at any LOE) does not refute a previously established positive acoustic result. The goal of Phase 3 netting is simply to verify where MYSO are active and to capture and track individuals to document roost trees and population size to further inform consultation or coordination under the ESA.

The summer survey season is from  $\underline{15}$  May through  $\underline{15}$  August $\underline{^{14}}$  for either survey option. The minimum prescribed survey level of effort for any given survey area unit (i.e.,  $\leq 123$ -acre area or 1-km section of linear project)  $\underline{\mathbf{cannot}}$  be completed in a single calendar night regardless of which

<sup>&</sup>lt;sup>13</sup> NOTE: acoustic and/or mist-net surveys should be conducted in the best suitable habitat possible for each survey type to increase the likelihood of detecting/capturing Indiana bats. In some cases, the most suitable habitat for effectively conducting surveys may occur outside a project site boundary and may be sampled if landowner permission is available. For projects with multiple survey areas (e.g., >123 acres or >1 km), survey methods may be interchanged. For example, acoustics could be used for one 123-acre survey area and netting could be used for another 123-acre area.

<sup>&</sup>lt;sup>14</sup> With prior USFWS FO approval, a survey may be completed after August 15 if it was initiated in time to be completed by August 15 and extenuating weather circumstances resulted in delaying completion. Delays as a result of not meeting the acceptable weather requirements are the ONLY valid justification for surveying after August 15.

survey method (netting or acoustic) is used (i.e., minimum survey effort must be spread over at least 2 calendar nights). If netting is chosen as the preferred P/A method and an Indiana bat(s) is captured, then surveyors may immediately begin Phase 4/radio-tracking. Project proponents must decide whether they will proceed to Phase 4 in coordination with the USFWS FO before any mist netting occurs. Submit Phase 2 study plans to USFWS FO prior to conducting surveys.

# Step 4. Conduct Mist-Netting Surveys following Recovery Unit-based Protocols<sup>15</sup> (see Figures 1 and 2 and Appendix B)

Northeast and Appalachia Recovery Units (CT, DE, MA, MD, NC, NJ, NY, PA, eastern TN, WV, VA, VT):

<u>Linear projects</u>: a minimum of 10 net nights per km (0.6 miles) of suitable summer habitat (see Appendix F).

Non-linear projects: a minimum of 42 net nights per 123 acres (0.5 km<sup>2</sup>) of suitable summer habitat.

#### For example:

- 7 sites, 2 nets/site for 3 calendar nights = 42 net nights
- 7 sites, 3 nets/site for 2 calendar nights = 42 net nights
- 3 sites, 2 nets/site for 7 calendar nights\* = 42 net nights

\*Maximum of 3 nights of consecutive netting at any given net location. After 3 consecutive nights of netting at the same location, you must change net locations or wait at least 2 calendar nights before resuming netting at the same location.

- a) If no capture of Indiana bats, then no further summer surveys are recommended 16.
- b) If capture of Indiana bat(s), then stop or proceed to **Phase 4** as previously decided in coordination with the FO.

Midwest and Ozark-Central Recovery Units (AL, AR, IA, IL, IN, GA, KY, MI, MO, MS, OH, OK, central & western TN, and Lee County, VA):

<u>Linear projects</u>: a minimum of 2 net nights per km (0.6 miles) of suitable summer habitat (see Appendix F).

Non-linear projects: a minimum of 9 net nights per 123 acres (0.5 km²) of suitable

<sup>&</sup>lt;sup>15</sup> The Indiana bat populations in the Northeast and Appalachia Recovery Units have been most heavily impacted by white-nose syndrome to date; therefore, we recommend higher survey effort when compared to the Midwest and Ozark-Central Recovery Units. We have no recommendations for reducing the minimum level of effort required to demonstrate probable absence for projects <123 acres in size. Level of effort is based on detection probabilities and occupancy estimates that were derived from past survey efforts that used the same acreage threshold. Level of effort is designed to reach 90% confidence in negative survey results (see Niver et al. 2013).

<sup>&</sup>lt;sup>16</sup> NOTE: For Phase 2 Presence/Absence Surveys, wherever the phrase "no further summer surveys are recommended" occurs within this document, the USFWS FO(s) is in affect assuming probable absence of Indiana bats.

summer habitat.

#### For Example:

- 3 sites, 1 net/site for 3 calendar nights = 9 net nights
- 1 site, 3 nets/site for 3 calendar nights = 9 net nights

The sampling period for each net shall begin at sunset<sup>17</sup> and continue for at least 5 hours (longer survey periods may also improve success).

\*Maximum of 3 nights of consecutive netting at any given net location. After 3 consecutive nights of netting at the same location, you must change net locations or wait at least 2 calendar nights before resuming netting at the same location.

- a) If no capture of Indiana bats, then no further summer surveys are recommended.
- b) If capture of Indiana bat(s), then stop or proceed to **Phase 4** as previously decided in coordination with the FO.

OR

### Step 5. Conduct Acoustic Surveys<sup>18</sup> (see Figures 1 and 2 and Appendix C)

<u>Linear projects</u>: a minimum of 2 detector nights per km (0.6 miles) of suitable summer habitat (see Appendix F).

<u>Non-linear projects</u>: a minimum of 8 detector nights per 123 acres (0.5 km<sup>2</sup>) of suitable summer habitat.

At least 2 detector locations per 123 acre "site" shall be sampled until at least 8 detector nights has been completed over the course of at least 2 calendar nights (may be consecutive).

#### For example:

•

• 4 detectors for 2 nights each (can sample the same location or move within the site)

- 2 detectors for 4 nights each (can sample the same location or move within the site)
- 1 detector for 8 nights (must sample at least 2 locations and move within the site we recommend evenly distributing LOE among locations)

The acoustic sampling period for each site must begin at sunset 19 and end at sunrise each

<sup>&</sup>lt;sup>17</sup> Surveys may need to start a little earlier or later than official sunset times (i.e., at "dusk") in some settings such as a deep/dark forested valleys or ridge tops to avoid missing early-flying bats or capturing late-flying birds, respectively. Sunset tables for the location of survey can be found at: http://aa.usno.navy.mil/data/docs/RS\_OneYear.php

<sup>&</sup>lt;sup>18</sup> Acoustic surveys are available as a Presence/Absence option throughout the range (i.e., Northeast, Appalachian, Midwest, and Ozark-Central Recovery Units).

<sup>&</sup>lt;sup>19</sup> Surveys may need to start a little earlier or later than official sunset times (i.e., at "dusk") in some settings such as a deep/dark forested valleys or ridge tops to avoid missing early-flying bats or capturing late-flying birds, respectively. Sunset tables for the location of survey can be found at: <a href="http://aa.usno.navy.mil/data/docs/RS\_OneYear.php">http://aa.usno.navy.mil/data/docs/RS\_OneYear.php</a>

night of sampling.

Optional coarse screening - for high frequency (HF) or myotid calls (depending on available H/L frequency filters) or Proceed to Step 6

- i) If no positive detection of HF calls<sup>20</sup> (≥35 kHz) or myotid calls, no further summer surveys recommended.
- ii) If positive detection of HF or myotid calls, then
  - (a) proceed to Step 6 for further acoustic analysis; **OR**
  - (b) assume presence of Indiana bats and coordinate with the USFWS FO(s); **OR**
  - (c) assume presence and proceed to **Phase 3**.

# Step 6. Conduct Automated Acoustic Analyses for each site that had HF or Myotid calls from Step 5 or ALL sites if Step 5 was not conducted.

(NOTE: cannot skip this step and proceed directly to Step 7)

Use **one or more** of the currently available 'approved' acoustic bat ID programs<sup>21</sup> (use most current <u>approved</u> software versions available and manufacturer's recommended settings for Indiana bat P/A surveys). 'Candidate' programs are not yet approved by USFWS for standalone use for Indiana bat P/A surveys, but may be used in conjunction with one or more of the approved programs. Include your plans for which specific software program(s) you will use in your survey study plan and submit for USFWS FO(s) review prior to conducting surveys. Beginning with acoustic data from night one at each acoustic site, run each night's data for each site through your chosen ID program(s). Review results <u>by site by night</u> from each acoustic ID program used<sup>22</sup>.

- a) If Indiana bat presence is considered unlikely by <u>all</u> of the approved and candidate program(s) used in analysis, then no further summer surveys recommended.
- b) If Indiana bat presence is considered likely at one or more sites on one or more nights by <u>any</u> approved or candidate program(s) used in analysis, then
  - i) proceed to Step 7 for qualitative ID; **OR**
  - ii) assume presence of Indiana bats and coordinate with the USFWS FO(s); **OR**
  - iii) assume presence and proceed to **Phase 3**.

#### Step 7. Conduct Qualitative Analysis of Calls.

At a minimum, for each detector site/night a program considered Indiana presence likely

http://www.fws.gov/midwest/Endangered/mammals/inba/surveys/inbaAcousticSoftware.html

 $<sup>^{20}</sup>$  HF calls are defined as individual call pulses whose minimum frequency is  $\geq$ 35 kHz.

<sup>&</sup>lt;sup>21</sup> Approved and candidate programs are listed at

<sup>&</sup>lt;sup>22</sup> The approved acoustic identification programs all have implemented a maximum likelihood estimator (MLE) at this time. If the analysis of collected calls at a given site on a given night results in the probable presence of Indiana bats with high levels of certainty (P<0.05), then select one of the options available in Step 6b.

(from MLE results) review <u>all files</u> (including no IDs) from that site/night. Qualitative analysis<sup>23</sup> (i.e., manual vetting) must also include a comparison of the results of each acoustic ID program by site and night (see Reporting Requirements in Appendix C).

- a) If no visual confirmation of probable Indiana bats, then no further summer surveys recommended<sup>24</sup>.
- b) If visual confirmation of probable Indiana bats, then
  - i) assume presence of Indiana bats and coordinate with the USFWS FO(s); **OR**
  - ii) assume presence and proceed to **Phase 3**.

# PHASE 3. CONDUCT MIST-NETTING SURVEYS TO CAPTURE INDIANA BATS.

If netting was not conducted as the P/A method, then netting may be conducted in Phase 3 to capture and characterize (e.g., sex, age, reproductive condition) the Indiana bats that are present in an area and to facilitate Phase 4 efforts. We encourage working with the FOs to develop Phase 3 netting plans based on best available information (e.g., positive acoustic locations). There are no minimum requirements for this phase as this is not a P/A phase.

- a) If no Indiana bats are captured, then coordinate with the USFWS FO.
- b) If Indiana bats are captured, then proceed to **Phase 4**.

# PHASE 4. CONDUCT RADIO-TRACKING AND EMERGENCE SURVEYS (See Appendices D and E).

# PHASE 5. CONDUCT POTENTIAL HIBERNACULA SURVEYS

(See Appendix H)

#### REFERENCES

Amelon, S.K. 2007. Multi-scale factors influencing detection, site occupancy, and resource use by foraging bats in the Ozark Highlands of Missouri. PhD Dissertation. University of Missouri – Columbia.

Duchamp, J.E., M. Yates, R. Muzika, and R.K. Swihart. 2006. Estimating probabilities of detection for bat echolocation calls: an application of the double-observer method. Wildlife Society Bulletin 34(2):408-412.

<sup>&</sup>lt;sup>23</sup> Qualitative analysis of each acoustic site and night with probable detections of Indiana bats during Step 6 must include the entire night's high-frequency call data and not just those files making it through the acoustic analysis tools as probable Indiana bats.

<sup>&</sup>lt;sup>24</sup> If you identify any suspected mis-identifications from programs, the Service will share those results with the software manufacturer(s) and the USGS to assist with future improvements and testing of software.

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Romeling, S., C.R. Allen, and L. Robbins. 2012. Acoustically detecting Indiana bats: how long does it take? Bat Research News 53(4):51-58.

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TABLE 1. Standard survey seasons for conducting P/A surveys for Indiana bats.

Survey Season	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ост	NOV	DEC
Internal Winter Hibernacula Surveys <sup>1</sup> Acceptable survey window (1 Jan 28 Feb.) Traditional survey window of known sites (15 Jan 15 Feb.)	1											
Spring & Fall Surveys at Entrances of Potential Hibernacula <sup>2,3</sup> Acceptable survey window (1 - 21 Apr. & 15 Sep 31 Oct.)												
Summer Surveys of Suitable Summer Habitat <sup>4</sup> Acceptable survey window (15 May - 15 Aug.) Optimal survey window (1 Jun 31 Jul.) <sup>5,6</sup>												

<sup>&</sup>lt;sup>1</sup> visual and photographic surveys conducted within known and/or potential hibernacula (if deemed safe to enter).

<sup>&</sup>lt;sup>2</sup> conducted using harp traps or mist nets at cave/mine entrances.

<sup>&</sup>lt;sup>3</sup> if State/USFWS FO approve, spring and fall survey windows can "drift" a bit earlier or later to better accommodate prevailing weather patterns and/or climate conditions in the location of the proposed survey. For example, the fall survey window in nothern portions of the Ibat range may begin on or after 1 Sep. and end prior to 31 Oct. pending local State and FO approval. Likewise, if agencies approve, spring surveys of potential hibernacula may be pushed back/extended a few days or longer due to an exended period of unseasonably cold spring weather.

<sup>&</sup>lt;sup>4</sup> conducted using mist nets or acoustic detectors deployed within suitable flight corridors and foraging areas.

<sup>&</sup>lt;sup>5</sup> the middle of the maternity season (June and July) is considered by many to be the best or "optimal" time to capture resident bats.

<sup>&</sup>lt;sup>6</sup> due to concerns with transmission of white-nose syndrome, some USFWS FO(s) and state natural resource agencies have delayed the start of the Indiana bat summer field survey season/mist-netting until June 1. Surveyors/applicants should always coordinate with local USFWS FO(s) and state natural resource agencies to confirm acceptable dates before beginning surveys.

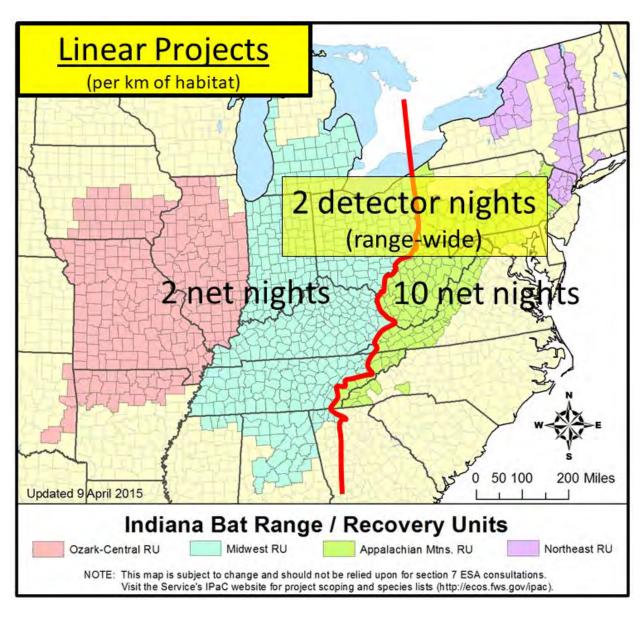


FIGURE 1. Minimum survey level of effort for mist netting and/or acoustic options for linear projects by recovery unit.

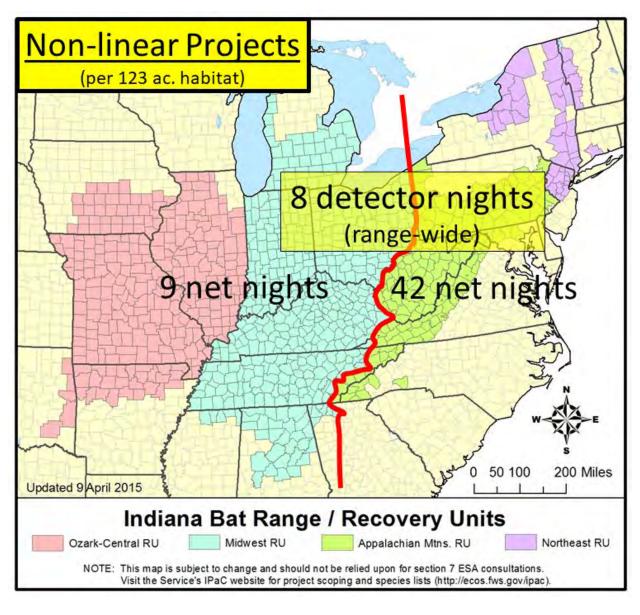


FIGURE 2. Minimum survey level of effort for mist netting and/or acoustic options for non-linear projects by recovery unit.

Summer habitat and potential hibernacula assessments are Step 2 of Phase 1- Initial Project Screening. The information below is provided to assist applicants, consultants, and/or project proponents (hereinafter termed the "applicant") in establishing whether surveys for Indiana bats should be conducted. As a reminder, the first step for determining presence of Indiana bats at a given site is to determine whether there is any existing occurrence data available for the vicinity of the project from the local USFWS FO. This step can be conducted remotely via a desktop analysis (e.g., use of aerial photography to assess the potential presence of suitable summer habitat). The applicant is responsible for developing and providing sufficient information as to whether suitable summer Indiana bat habitat and/or potential hibernacula exist within a proposed project area. If suitable habitat is present, the applicant should calculate the amount and submit this to the USFWS FO(s) and determine the need for any presence/absence surveys (Phase 2). NOTE: if Indiana bats are present or assumed to be present during any phase, more detailed habitat information may be necessary to adequately assess the potential for impacts (see attached example Indiana Bat Habitat Assessment Datasheet). If no suitable habitat is present or it is determined through discussions with USFWS FO(s) that no adverse effects are anticipated from the proposed project, no surveys are recommended to assess risk during the summer. Habitat assessments for Indiana bats can be completed any time of year and applicants are encouraged to submit results and proposed Phase 2 study plans well in advance of the summer survey season.

#### **PERSONNEL**

Habitat assessments should be completed by individuals with a natural resource degree or equivalent work experience.

#### DEFINITION FOR POTENTIALLY SUITABLE INDIANA BAT SUMMER HABITAT

Suitable summer habitat for Indiana bats consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed nonforested habitats<sup>25</sup> such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥5 inches dbh<sup>26</sup> (12.7 centimeter) that have exfoliating bark, cracks, crevices, and/or hollows), as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Individual trees may be considered suitable habitat when they exhibit the characteristics of a potential roost tree and are located within 1,000 feet (305 meters) of other forested/wooded habitat.

<sup>&</sup>lt;sup>25</sup> Non-forested habitats typically should be excluded from acreages used to establish a minimum level of survey effort for Phase 2 surveys.

<sup>&</sup>lt;sup>26</sup> While trees <5 inches (<12.7 cm) dbh that have exfoliating bark, cracks, crevices, and/or hollows may have some potential to be male Indiana bat summer roosting habitat, the USFWS does not consider early-successional, even-aged stands of trees <5 inches dbh to be suitable roosting habitat for the purposes of this guidance. Suitable *roosting* habitat is defined as forest patches with trees of 5-inch (12.7 cm) dbh or larger. However, early successional habitat with small diameter trees may be used as foraging habitat by Indiana bats. Therefore, a project that would remove or otherwise adversely affect ≥20 acres of early successional habitat containing trees between 3 and 5 inches (7.6-12.7 cm) dbh would require coordination/consultation with the USFWS FO to ensure that associated impacts would not rise to the level of take. The USFWS may request P/A surveys if >20 acres of early successional habitat were proposed for removal.

Indiana bats have also been observed roosting in human-made structures, such as bridges and bat houses (artificial roost structures); therefore, these structures should also be considered potential summer habitat<sup>27</sup>. We recommend that project proponents or their representatives coordinate with the appropriate USFWS Field Office to more clearly define suitable habitat for their particular region as some differences in state/regional suitability criteria may be warranted (e.g., high-elevation areas may be excluded as suitable habitat in some states).

#### Examples of unsuitable habitat:

- Individual trees that are greater than 1,000 feet from forested/wooded areas;
- Trees found in highly-developed urban areas (e.g., street trees, downtown areas); and
- A pure stand of less than 3-inch dbh<sup>28</sup> trees that are not mixed with larger trees.

# DEFINITION FOR POTENTIALLY SUITABLE NORTHERN LONG-EARED BAT SUMMER HABITAT

Suitable summer habitat for NLEB consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥3 inches dbh that have exfoliating bark, cracks, crevices, and/or cavities), as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Individual trees may be considered suitable habitat when they exhibit characteristics of suitable roost trees and are within 1,000 feet of other forested/wooded habitat<sup>29</sup>. NLEB has also been observed roosting in human-made structures, such as buildings, barns, bridges, and bat houses; therefore, these structures should also be considered potential summer habitat<sup>30</sup>. NLEBs typically occupy their summer habitat from mid-May through mid-August each year<sup>31</sup> and the species may arrive or leave some time before or after this period.

#### Examples of unsuitable habitat:

- Individual trees that are greater than 1,000 feet from forested/wooded areas;
- Trees found in highly-developed urban areas (e.g., street trees, downtown areas); and
- A pure stand of less than 3-inch dbh trees that are not mixed with larger trees.

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<sup>&</sup>lt;sup>27</sup> If human-made structures are present within your project area, see Appendix E (Emergence Surveys) and then coordinate with the local USFWS FO(s) regarding how to determine presence/absence.

<sup>&</sup>lt;sup>28</sup> Suitable *roosting* habitat is defined as forest patches with trees of 5-inch (12.7 cm) dbh or larger. However, early successional habitat with small diameter trees may be used as foraging habitat by Indiana bats. Therefore, a project that would remove or otherwise adversely affect  $\geq$ 20 acres of early successional habitat containing trees between 3 and 5 inches (7.6-12.7 cm) dbh would require coordination/consultation with the USFWS FO to ensure that associated impacts would not rise to the level of take. The USFWS may request P/A surveys if >20 acres of early successional habitat were proposed for removal.

<sup>&</sup>lt;sup>29</sup> This number is based on observations of bat behavior indicating that such an isolated tree (i.e., ≥1000 feet) would be extremely unlikely to be used as a roost. This distance has also been evaluated and vetted for use for the Indiana bat. See the "Indiana bat Section 7 and Section 10 Guidance for wind Energy Projects," question 33, found at: http://www.fws.gov/midwest/endangered/mammals/inba/WindEnergyGuidance.html

<sup>&</sup>lt;sup>30</sup> Trees found in highly-developed urban areas (e.g., street trees, downtown areas) are extremely unlikely to be suitable habitat.

<sup>&</sup>lt;sup>31</sup> Exact dates vary by location.

# SUBMISSION OF PHASE 1 HABITAT ASSESSMENT & PHASE 2 AND/OR PHASE 5 STUDY PLAN (IF NEEDED)

If a proposed project may affect (positively or negatively) Indiana bats and the conditions outlined in Step 3 a or b are not met, a habitat assessment report should be submitted to the appropriate USFWS FO(s) (and/or to the lead Federal Action Agency, such as the USACE, as appropriate) along with a draft study plan for the Phase 2 (acoustic or netting) and/or Phase 5 (potential hibernaculum) survey(s) (if suitable habitat(s) is present). Complete Phase 1 reports will include the following:

- 1. Full names and relevant titles/qualifications of individuals (e.g., John E. Smith, Biologist II, State University, B.S. Wildlife Science 2007) completing the habitat assessment and when the assessment was conducted
- 2. A map and latitude/longitude or UTM clearly identifying the project location (or approximate center point) and boundaries
- 3. A detailed project description (if available)
- 4. Documentation of any known/occupied spring staging, summer, fall swarming, and/or winter habitat for Indiana bats within or near the project area
- 5. A description of methods used during the habitat assessment
- 6. A summary of the assessment findings and a completed Indiana Bat Summer Habitat Assessment Datasheet (see example below; use of this particular datasheet is optional)
- 7. Other information that may have a bearing on Indiana bat use of the project area (e.g., presence of fall or winter habitat [caves, crevices, fissures, or sinkholes, or abandoned mines of any kind], bridges and other non-tree potential summer roosts.)
- 8. A Phase 1 Habitat Assessment on all potential hibernacula that could be affected by the proposed project (see Appendix H for additional instructions for completing this assessment and sample datasheet), if necessary
- 9. Any other information requested by the local USFWS FO(s) related to the project

#### In addition, Phase 2 Study Plans should contain the following:

- 1. A statement as to which type of P/A surveys will be conducted (i.e., mist netting or acoustic surveys) and how the proposed survey level of effort (i.e., total # of net nights or detector nights) was calculated/determined;
- 2. A map depicting the proposed number of survey sites (mist netting or acoustic) and their tentative distribution throughout the project area;
- 3. A tentative list of surveyors names and copies of relevant federal permits (if applicable);
- 4. A tentative survey schedule (e.g., start date, duration, end date);
- 5. For mist netting surveys with planned Phase 4 radio-tracking the approximate number and distribution of transmitters (e.g., prioritization of sex/age, maximum number per site)

- and a request that bats targeted for tracking may be held for up to 45 minutes<sup>32</sup> to allow for application of transmitters; and
- 6. For acoustic surveys information on which specific program(s) will be used and what level of acoustic analyses will be conducted.

If potential hibernacula are identified, then Phase 5 Study Plans should contain the following:

- 1. A completed USFWS Project Proposal Form (see Appendix H);
- 2. A map depicting all potential hibernacula identified and their tentative distribution throughout the project area;
- 3. A written justification if an entrance(s) survey is proposed instead of an internal survey;
- 4. A written justification if mist-nets are proposed instead of harp traps; and
- 5. For surveys of entrances that are inter-connected and unfeasible to survey on the same night, a proposed modified method to complete the survey (see Phase 2, #5 in Appendix H).

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<sup>&</sup>lt;sup>32</sup> Current standard federal Section 10 bat permit conditions require prior written approval from the Field Supervisor in the USFWS FO(s) if capture times may exceed 30 minutes.

# INDIANA BAT HABITAT ASSESSMENT DATASHEET

roject Name;		Date			
ownship/Range/Se	etion:				
at Long/UTM/ Zoi	ne:	Surveyor:			
Brief Project Desci	ription	ı.			
roject Area	1				
	Total Acres	Fores	st Acres	Open Acres	
'roject			0.00		
Proposed Tree Removal (ac)	Completely oleared	Partially cleared (will leave trees)	Preserve acres- no clearing		
Vegetation Cover T Pre-Project	Гуреѕ	1	Post-Project		
andscape within :	5 mile radius	1			
Flight corridors to	other forested are	as?			
Describe Adjacent	Properties (e.g. fo	rested, grassland, c	ommercial or residencia	al development, water sources)	
roximity to Public					
		roject area to forest anagement areas)?	ted public lands (e.g., na	itional or state forests, national or state	

Use additional sheets to assess discrete habitat types at multiple sites in a project area

Include a map depicting locations of sample sites if assessing discrete habitats at multiple sites in a project area

#### A single sheet can be used for multiple sample sites if habitat is the same Sample Site Description Sample Site No.(s): Water Resources at Sample Site Stream Type Ephemeral Intermittent Describe existing condition of water Perennial (# and length) sources: Pools/Ponds Open and accessible to bats? (# and size) Weilands Permanent Seasonal (approx. ac.) Forest Resources at Sample Site 1=1-10%, 2=11-20%, 3=21-40%, 4=41-60%, Canopy (> 50 °) Midstory (20-50') Understory (<20) Closure/Density 5=61-80%, 6=81=100% Dominant Species of Mature Trees % Trees w/ **Exfoliating Bark** Small (3-8 in) Med (9-15 in) Large (>15 in) Size Composition of Live Trees (%) No. of Suitable Snags Standing dead trees with exfoliating bark, cracks, crevices, or hollows. Snags without these characteristics are not considered suitable. IS THE HABITAT SUITABLE FOR INDIANA BATS? Additional Comments:

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Attach aerial photo of project site with all forested areas labeled and a general description of the habitat

Photographic Documentation: habitat shots at edge and interior from multiple locations: understory/midstory/canopy; examples of potential suitable snags and live trees; water sources

#### APPENDIX B: PHASE 2 or 3 MIST-NETTING

Mist-netting can be used as a presence/probable absence method (Phase 2 surveys) or it can be conducted for the purpose of attempting to capture Indiana bats after detection during acoustic presence/probable absence surveys (Phase 3 surveys). The same recommendations (e.g., season, personnel, equipment, net placement, checking nets) apply for either use of mist-netting surveys.

SUMMER MIST-NETTING SEASON: May 15<sup>33</sup> – August 15<sup>34</sup>

Capture of reproductive adult females (i.e., pregnant, lactating, or post-lactating) and/or young of the year during May 15 – August 15 confirms the presence of a maternity colony in the area. Since adult males and non-reproductive females have commonly been found summering with maternity colonies, radio-tracking results will be relied upon to help determine the presence or absence of a maternity colony or large concentrations of bats in the area when only males and/or non-reproductive females are captured.

#### **PERSONNEL**

A qualified biologist(s)<sup>35</sup> must (1) select/approve mist-net set-ups in areas that are most suitable for capturing Indiana bats, (2) be physically present at each mist-net site throughout the survey period, and (3) confirm all bat species identifications. This biologist may oversee other biological technicians and manage mist-net set-ups in close proximity to one another as long as the net-check timing (i.e., every 10 minutes) can be maintained while **walking** between nets.

#### COORDINATION WITH USFWS FO(s)

If not already required by federal permit, we recommend that applicants submit a draft study plan for all survey phases to the USFWS FO(s) for review and approval (See Appendix A for guidance on submitting a draft study plan).

#### **EQUIPMENT**

Use the finest, lowest visibility mesh mist-nets commercially available, as practicable. Currently, the finest net on the market is 75 denier, 2 ply, denoted 75/2 (Arndt and Schaetz 2009); however, the 50 denier nets are still acceptable for use at this time. The finest mesh size available is approximately 1½ inches (38 millimeters).

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<sup>&</sup>lt;sup>33</sup> Due to concerns with transmission of white-nose syndrome, some USFWS FO(s) and state natural resource agencies have delayed the start of the Indiana bat summer field survey season/mist-netting until June 1. Surveyors/applicants should always coordinate with local USFWS FO(s) and state natural resource agencies before beginning surveys.

<sup>34</sup> With prior USFWS FO approval, a survey may be completed after August 15 if it was initiated in time to be completed by August 15 and extenuating weather circumstances resulted in delaying completion. Delays as a result of not meeting the acceptable weather requirements are the ONLY valid justification for surveying after August 15.

<sup>&</sup>lt;sup>35</sup> A qualified biologist is an individual who holds a USFWS Recovery Permit (Federal Fish and Wildlife Permit) for Indiana bats in the state/region in which they are surveying and/or has been authorized by the appropriate state agency to net and handle Indiana bats. Several USFWS offices maintain lists of qualified bat surveyors, and if working in one of those states with authorizations in lieu of a Recovery Permits, the individual will either need to be on that list or submit qualifications to receive USFWS approval prior to conducting any field work.

No specific hardware is required. There are many suitable systems of ropes and/or poles to hold nets. The system of Gardner et al. (1989) has been widely used. See NET PLACEMENT for minimum net heights, habitats, and other netting requirements that affect the choice of hardware.

To minimize potential for disease transmission, any equipment that comes in contact with bats should be kept clean and disinfected, following approved protocols; this is particularly a concern relative to white-nose syndrome (WNS). Disinfection of equipment to avoid disease transmission (e.g., WNS) is required; protocols are posted at <a href="http://www.whitenosesyndrome.org/">http://www.whitenosesyndrome.org/</a>. Federal and state permits may also have specific equipment restrictions and disinfection requirements.

## MINIMUM PRESENCE/ABSENCE MIST-NETTING LEVEL OF EFFORT (PHASE 2)

The level of netting survey effort required for a non-linear project will be dependent upon the overall acreage of suitable habitat that may be impacted by the action (directly or indirectly). To determine the survey effort, quantify the amount of suitable summer habitat within the project area. **NOTE**: for projects where other impacts than tree removal are likely (e.g., collision), ensure that presence/probable absence surveys are designed to cover all suitable habitat within the entire project area (where exposure to any kind of impacts may be anticipated) and NOT just the locations where tree removal is planned. Additional guidance for linear project is in Appendix F.

Conduct Mist-Netting Surveys following Recovery Unit-based protocols<sup>36</sup> (See Figures 1 and 2)

Northeast and Appalachia Recovery Units (CT, DE, MA, MD, NC, NJ, NY, PA, eastern TN, WV, VA, VT):

<u>Linear projects</u>: a minimum of 10 net nights per km (0.6 miles) of suitable summer habitat (see Appendix F).

Non-linear projects: a minimum of 42 net nights per 123 acres<sup>37</sup> (0.5 km<sup>2</sup>) of suitable summer habitat.

## For example:

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• 7 sites<sup>38</sup>, 2 nets<sup>39</sup>/site for 3 calendar nights = 42 net nights

• 7 sites, 3 nets/site for 2 calendar nights = 42 net nights

• 3 sites, 2 nets/site for 7 calendar nights\* = 42 net nights

<sup>&</sup>lt;sup>36</sup> The Indiana bat populations in the Northeast and Appalachia Recovery Units (RUs) have been more heavily impacted by white-nose syndrome; therefore, we recommend higher survey effort in these RUs than the Midwest and Ozark-Central RUs.

<sup>&</sup>lt;sup>37</sup> We have no recommendations for reducing the minimum level of effort required to demonstrate probable absence for projects <123 acres in size. Detection probabilities and occupancy estimates were derived from past survey efforts that used the same acreage threshold (see Niver et al. 2013).

<sup>&</sup>lt;sup>38</sup> A site is defined as a geographic area to be sampled. It can include one or more nets that can be managed by one Qualified Biologist.

<sup>&</sup>lt;sup>39</sup> A net is defined as any combination of individual panels and poles (e.g., single, double, triple high) to fill the area (e.g., corridor) being sampled.

Maximum of 3 nights of consecutive netting at any given net location. After 3 consecutive nights of netting at the same location, you must change net locations or wait at least 2 calendar nights before resuming netting at the same location.

- a) If no capture of Indiana bats, then no further summer surveys are recommended<sup>40</sup>.
- b) If capture of Indiana bat(s), then stop or proceed to **Phase 4** as previously decided in coordination with the FO(s).

# Midwest and Ozark-Central Recovery Units (AL, AR, GA, IA, IL, IN, KY, MI, MO, MS, OH, OK, and central & western TN):

<u>Linear projects</u>: a minimum of 2 net nights per km (0.6 miles) of suitable summer habitat (see Appendix F).

<u>Non-linear projects</u>: a minimum of 9 net nights per 123 acres (0.5 km<sup>2</sup>) of suitable summer habitat.

- 3 sites, 1 net/site for 3 calendar nights = 9 net nights
- 1 site, 3 nets/site for 3 calendar nights = 9 net nights

<u>Maximum of 3 nights of consecutive netting at any given net location</u>. After 3 consecutive nights of netting at the same location, you must change net locations or wait at least 2 calendar nights before resuming netting at the same location.

- a) If no capture of Indiana bats, then no further summer surveys are recommended.
- b) If capture of Indiana bat(s), then stop or proceed to **Phase 4** as previously decided in coordination with the FO(s).

# MIST-NETTING SURVEYS TO CAPTURE INDIANA BATS AFTER ACOUSTICS WERE USED AS P/A METHOD (PHASE 3)

If netting was not conducted as the P/A method, then netting may be conducted to capture and characterize (e.g., sex, age, reproductive condition) the Indiana bats (documented through the Phase 2 acoustic P/A survey) present in an area and to facilitate radio-tracking (Phase 4) efforts. We encourage working with the FO(s) to develop Phase 3 netting plans based on best available information (e.g., positive acoustic locations). There are no minimum requirements for this phase as this is not a P/A phase.

- a) If no Indiana bats are captured, then coordinate with the USFWS FO.
- b) If Indiana bats are captured, then proceed to <u>Phase 4</u> as previously decided in coordination with the FO(s).

<sup>40</sup> NOTE: For Phase 2 Presence/Absence Surveys, wherever the phrase "no further summer surveys are recommended" occurs within this document, the USFWS FO(s) is in affect assuming probable absence of Indiana bats during the summer.

## **NET PLACEMENT**

Potential travel corridors (e.g., streams, logging trails) typically are the most effective places to net (although other places may also be productive; see Carroll et al. 2002). Place nets approximately perpendicular across the corridor. Nets should fill the corridor from side to side, extending beyond the corridor boundaries when possible, and from stream (or ground) level up to the overhanging canopy. Nets of varying widths and heights may be used as the situation dictates. A typical set is at least 5 m to 9 m high consisting of two or more nets stacked on top one another and from 6 m to 18 m wide. If netting over water, ensure there is enough space between the net and the water so that captured bats will not get wet.

Occasionally it may be necessary or desirable to net where a suitable corridor is lacking. The typical equipment described in the section above may be inadequate for these situations, requiring innovation on the part of the surveyor (see Humphrey et al. 1968). See Kiser and MacGregor (2005) for additional discussion about net placement.

Although no minimum spacing between mist-nets is being specified, surveyors should attempt to evenly distribute net set-ups throughout suitable habitat and must provide written justification in their report if net set-ups were not distributed throughout suitable habitat (i.e., why were they clumped?). Net set-ups can be repeatedly sampled throughout the project, but generally no more than 2-3 nights at a single location is recommended. In addition, changing locations within a project area may improve capture success (see Robbins et al. 2008; Winhold and Kurta 2008). Photo-document placement of nets.

#### SURVEY PERIOD

The survey period for each net shall begin at sunset<sup>41</sup> and continue for at least 5 hours (longer survey periods may also improve success).

### CHECKING NETS

Each net set-up should be checked approximately every 10 minutes (Gannon et al. 2007). If surveyors monitor nets continuously, take care to minimize noise, lights and movement near the nets. Monitoring the net set-up continuously with a bat detector (ideally using ear phones to avoid alerting bats) can be beneficial: (a) bats can be detected immediately when they are captured, (b) prompt removal from the net decreases stress on the bat and potential for the bat to escape (MacCarthy et al. 2006), and (c) monitoring with a bat detector also allows the biologist to assess the effectiveness of each net placement (i.e., if bats are active near the net set-up but avoiding capture), which may allow for adjustments that will increase netting success on subsequent nights. There should be no other disturbance near the nets, other than to check nets and remove bats. Biologists should be prepared to cut the net if a bat is severely entangled and cannot be safely extracted within 3 or 4 minutes (CCAC 2003; Kunz et al. 2009).

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<sup>&</sup>lt;sup>41</sup> Surveys may need to start a little earlier or later than official sunset times (i.e., at "dusk") in some settings such as a deep/dark forested valleys or ridge tops to avoid missing early-flying bats or capturing late-flying birds, respectively. Sunset tables for the location of survey can be found at: http://aa.usno.navy.mil/data/docs/RS\_OneYear.php.

Capture and handling are stressful for bats. Emphasis should be on minimizing handling and holding bats to as short a time as possible to achieve field study objectives. Indiana bats should not be held for more than 30 minutes after capture, unless the individual is targeted for radio-tracking. Bats targeted for radio-tracking should be released as quickly as possible, but no longer than 30 minutes <sup>42</sup> after capture, or as allowed in federal and state permits. See Kunz and Kurta (1988) for general recommendations for holding bats.

## WEATHER, LIGHTING, AND OTHER ENVIRONMENTAL CONDITIONS

Severe weather adversely affects capture of bats. Some Indiana bats may remain active despite inclement weather and may still be captured while others in the same area become inactive. Therefore, negative surveys combined with any of the following weather conditions throughout all or most of a sampling period are likely to require an additional night of mist-netting<sup>43</sup>: (a) temperatures that fall below 50°F (10°C)<sup>44</sup>; (b) precipitation, including rain and/or heavy fog, that exceeds 30 minutes or continues intermittently during the survey period; and (c) sustained wind speeds greater than 9 miles/hour (4 meters/seconds; 3 on Beaufort scale) for 30 or more minutes.

<u>NOTE</u>: Provided that nets are not dripping wet, surveyors can resume netting to meet the minimum 5-hour requirement after short periods of adverse weather. If nets are under good cover, light rain may not alter bat behavior. However, if no bats are being captured during marginal weather, coordinate with the USFWS FO(s).

It is typically best to place net set-ups under the canopy where they are out of moonlight, particularly when the moon is half-full or greater. Net set-ups illuminated by artificial light sources should also be avoided.

The shining of lights, and noise should be kept to a minimum with no smoking around the survey sites. In addition, the use of radios, campfires, running vehicles, punk sticks, citronella candles and other disturbances will not be permitted within 300 feet of mist nets (or acoustic detectors) during surveys.

## DOCUMENTATION OF INDIANA BAT CAPTURES

If an Indiana bat(s) is captured during mist-netting, protocols for radio-tracking and emergence survey requirements, as provided in Appendix D and E, respectively, should be followed. In addition, the appropriate USFWS FO(s) must be notified of the capture within 48 hours (or in accordance with permit conditions), and the sex and reproductive condition of the bat and GPS coordinates of the capture site should be provided. Ensure GPS coordinates are recorded for each individual net set on datasheets.

<sup>42</sup> Current standard federal Section 10 bat permit conditions require prior written approval from the Field Supervisor in the USFWS FO(s) if capture times may exceed 30 minutes.

<sup>&</sup>lt;sup>43</sup> With prior USFWS FO approval, a survey may be completed after August 15 if it was initiated in time to be completed by August 15 and extenuating weather circumstances resulted in delaying completion. Delays as a result of not meeting the acceptable weather requirements are the ONLY valid justification for surveying after August 15.

<sup>&</sup>lt;sup>44</sup> If using this guidance for NLEB: Overnight survey temperatures may be lower in northern portions of the NLEB range, please coordinate with the local USFWS FO in the northern portion of the range for any variation in temperature requirements.

Several species of bats from the genus *Myotis* share common features which can make identification difficult; Indiana bats and little brown bats (*Myotis lucifugus*) can be particularly difficult to distinguish. Photo-documentation of all bats captured and identified as Indiana bats and the first 10 little brown bats per project are requested to verify the identifications made in the field.

Photo-documentation should include diagnostic characteristics:

- a ¾-view of face showing ear, tragus, and muzzle
- view of calcar showing presence/absence of keel
- a transverse view of toes showing extent of toe hairs

If a bat from the genus *Myotis* is captured during mist netting that cannot be readily identified to the species level, then species verification may be attempted through fecal DNA analysis. Collect one or more fecal pellets (i.e., guano) from the bat in question by placing it temporarily in a holding bag (15 minutes is usually sufficient, no more than 30 minutes is recommended). The pellet (or pellets) collected should be placed in a small vial (e.g., 1.5 ml) with silica gel desiccant; pellets from each individual bat should be stored in separate vials and out of direct light. Fees charged by independent laboratories for sequencing fecal DNA samples is generally inexpensive (approx. \$50 per guano sample), however, it has been challenging to identify labs willing to consistently conduct these analyses. Any additional information and a list of available laboratories will be made available on the Indiana bat webpage on the USFWS's Region 3 website (http://www.fws.gov/midwest/Endangered/mammals/inba/index.html).

#### SUBMISSION OF MIST-NETTING RESULTS

Provide results of netting surveys to the appropriate USFWS FO(s) in accordance with previously agreed upon<sup>45</sup> timeframes and formats<sup>46</sup>. If Indiana bats are captured, this report should also include the results of subsequent radio-tracking and emergence counts. Reports should include the following:

- 1. Copy of prior phase reports (if not previously provided).
- 2. Explanation of any modifications from original survey plan (e.g., altered net locations). 47
- 3. Description of net locations (including site diagrams), net set-ups (include net heights), survey dates, duration of surveys, weather conditions, and a summary of findings.
- 4. Map identifying netting locations and information regarding net set-ups, including lat/long or UTM, individual net placement, net spacing (i.e., include mist-netting

<sup>45</sup> As discussed in the Introduction, we encourage coordination with USFWS FO(s) prior to implementation of any surveys to ensure that all parties agree upon the need for surveys, the methods proposed, and the decisions from various survey results.

<sup>&</sup>lt;sup>46</sup> In 2016, the USFWS implemented a new standardized approach for reporting of bat survey data. In addition to a traditional written report, federal permit holders are now required to submit their survey data using the standardized permit reporting spreadsheets available on the R3 Indiana Bat Summer Survey Guidance webpage (http://www.fws.gov/midwest/Endangered/mammals/inba/inbasummersurveyguidance.html).

<sup>&</sup>lt;sup>47</sup> If the USFWS previously agreed upon the study plan we need to understand whether the revised work still accomplished the agreed upon methods

- equipment in photographs of net locations), and adequate justification if net set-ups are not evenly distributed across suitable habitat within the project area.
- 5. Full names of mist-netting personnel attending each mist-net site during an operation, including the federally-permitted/qualified biologist present at each mist-net site. Indicate on the field data sheet the full name of person who identified bats each night at each site.
- 6. Legible copies of all original mist-netting datasheets (see example datasheet below) and a summary table with information on all bats captured during the survey including, but not limited to: capture site, date of capture, time of capture, sex, reproductive condition, age, weight, right forearm measurement, band number and type (if applicable), and Reichard's wing damage index score (Reichard and Kunz. 2009).
- 7. Photographs of all net set-ups, as well as **all** Indiana bats and the first 10 little brown bats captured from each project, so that the placement of netting equipment and identification of species can be verified. Photographs of bats should include all diagnostic characteristics that resulted in the identification of the bat to the species level.
- 8. Any other information requested by the local USFWS FO(s) related to the project.

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## Sample Data Sheets for Indiana Bat Surveys

Site No.			Proje	ect/Firm:						Date:						
Loca	tion:															
Cou	nty:			Sta	ite:	Quad:					Quadra	ant:				
Lat/	Long (DM	(S): N		W			Z	one:			Survey					
#	Time	Species	Age	Sex	Repro. Cond.*	RFA (mm)	Mass (g)	Net/ Ht	Guano/ Hair	Wing Score	nd# vpe	Moon P	hase:		%	
1						(	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\							Rise		Set
2											_	Moon:				
3												Sun:				
4											_					
5											_	Time	Temp	Sky	Wind	# Bats
6																
7											_					
8											_					
9											_					
10											_					
11																
12																
13												Avg				
14																
15														Sky	Code	
16												0	Clear			
17												1	Few Clo			
18												2	Partly C	loudy		
19												3	Cloudy	or overc	ast	
20												4	Smoke o	r fog		
21												5	Drizzle	or light i	rain	
22												6	Thunder	storm		
23																
24															Wind Cod	le
25												0	Calm (0	mph)		
26												1	Light wind (1-3 mph)			
27												2	Light br	eeze (4-	7 mph)	
28												3	Gentle b	reeze (8	-12 mph)	
29												4	Moderat	e breeze	(13-18 m	ph)
30																

<sup>\*</sup>Repro. Cond (Reproductive Condition): (P) pregnant; (L) lactating; (PL) post-lactating; (NR) non-reproductive, (TD) testes descended

# Sample Data Sheets for Indiana Bat Surveys

Net Site Diagram			Domi	nant V	egetatio	F .	
		1					
		2					
		3					
		A					
		5					
			Net S	ite(s) b	y Habita	t	
		Habitat		A	В	C	
		River		1			
		Stream					
		Pond		-			
		Road Rut		-			
		Corridor		117			
		Cave/mine					
		Total			+		
		Total	-		-		
			No. of I	Poles X	Net len	rth	
		A	=	1	X	T	
	B	В	=		X		
		C	-		X		
	Other Species:	D			X		
	canter operation	L.		-		-	
Comments:							
John Christ							

## APPENDIX C: PHASE 2 ACOUSTIC SURVEYS

SUMMER ACOUSTIC SURVEY SEASON: May 15 – August 15<sup>48</sup>

PERSONNEL<sup>49</sup>

**Overall:** Acoustic surveyors should have either completed one or more of the available bat acoustic courses/workshops (e.g., BCM, ERM, Titley/AnaBat, Wildlife Acoustics, USFWS) or be able to show similar on-the-job or academic experience.

**Detector Deployment:** Acoustic surveyors should have a working knowledge of the acoustic equipment and Indiana bat ecology. Surveyors should be able to identify appropriate detector placement sites and establish those sites in the areas that are most suitable for recording high-quality Indiana bat calls. Thus, it is highly recommended that all potential acoustic surveyors attend appropriate training and have experience in the proper placement of their field equipment.

**Acoustic Analysis:** Acoustic surveyors should have a working knowledge of the approved acoustic analysis programs. Thus, it is highly recommended that all potential acoustic surveyors attend appropriate training and have experience in the analysis of acoustic recordings.

Qualitative Analysis: Individuals qualified to conduct qualitative analysis of acoustic bat calls typically have experience: (1) gathering known calls as this provides a valuable resource in understanding how bat calls change and the variation present in them; (2) identifying bat calls recorded in numerous habitat types; (3) familiarity with the species likely to be encountered within the project area; and (4) individuals must have multiple years of experience and must have stayed current with qualitative ID skills. A resume (or similar documentation) must be submitted along with final acoustic survey reports for anyone making final qualitative identifications.

## COORDINATION WITH USFWS FO(s)

If not already required by federal permit, we recommend that applicants submit a draft study plan for all survey phases to the USFWS FO(s) for review and approval. Study plans should include a map/aerial photo identifying the proposed project area boundaries, suitable bat habitats and acreages within the project area, the proposed number and tentative locations of acoustic monitoring sites, and the identification of the approved acoustic software program(s) (and version #) used for analysis of calls for the specific project. If a single software program is used for analysis, surveyors will not be allowed to switch programs from what was originally identified in their final study plan.

## DETECTOR AND MICROPHONE REQUIRED CHARACTERISTICS

Full-spectrum (FS) and/or zero-crossing (ZC) detectors are suitable for use in this survey protocol. Directional, hemispherical, and omnidirectional microphones are acceptable for acoustic surveys. The use of external microphones on an extension cable is the preferred deployment as it further limits

<sup>&</sup>lt;sup>48</sup> With prior USFWS FO approval, a survey may be completed after August 15 if it was initiated in time to be completed by August 15 and extenuating weather circumstances resulted in delaying completion. Delays as a result of not meeting the acceptable weather requirements are the ONLY valid justification for surveying after August 15.

<sup>&</sup>lt;sup>49</sup> Coordinate with your local FO regarding any state-specific requirements.

degradation of call quality. Recording without directional horns on hemispherical and omnidirectional microphones is preferred as the addition of these systems may result in some signal degradation and directional microphones are commercially available.

Use recommended manufacturer detector settings for conducting Indiana bat P/A surveys unless otherwise noted on the Service's Indiana Bat Summer Survey Guidance webpage. For ZC detectors (as well as when converting WAV files to ZC files), the data-division ratio must be set to 8.

## ACOUSTIC SAMPLING PROTOCOL

## Detector/Microphone Placement

Detector/Microphone placement is critical to the successful isolation of high-quality bat call sequences for later analysis. The following locations are likely to be suitable sites for detectors/microphones, including, but not limited to: (a) forest-canopy openings; (b) near water sources; (c) wooded fence lines that are adjacent to large openings or connect two larger blocks of suitable habitat; (d) blocks of recently logged forest where some potential roost trees remain; (e) road and/or stream corridors with open tree canopies or canopy height of more than 33 feet (10 meters); and (f) woodland edges (Britzke et al. 2010). Of equal importance to acoustic site selection is the surveyor's working knowledge of the sampling volume and area of highest sensitivity within the zone of detection around a given microphone, which helps to ensure that detector placement as well as microphone selection and orientation are best suited for a particular site to ensure the detection zone is free of clutter. Detection distance, placement (e.g., location, orientation, height of microphone), and specific features (e.g., vegetation, water, and other obstructions) at the sample site should dictate whether a directional, hemispherical, or omnidirectional microphone is used. If detectors/microphones are placed in unsuitable locations, effective data analysis may be impossible, and the results of the sampling effort will likely be invalid.

Many features (e.g., vegetation, water, wind turbines, high-tensile power-lines, micro-wave towers) can obstruct and reflect call sequences recorded in the field and thereby reduce the surveyor's ability to record high-quality bat call sequences. The following recommendations are provided to aid surveyors in their selection of acoustic sites (also see Chenger and Tyburec 2014). If surveyors choose acoustic sites outside of these recommendations, then adequate justification for doing so should be provided with the acoustic survey report provided to the USFWS FO(s); otherwise, results from these sites will not be accepted. Surveyors should deploy microphones: (a) at least 10 feet (3 meters) in any direction from vegetation or other obstructions (Hayes 2000; Weller and Zabel 2002; Chenger and Tyburec 2014); (b) in areas without, or with minimal of highly directional microphones or 33 feet (10 meters) from other microphones; (c) parallel to woodland edges; and (d) at least 49 feet (15 meters) from known or suitable roosts (e.g., trees/snags, buildings, bridges, bat houses, cave or mine portal entrances).

<sup>50</sup> If necessary, surveyors can remove small amounts of vegetation (e.g., small limbs, saplings) from the estimated detection zone at a site, much like what is done while setting up mist-nets. Deployment of detectors/microphones in closed-canopy locations that typically are good for mist-netting are acceptable as long as the area sampled below the canopy does not restrict the ability of the equipment's detection zone to record high-quality calls (i.e., vegetation is outside of the detection zone).

<sup>&</sup>lt;sup>51</sup> If the surveyor discovers a potential roost and wishes to document but use, please refer to Appendix E for guidance on conducting emergence surveys and contact the USFWS FO(s).

Elevating a detector greater than 3 meters above ground level (AGL) vegetation may dramatically improve recording quality. Microphones can be attached horizontally to a pole to listen out into flight space, rather than just listening up from the ground. This will serve to increase the volume of airspace sampled and avoid the distortion effect of recording near the ground. However, the relationship between the zone of detection and the vegetation, not the placement of the detector is the most important consideration during site selection.

Surveyors should distribute acoustic sites throughout the project area or adjacent habitats. In most cases, acoustic sites should be at least 656 feet (200 meters) apart. If closer spacing is determined to be necessary or beneficial (e.g., multiple suitable habitats and acoustic sites immediately adjacent to each other), sufficient justification must be provided in the acoustic study plan and survey report submitted to USFWS FO(s).

## Verification of Deployment Location

It is recommended to temporarily attach GPS units to each detector (according to manufacturer's instructions) to directly record accurate location coordinates for each acoustic site that is paired with the acoustic data files. Regardless of technique used, accurate GPS coordinates must be generated and reported for each acoustic detector location.

## **Verification of Proper Functioning**

It is highly recommended that surveyors ensure acoustic detectors are functioning properly through a periodic verification of performance to factory specifications (a service currently offered or in development by several manufacturers). It may be possible that independent service bureaus would be willing to perform this service, providing that a standard test/adjustment procedure can be developed.

It is also recommended to ensure equipment is working during set-up in the field. This can be done simply by producing ultrasound (e.g., finger rubs, calibrator, or follow the equipment manufacturer's testing recommendations) in front of the microphone at survey start and survey finish. These tests document that the equipment was working when deployed and when picked up (and by assumption throughout the entire period). Detector field settings (e.g., sensitivity, frequency, etc.) should follow the recommendations provided by the manufacturer. Surveyors should also save files produced by detectors (e.g., log files, status files, sensor files) as an excellent way to provide documentation when equipment was functioning within the survey period. Many types of detectors allow for setting timers that initiate and end recording sessions. This saves battery life as well as reducing the number of extraneous noise files recorded. However, if the units are visited when the timer is on (i.e., unit is in standby mode), the surveyor cannot verify that the unit is functioning properly. This is particularly important in areas where no bat activity is recorded for the entire night or during the last portion of the night. In these cases, if the surveyor cannot demonstrate that the detector was indeed functioning properly throughout the survey period, then the site will need to be re-sampled, unless adequate justification can be provided to the USFWS FO(s).

Selection of acoustic sites is similarly important. Suitable set-up of the equipment should result in high-quality call sequences that are adequate for species identification. Nights of sampling at individual sites that produce no bat calls may need to be re-sampled unless adequate justification (e.g., areas with significant bat population declines due to WNS) can be provided to the USFWS FO(s). Modifications of the equipment (e.g., changing the orientation and/or microphone type) at the

same location on subsequent nights may improve quantity and quality of call sequences recorded, which can be determined through daily data downloads. If modifications of the equipment do not improve call identification, then the detectors will need to be moved to a new location.

## Orientation

Detectors deployed with directional microphones should be aimed to sample the majority of the identified flight path/zone to maximize the number of call pulses recorded from individual bats. Omnidirectional microphones deployed on a pole in the center of the flight path/zone should be oriented horizontally. In some circumstances, it might be desirable to aim a directional microphone straight up in smaller forest openings. As always, the goal is to sample as large a volume of likely bat flight space as possible while minimizing clutter. Hemispherical microphones should be aimed vertically, creating a dome-like detection field. Hemispherical microphones are best suited for open areas where deploying at heights greater than 3 meters AGL is problematic because of the lack of structure to hide the microphone and prevent it from becoming a novel item of interest to bats. Vertical orientation, however, precludes the use of weatherproofing for protection of the microphone, since no currently-approved weatherproofing system will adequately protect the microphone of a detector aimed vertically. Once acoustic sites are identified, photographs documenting the orientation, detection zone (i.e., "what the detector is sampling"), and relative position of the microphone should be taken for later submittal to the USFWS FO(s) as part of the acoustic survey report (See Submission of Acoustic Survey Results for additional description).

## Weather Conditions

If any of the following weather conditions exist at a survey site during acoustic sampling, note the time and duration of such conditions, and repeat the acoustic sampling effort for that night<sup>52</sup>: (a) temperatures fall below 50°F (10°C) during the first 5 hours of survey period; (b) precipitation, including rain and/or fog, that exceeds 30 minutes or continues intermittently during the first 5 hours of the survey period; and (c) sustained wind speeds greater than 9 miles/hour (4 meters/second; 3 on Beaufort scale) for 30 minutes or more during the first 5 hours of the survey period. At a minimum, nightly weather conditions for survey sites should be checked using the nearest NOAA National Weather Service station and summarized in the survey reports.

## Weatherproofing

Most bat detectors are not weatherproof when delivered from the factory. Recording without aftermarket weatherproofing is preferred as the addition of these systems may result in some signal degradation. The decision to weatherproof detectors or not should be determined nightly based on the likelihood of precipitation in the survey area. If necessary, detectors should be placed in after-market weatherproof containers and an external microphone, attached by an extension cable should be deployed greater than 3 meters AGL.

For directional microphones, the use of a polyvinyl chloride (PVC) tube<sup>53</sup>, generally in the form of a 45-degree elbow the same diameter as the microphone (Britzke et al. 2010) is acceptable, if the situation requires the use of after-market weatherproofing. The microphone should be placed facing

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<sup>&</sup>lt;sup>52</sup> With prior USFWS FO approval, a survey may be completed after August 15 if it was initiated in time to be completed by August 15 and extenuating weather circumstances resulted in delaying completion. Delays as a result of not meeting the acceptable weather requirements are the ONLY valid justification for surveying after August 15.

<sup>&</sup>lt;sup>53</sup> The PVC option has only been tested with AnaBat SD1/SD2 detectors and directional microphones. It may not perform as well with other detector microphone combinations.

the open end of the elbow and as close to the opening as is consistent with the aim of weatherproofing. The microphone should be pointing at an angle below horizontal so water will not collect in it. Corben & Livengood (2014) showed that the direction of greatest sensitivity of tubes like this varies greatly depending on details of the specific tube shape and the exact position of the microphone. Often the greatest sensitivity will be pointed up at a substantial angle (up to 45 degrees) above horizontal when the microphone itself is pointing 45 degrees below horizontal. Users should be aware of the characteristics of the setup they use so they can know what region is actually being sampled. Again, the preferred option for weatherproofing detectors is to detach the microphone from the detector so that the detector can be placed in a weatherproof container but the microphone (tethered by a cable) remains unobstructed.

Other after-market weatherproofing systems may become available and approved by the USFWS provided they show that call quality and the number of calls recorded are comparable to those without weatherproofing.

MINIMUM LEVEL OF EFFORT (applies to all Recovery Units/range-wide) (See Figures 1 and 2)

The level of acoustic survey effort required for a project will be dependent upon the overall acreage of suitable habitat that may be impacted by the action (directly or indirectly). To determine the acoustic survey effort, quantify the amount of suitable summer habitat within the project area.

NOTE: for projects where impacts other than tree removal are likely (e.g., collision), ensure that presence/probable absence surveys are designed to cover all suitable habitat within the entire project area and NOT just the locations where tree removal is planned.

<u>Linear projects</u>: a minimum of 2 detector nights per km (0.6 miles) of suitable summer habitat (See Appendix F).

At least 1 detector location for at least 2 calendar nights (can sample the same location or move within the km site).

Non-linear projects: a minimum of 8 detector nights per 123 acres (0.5 km<sup>2</sup>) of suitable summer habitat.

At least 2 detector locations per 123 acre "site" shall be sampled until at least 4 detector nights has been completed over the course of at least 2 calendar nights (may be consecutive).

## For example:

- 4 detectors for 2 nights each (can sample the same location or move within the site)
- 2 detectors for 4 nights each (can sample the same location or move within the site)
- 1 detector for 8 nights (must sample at least 2 locations and move within the site we recommend evenly distributing LOE among locations)

The acoustic sampling period for each site must begin at sunset<sup>54</sup> and ends at sunrise each night of sampling.

#### ANALYSIS OF RECORDED ECHOLOCATION CALLS

# Step 5. Optional coarse screening - for high frequency (HF) or myotid calls (depending on available H/L frequency filters) or Proceed to Step 6.

- a) If no positive detection of HF calls<sup>55</sup> (≥35 kHz) or myotid calls, no further summer surveys recommended.
- b) If positive detection of HF or myotid calls, then
  - i) proceed to Step 6 for further acoustic analysis; **OR**
  - ii) assume presence of Indiana bats and coordinate with the USFWS FO(s); **OR**
  - iii) assume presence and proceed to **Phase 3**.

# Step 6. Conduct Automated Acoustic Analyses for each site that had HF or Myotid calls from Step 5 or ALL sites if Step 5 was not conducted.

Use **one or more** of the currently available 'approved' acoustic bat ID programs<sup>56</sup> (use most current approved software versions available and manufacturer's recommended settings for Indiana bat P/A surveys) as previously identified in your Phase 2 study plan. 'Candidate' programs are not yet approved by USFWS for stand-alone use for Indiana bat P/A surveys, but may be used in conjunction with one or more of the approved programs. Include your plans for which specific software program(s) you will use in your survey study plan and submit for USFWS FO(s) review prior to conducting surveys. Beginning with acoustic data from night one at each acoustic site, run each night's data for each site through your chosen ID program(s). Review results <u>by site by night</u> from each acoustic ID program used<sup>57</sup>.

- a) If Indiana bat presence is considered unlikely by the approved and candidate program(s) used in analysis, then no further summer surveys recommended.
- b) If Indiana bat presence is considered likely at one or more sites on one or more nights by any approved or candidate program(s) used in analysis, then
  - i) proceed to Step 7 for qualitative ID; **OR**
  - ii) assume presence of Indiana bats and coordinate with the USFWS FO(s); **OR**
  - iii) assume presence and proceed to **Phase 3**.

## Step 7. Conduct Qualitative Analysis of Calls.

<sup>54</sup> Surveys may need to start a little earlier or later than official sunset times (i.e., at "dusk") in some settings such as a deep/dark forested valleys or ridge tops to avoid missing early-flying bats or capturing late-flying birds, respectively. Sunset tables for the location of survey can be found at: <a href="http://aa.usno.navy.mil/data/docs/RS">http://aa.usno.navy.mil/data/docs/RS</a> OneYear.php

<sup>&</sup>lt;sup>55</sup> HF calls are defined as individual call pulses whose minimum frequency is ≥35 kHz.

<sup>&</sup>lt;sup>56</sup> Approved and candidate programs are listed at http://www.fws.gov/midwest/Endangered/mammals/inba/surveys/inbaAcousticSoftware.html

<sup>&</sup>lt;sup>57</sup> The approved acoustic identification programs all have implemented a maximum likelihood estimator (MLE) at this time. If the analysis of collected calls at a given site on a given night results in the probable presence of Indiana bats with high levels of certainty (P<0.05), then select one of the options available in Step 6b.

At a minimum, for each detector site/night a program considered Indiana presence likely, review <u>all files</u> (including no IDs) from that site/night. Qualitative analysis<sup>58</sup> (i.e., manual vetting) must also include and present within a written report a comparison of the results of each acoustic ID program by site and night (see Reporting Requirements below).

- a) If no visual confirmation of probable Indiana bats, then no further summer surveys recommended<sup>59</sup>.
- b) If visual confirmation of probable Indiana bats, then
  - i) assume presence of Indiana bats and coordinate with the USFWS FO(s); **OR**
  - ii) assume presence and proceed to **Phase 3**.

## SUBMISSION OF ACOUSTIC SURVEY RESULTS

<u>NOTE</u>: All originally recorded (ZC or FS) data MUST be maintained for a period of 7 years and be made available to the USFWS FO(s), if requested. Failure to do so may result in invalidation of survey results.

Provide results of acoustic surveys to the appropriate USFWS FO(s) within 10 days of completing the survey unless otherwise agreed upon with the local USFWS FO(s)<sup>60</sup>. Each acoustic survey report should include the following<sup>61</sup> (also, see checklist at end of this appendix):

- 1. Copy of habitat assessment (if not previously provided)
- 2. Explanation of any modifications from original survey plan (e.g., altered site locations)<sup>62</sup>
- 3. Full names of all personnel conducting acoustic surveys, including those that selected acoustic sites and deployed detectors
- 4. Full name and resume of individual(s) conducting qualitative acoustic analyses (if applicable)

<sup>&</sup>lt;sup>58</sup> Qualitative analysis of each acoustic site and night with probable detections of Indiana bats during Step 6 should include the entire night's high frequency call data, including "no ID" files, and not just those files making it through the acoustic analysis tools as probable Indiana bats in Step 6.

<sup>&</sup>lt;sup>59</sup> If you identify any suspected mis-identifications from programs, the Service will share those results with the software manufacturer(s) and the USGS to assist with future improvements and testing of software.

<sup>&</sup>lt;sup>60</sup> As discussed in the Introduction, we encourage coordination with USFWS FO(s) prior to implementation of any surveys to ensure that all parties agree upon the need for surveys, the methods proposed, and the decisions from various survey results.

<sup>&</sup>lt;sup>61</sup> In 2016, the USFWS implemented a new standardized approach for reporting of bat survey data. In addition to a traditional written report, federal permit holders are now required to submit their survey data using the standardized permit reporting spreadsheets available on the Indiana Bat Summer Survey Guidance webpage (http://www.fws.gov/midwest/Endangered/mammals/inba/inbasummersurveyguidance.html).

<sup>&</sup>lt;sup>62</sup> If the USFWS previously agreed upon the study plan we need to understand whether the revised work still accomplished the agreed upon methods.

- 5. Description of acoustic monitoring sites, survey dates, duration of survey, weather conditions, and a summary of findings
- 6. Table with information on acoustic monitoring and resulting data, including but not limited to: detector GPS coordinates for each detector, survey dates, survey hours
- 7. Map identifying acoustic detector locations and a corresponding table including the GPS coordinates. Include arrow(s) showing direction(s) of microphone(s)
- 8. Photographs documenting the location of each detector, the orientation of the detector, and the intended sampling area. Please include detector and something for scale (e.g., vehicle, person) in photographs of acoustic sites
- 9. Description of acoustic detector and microphone brand(s) and model(s) used, microphone type, use of weatherproofing, acoustic monitoring equipment settings (e.g., sensitivity, audio division ratios), deployment data (i.e., deployment site, habitat, date, time started, time stopped, orientation), and call analysis methods used
- 10. A description of how proper functioning of bat detectors was verified
- 11. Discussion of what software program(s) was/were used (including settings)
- 12. Acoustic detector log files renamed by site identifier
- 13. Acoustic analysis software program output/summary results by site by night (i.e., number of calls detected, species composition, MLE results, settings files)
- 14. Discussion for any site/nights with zero bat calls (were additional nights added? was detector functioning? was placement appropriate?)
- 15. If manual vetting was used, discussion of how this was done (e.g., what keys were used?)
- 16. If manual vetting was used, detailed analysis and results of any qualitative acoustic analysis conducted on those projects where a program(s) considered Indiana bat presence likely, including justification for rejecting any program MLE results (if applicable). We recommend providing a table with each species ID from the program(s), suggested species ID from manual vetting, and rationale for any changes.
- 17. Any other information requested by the local USFWS FO(s) related to the project

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## **General Checklist for Acoustic Surveys of Indiana Bats**

The following items should be documented and clearly presented within acoustic bat survey reports submitted to the Service

<b>ACOUST</b>	<u>FIC SURVEY INFO</u>	ACOUST	TIC ANALYSIS INFO
	Project Name		Program used to convert Full Spectrum to Zero
	Site ID No./Name		Cross (if applicable)?
	State and County		Filter(s) used (if any) and parameters used
	Site Lat./Long. Coordinates		(e.g., CFRead, noise, bug, etc.)
	(e.g., decimal degrees, NAD83)		Name of Service-approved Bat ID Software
	Approx. accuracy of Lat./Long. Coordinates		Program(s) and Version(s) used and Candidate
	Survey Date(s)		program(s)(if used)
	Person who Selected Acoustic Site(s)		Program Settings (if applicable):
	Person who Deployed Detector(s)		<ul> <li>Min. # of pulses for species ID</li> </ul>
	Detector Brand & Model		<ul> <li>Min. # of pulses per group ID</li> </ul>
	Microphone Brand & Model		<ul> <li>Min. discrim. prob. for species ID</li> </ul>
	Microphone Type:		<ul> <li>Other relevant settings affecting ID</li> </ul>
	Directional/Hemispherical/Omnidirectional		<ul> <li>Suite of species/groups included in</li> </ul>
	Type of Weatherproofing (if any)		program analysis
	Microphone Height above Ground-level		Table summarizing Number of Calls ID'd for
	Vegetation(m)		each Species/Site/Night/Program (including
	Distance from Nearest Vegetation or other		MLE p-values)
	Obstruction (m)(apart from veg. on ground)		If Qualitative Analysis was conducted, include
	Horizontal Orientation of Microphone		Number of Calls Confirmed through
	$(1-360^{\circ})$		Qualitative ID for each Species/Site/Night
	Vertical Orientation of Microphone (assuming		Full Name of Person(s) who conducted
	0° is parallel with horizon)		Qualitative Analysis
	Photographs of Detector Set-up at each Site		Additional Survey Reporting Requirements
	Detector Settings and/or Log Files (all settings		Acoustic Report Appendices:
	used for each brand/model of detector. For		o data sheets and maps,
	example, sensitivity, gain, data division, 16k		<ul> <li>photographs of detector set-ups,</li> </ul>
	high filter, sample rate, min/max duration, min		o computer screen captures of
	trigger freq., trigger level, etc.)		representative bat species identified
	Survey Start Time (military)		during acoustic analyses, and
	Survey End Time (military)		o resume(s) highlighting relevant
	Methods used to Field-test proper Functioning		qualifications of person(s) who
	of Detector		conducted qualitative analysis
	Were calls collected in Full Spectrum or Zero		(e.g., experience visually identifying
	Crossing?		<i>Myotis</i> , certificates of training,
	Habitat Type and/or Feature Surveyed		publications etc.)
	Weather Conditions during Survey Period		

#### PERSONNEL

**Transmitter Attachment:** A qualified biologist<sup>63</sup> who is experienced in handling Indiana bats and attaching radio transmitters must perform transmitter attachments, as further explained in the protocol below.

**Tracking:** Biological technicians and/or a qualified biologist who is experienced in tracking transmittered bats must be present and actively involved in all tracking activities for Indiana bats as further explained in the protocol below.

## **METHODS**

If one or more Indiana bats are captured, the following radio-tracking protocols will be applicable:

- 1. Biologists should coordinate in advance with USFWS FO(s) regarding recommendations for the number and distribution of transmitters (e.g., prioritization of sex/age, maximum number per site) and whether foraging data would be beneficial to collect. Also, professional judgment should be used to determine whether attachment of transmitters could compromise the health of a bat. Since the maximum holding times for Indiana bats targeted for radiotracking is 30 minutes<sup>64</sup>, or as allowed in federal and state permits, surveyors should be prepared to place transmitters on bats immediately following their capture to minimize holding times.
- 2. The radio transmitter, adhesive, and any other markings (e.g., wing bands) should weigh less than 5% of pre-attachment body weight (Aldridge and Brigham 1988, American Society of Mammalogists 1998), the total weight of the package (transmitter and adhesive) may not exceed 6% of the bat's body weight, and must comply with any USFWS and state permits. In all cases, the lightest transmitters capable of the required task should be used, particularly with pregnant females and volant juveniles. With pregnant bats, biologists should always use the lightest transmitter possible but no more than 5% of their expected non-pregnant weight.
- 3. Proposed radio telemetry equipment (e.g., receivers, antennas, and transmitters) and frequencies should be coordinated with the appropriate state natural resource agency and USFWS FO(s).
- 4. The qualified biologist or biological technician(s) should track all radio-tagged bats captured to diurnal roosts in accordance with permit requirements. We generally recommend tracking until the transmitter fails, fall off, or cannot be located for at least 7 days and should conduct

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<sup>&</sup>lt;sup>63</sup> A qualified biologist is an individual who holds a USFWS Recovery Permit (Federal Fish and Wildlife Permit) for federally-listed bats in the state/region in which they are surveying and/or has been authorized by the appropriate state agency to mist-net for Indiana bats. Several USFWS offices maintain lists of qualified bat surveyors, and if working in one of those states with authorizations in lieu of a Recovery Permits, the individual will either need to be on that list or submit qualifications to receive USFWS approval prior to conducting any field work.

<sup>&</sup>lt;sup>64</sup> Current standard federal Section 10 bat permit conditions require prior written approval from the Field Supervisor in the USFWS FO(s) if capture times may exceed 30 minutes

a minimum of 2 evening emergence counts at each identified roost (See Appendix E for Emergence Survey Protocols). However, biologists are encouraged to continue radio-tracking efforts for the life of the transmitter. Biologists should contact the USFWS FO(s) immediately if they plan to cease tracking efforts before the 7-day tracking period ends. If landowner access is denied, approximate roost locations (i.e., coordinates) should be determined using triangulation.

- 5. Daily radio telemetry searches for roosts must be conducted during daylight hours and should be conducted until the bat(s) is located or for a minimum of 4 hours of ground or 1 hour of aerial-searching effort per tagged bat per day for 7 days. However, multiple bats captured at the same net location or nearby may be tracked simultaneously. Once a signal is detected, tracking should continue until the roost is located. At a minimum, biologists should document all ground and aerial-searching effort for all bats not recovered during radiotracking for submittal with the survey report. For each roost identified during tracking, the biologist should complete a "USFWS Indiana Bat Roost Datasheet".
- 6. To minimize potential for disease transmission, any equipment that comes in contact with bats should be kept clean and disinfected, following approved protocols; this is particularly a concern relative to WNS. Protocols are posted at <a href="http://www.whitenosesyndrome.org/">http://www.whitenosesyndrome.org/</a>. Federal and state permits may also have specific equipment restrictions and disinfection requirements.

## SUBMISSION OF RADIO-TRACKING RESULTS

Phase 4 radio-tracking results should be included with the Phase 2 or 3 mist-netting report and submitted to the appropriate USFWS FO(s). Each report should include the following information related to radio-tracking efforts<sup>65</sup>:

- 1. Copy of prior phase reports (if not previously provided)
- 2. Explanation of any modifications from original survey plan (e.g., number of transmitters used, frequency of transmitters changed)<sup>66</sup>
- 3. Map and narrative detailing all ground and aerial searching effort for all bats not recovered during radio-tracking and relative to the negotiated or agreed effort as determined by the appropriate USFWS FO(s)
- 4. Map summarizing Indiana bat data collected from summer surveys for the proposed project (e.g., project area boundary and results from the site habitat assessment, acoustic survey, mist-net survey, radio-tracking, and emergence surveys)
- 5. Full names and permit numbers of personnel who attached transmitters to Indiana bats and full names of all personnel conducting radio-tracking efforts
- 6. Photographs of all roosts identified during radio-tracking
- 7. Legible copies of all original USFWS Indiana Bat Roost Datasheets
- 8. Any other information requested by the local USFWS FO(s) where work was conducted

<sup>&</sup>lt;sup>65</sup> In 2016, the USFWS implemented a new standardized approach for reporting of bat survey data. In addition to a traditional written report, federal permit holders are now required to submit their survey data using standardized permit reporting spreadsheets available on the Indiana Bat Summer Survey Guidance webpage (http://www.fws.gov/midwest/Endangered/mammals/inba/inbasummersurveyguidance.html).

<sup>&</sup>lt;sup>66</sup> If the USFWS previously agreed upon the study plan we need to understand whether the revised work still accomplished the agreed upon methods.

## REFERENCES

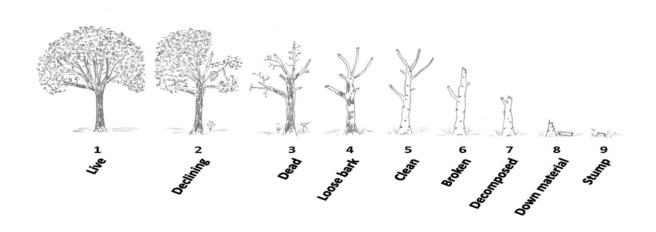
Aldridge, H., and R.M. Brigham. 1988. Load carrying and maneuverability in an insectivorous bat: a test of the 5% "rule." Journal of Mammalogy 69:379-382.

American Society of Mammalogists. 1998. Guidelines for the capture, handling and care of mammals. Journal of Mammalogy 79:1416-1431.

## USFWS INDIANA BAT ROOST DATASHEET

Biologists (Full Na	ame):	Date:	
UTM: Zone	Easting	Northing	OR
LAT	LONG		
Property Owner:		Phone#	
State	County	Si	te #
Roost #	Roost Name:		
Roost Tree Data			
Species:		Live S	Snag Other _
(if other, explain)			
DBH (in or cm)	Total H	eight (ft or m)	
Height of roost ar	ea (if known)	_Dist. from capture	site
Roost position asp	ect (deg)		
Exfoliating bark of	on bole (%) D	escribe: sloughing _	_ platy tight_
Cavities present?	If so, describe:		

Roost Decay State: 1 2 3 4 5 6 7 8 9 Other



Surrounding Habitat Condition  Canopy closure at roost (%)  Approximate woodlot size (ac or ha) Distance to non-forest (ft or m)  Describe forest/woodlot current condition (mature, partially cut-over, burned, insect damage, etc.)   Additional Comments
Approximate woodlot size (ac or ha) Distance to non-forest (ft or m)  Describe forest/woodlot current condition (mature, partially cut-over, burned, insect damage, etc.)
Describe forest/woodlot current condition (mature, partially cut-over, burned, insect damage, etc.)
Additional Comments

## **PERSONNEL**

Qualified biologists<sup>67</sup>, biological technicians, and any other individuals deemed qualified by a local USFWS FO may conduct emergence surveys for Indiana bats by following the protocols below.

## EMERGENCE SURVEYS FOR KNOWN INDIANA BAT ROOSTS

The following protocols should begin as soon as feasible after identification of a diurnal roost (ideally that night):

- 1. Bat emergence surveys should begin one half hour before sunset<sup>68</sup> and continue until at least one hour after sunset or until it is otherwise too dark to see emerging bats. The surveyor(s) should be positioned so that emerging bats will be silhouetted against the sky as they exit the roost. Tallies of emerging bats should be recorded every few minutes or as natural breaks in bat activity allow. There should be at least one surveyor per roost. Surveyors must be close enough to the roost to observe all exiting bats but not close enough to influence emergence. That is, do not stand directly beneath the roost, do not make noise or carry on a conversation, and minimize use of lights (use a small flashlight or similar to record data, if necessary). Do not shine a light on the roost as this may prevent or delay bats from emerging. Use of an infra-red, night vision, or thermal-imaging video camera or spotting scope is encouraged but not required. Likewise, use of an ultrasonic bat detector may aid in identifying the exact timing of bats emerging and may be used to help differentiate between low- and highfrequency bats species, and therefore, is strongly recommended. If multiple roosts are known within a colony, then simultaneous emergence surveys are encouraged to estimate population size. [NOTE: If a roost cannot be adequately silhouetted, then the local USFWS FO(s) should be contacted to discuss alternative survey methods].
- 2. Bat activity is affected by weather; therefore emergence surveys should not be conducted when the following conditions exist: (a) temperatures that fall below 50°F (10°C); (b) precipitation, including rain and/or fog, that exceeds 30 minutes or continues intermittently during the survey period; and (c) sustained wind speeds greater than 9 miles/hour (4 meters/second; 3 on Beaufort scale).
- 3. Surveyors should use the attached (or similar) "Bat Emergence Survey Datasheet".

<sup>&</sup>lt;sup>67</sup> A qualified biologist is an individual who holds a USFWS Recovery Permit (Federal Fish and Wildlife Permit) for federally-listed bats in the state/region in which they are surveying and/or has been authorized by the appropriate state agency to mist-net for Indiana bats. Several USFWS offices maintain lists of qualified bat surveyors, and if working in one of those states with authorizations in lieu of a Recovery Permits, the individual will either need to be on that list or submit qualifications to receive USFWS approval prior to conducting any field work.

<sup>&</sup>lt;sup>68</sup> Surveys may need to start a little earlier or later than one half hour before official sunset times (i.e., before "dusk") in some settings such as deep/dark forested valleys or ridge tops, respectively. Sunset tables for the location of survey can be found at: http://aa.usno.navy.mil/data/docs/RS\_OneYear.php

- 4. Surveyors should also complete an "Indiana Bat Roost Datasheet" for each roost known to be used by one or more Indiana bats (see Appendix D for an example).
- 5. Completed datasheets should be included in reports prepared for the USFWS.

## EMERGENCE SURVEYS FOR POTENTIAL INDIANA BAT ROOSTS

In some limited cases (e.g., individual hazard tree removal during the active season), surveyors may have the option of conducting emergence surveys for individual potential Indiana bat roosts to determine use prior to removal. The following protocol applies to these surveys:

- 1. Consult with the local USFWS FO(s) to determine whether a tree(s) that needs to be felled/ cleared may be potential roosting habitat for Indiana bats and whether conducting an emergence survey is an appropriate means of avoiding take of Indiana bats<sup>69</sup>. In general, the USFWS only approves of conducting emergence surveys as a means of avoiding direct take of bats for projects that only affect a very small number of potential roosts (e.g., less than or equal to 10)<sup>70</sup> in relatively small project areas. An online directory of USFWS offices is available at: http://www.fws.gov/offices/.
- 2. If the USFWS FO(s) approves/concurs with Step 1, then follow the emergence guidelines for Emergence Surveys for Known Indiana Bat Roosts (above) to determine if any bats are roosting in the tree(s).
- 3. At the conclusion of the emergence survey:
  - a. If <u>no</u> bats were observed emerging from the potential roost(s), then it maybe felled immediately. If safety concerns dictate that a tree cannot be felled immediately (i.e., in the dark), then the tree(s) should be felled as soon as possible after sunrise on the following day. If a tree is not felled during the daytime immediately following an emergence survey, then the survey has to be repeated, because bats may switch roosts on a nightly basis. Immediately after the tree is felled, a visual inspection of the downed tree must be completed to ensure that no bats were present, injured, or killed. The USFWS FO(s) should be contacted immediately, if bats are discovered during this inspection.
  - b. If <u>1 or more</u> bats (regardless of species, because species identification cannot reliably be made during visual emergence counts alone) are observed emerging from the roost, then it should <u>not</u> be felled, and the USFWS FO(s) should be contacted the next working day for further guidance.

<sup>69</sup> If a potential bat roost tree poses an imminent threat to human safety or property, then emergency consultation procedures should be followed as appropriate. (50 CFR §402.05). If a hazard tree does not pose an imminent threat, then the USFWS requests that it be felled during the bat's inactive season (i.e., generally from October – March, but contact the FO for specific dates for your area.) When possible, felling of potential roost/hazard trees should be avoided during the primary maternity period (June – July) to avoid potential adverse effects to non-volant pups.

<sup>70</sup> Areas containing >10 hazard trees will be assessed by the USFWS on a case-by-case basis with the project proponent.

## SUBMISSION OF EMERGENCE SURVEY RESULTS

Emergence survey results should be included with the mist-netting survey report, unless the survey was completed as an evaluation of potential roosts, and should be submitted to the appropriate USFWS FO(s) for review. Each survey report should include the following information related to emergence survey efforts<sup>71</sup>:

- 1. Copy of prior phase reports (if not previously provided)
- 2. Explanation of any modifications from the Phase 4 emergence count study plan (e.g., number of potential roosts surveyed), if applicable
- 3. Summary of roost emergence data
- 4. Map identifying location of roost(s) identified during radio-tracking and/or emergence surveys for Indiana bat(s) including GPS coordinates
- 5. Full names of personnel present during emergence survey efforts and who conducted emergence surveys of roosts
- 6. Photographs of each identified roost
- 7. Copies of all "Emergence Survey" and "Indiana Bat Roost" datasheets
- 8. Any other information requested by the local USFWS FO(s) where work was conducted
- 9. Copy of the pre-approved site-specific written authorization from USFWS and/or state natural resource agency (if required)

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<sup>&</sup>lt;sup>71</sup> In 2016, the USFWS implemented a new standardized approach for reporting of bat survey data. In addition to a traditional written report, federal permit holders are now required to submit their survey data using standardized permit reporting spreadsheets available on the Indiana Bat Summer Survey Guidance webpage (http://www.fws.gov/midwest/Endangered/mammals/inba/inbasummersurveyguidance.html).

## USFWS BAT EMERGENCE SURVEY DATASHEET

Date:	Surveyor(	s) Full Name:	
State: C	ounty:	Project Nam	ne:
			Bat #:
Lat/Long or UT	TM of Roost:		
Description of l	Roost/Habitat Feature	Surveyed:	
Bat Species Kn	own to be using this R	oost/Feature (if not k	known, leave blank):
Other Suspecte	d Bat Species (explain	);	
Weather Condi	tions during Survey (	temperature, precipit	tation, wind speed):
Survey Start Ti	me: Ti	ime of Sunset:	Survey End Time:
natural breaks in be exiting/returning be make unnecessary necessary). Do no emerging. If avail	out activity allow. Please bats, but not close enough noise and/or conversation of shine a light on the roos	ensure that surveyor(s) a to influence emergence n, and minimize use of list tree crevice/cave/mine night vision, or thermal-i	g bats should be recorded every few minutes or as are close enough to the roost to observe all (i.e., do not stand directly beneath the roost and do not ights other than a small flashlight to record data, if entrance itself as this may prevent or delay bats from imaging video camera or spotting scope and an
Time	Number of Bats Leaving Roost*		Comments / Notes

Site Name/#:		Roost Name/#:
Time	Number of Bats Leaving Roost*	Comments / Notes
Total Number of Bats Observed Emerging from the Roost/Feature During the Survey:		
Describe Emerge	nce: Did bats emerge si	ey, then they should be subtracted from the tally.  multaneously, fly off in the same direction, loiter, circle, disperse, he tree, at what time did it emerge?

## APPENDIX F: LINEAR PROJECT GUIDANCE

For linear projects (e.g., pipelines and roadways), surveyors have the option to use either mist nets <u>or</u> acoustic detectors in any given 1-km segment of suitable habitat. A survey site may also cover other associated linear project facilities (e.g., access roads) that are located within a predetermined distance of each segment. When possible, surveyors should seek out the best available survey sites located within the footprint of the project alignment, and directly adjacent to, or near, the alignment if no suitable sites are available within the footprint. Because the best survey sites for capturing/detecting bats may fall outside of a project footprint, the surveyor and project proponent should coordinate with the appropriate USFWS FO to establish a project-specific maximum distance from the centerline or project boundary prior to initiating surveys.

Tentative survey site locations along linear projects should be included in a proposed study plan to be reviewed and approved by the USFWS FO. Adequate survey effort should be conducted within each approximate 1-km segment that contains suitable forested habitat along the proposed workspace. It is not appropriate to cumulatively add up each habitat block crossed until 1km of habitat has been traversed. Segments along a linear project that do not contain suitable habitat should be skipped until the next patch of suitable habitat is encountered (Figure 3). Establishing exactly how many survey sites are needed for presence/absence surveys along a linear project often involves some give and take particularly in fragmented habitat areas (Figure 3, rows B and C). The final number of survey sites could be greater than the minimum number of sites prescribed in the protocol in order to adequately cover the areas of suitable habitat to be impacted. When available, habitat quality and quantity (e.g., size and location of suitable maternity roost trees) from on-the-ground habitat assessments can be used to fine tune and guide the placement of survey sites. In some marginal habitat areas, the quality and quantity of the existing habitat may be low enough to justify skipping some survey segments (e.g., Figure 3, Site 11). Likewise, some isolated woodlots, fencelines or individual trees may be considered too isolated and/or small to independently support bats and may be skipped if the USFWS FO concurs. Habitat suitability in fragmented areas should be assessed on a site-specific basis and consider habitat configuration and connectivity to other suitable habitat patches. In general, we recommend surveying a few more sites for a project than the absolute minimum required.

In instances where a mist netting survey has been proposed, but no suitable mist net sites can be found or accessed within a particular segment, biologists should contact the USFWS FO for further guidance or ideally agree in advance as to how such situations will be handled when encountered in the field (e.g., an acoustic survey may be substituted). Similarly, if an area of forest habitat that seemed suitable from aerial photography appears to be unsuitable or of particularly low quality upon field inspection, then you should coordinate with the USFWS FO to determine if an area may be exempted from surveys. To avoid problems, any significant departures from previously agreed to survey plans should be justified and coordinated with the USFWS FO prior to leaving the field.

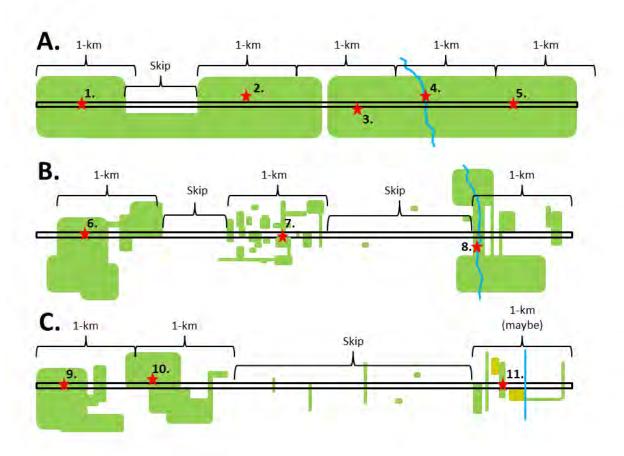


FIGURE 3. Conceptual linear project (black double lines) through relatively contiguous (A.) and fragmented (B. and C.) forested habitats (green patches) delineated into approximate 1-km survey sections. Numbered red stars represent suitable survey sites (1-11) on or near the project boundaries. Blue lines represent natural streams (A. and B.) and a ditch (C.). Yellow-green patches near Site 11 represent low-quality habitat.

## APPENDIX G: THE OUTER-TIER GUIDANCE

Since early radio-tracking studies in Illinois, it has become standard practice for USFWS FOs to assume that an Indiana bat summer maternity colony will utilize suitable habitat within approximately 2.5 miles of its primary roost tree(s)/focal roosting area. However, if a reproductive adult female or juvenile Indiana bat is captured (or Indiana bats are acoustically detected), but not radio-tracked to a roost site, then FOs typically assign its capture site a 5-mile conservation buffer and assume that its roost tree is located somewhere within 2.5 miles of the capture site. This approach is further detailed in the Service's Indiana Bat Section 7 and Section 10 Guidance for Wind Energy Projects<sup>72</sup>. NOTE: The same principles used for Indiana bat can be used for NLEB pertaining to NLEB capture/ detections having been assigned a 3-mile conservation buffer.

Because a 5-mile buffer encompasses four times more area than a 2.5-mile buffer (50,265 acres vs. 12,566 acres), it is reasonable to assume that only 25% of a 5-mile buffered area is actually occupied by the documented Indiana bat summer maternity colony at any given time and that 75% remains unoccupied or could be used by members of another as yet undocumented colony(s). Therefore, if a subsequently proposed project is either  $\leq 123$  acres in size or affects  $\leq 1\%$  of existing suitable summer habitat within a 5-mile buffer (whichever is greater), but is situated ≥2.5 miles from the original capture/detection site, then it will have a relatively low probability of being within the true maternity colony home range (assuming suitable habitat is more or less evenly distributed in all directions from the capture site)(See Figures 4 & 5). Allowing project proponents of such "outer tier" projects to conduct a summer P/A survey for Indiana bats using the standard survey level of effort (LOE) (as outlined in Appendix B and C) in such cases is reasonable and the additional survey data would 1) help refine the home range boundaries of the original colony, 2) confirm presence of additional colonies if present, 3) provide additional radio-tracking opportunities /roost tree locations, and 4) provide an option for project proponents to survey instead of always assuming presence. **NOTE**: A FO may decide not to approve an outer-tier survey under the following circumstances: (1) If available forest habitat with a 5-mile buffer is not more-or-less evenly distributed, but rather is highly clumped or restricted to a relatively narrow strip(s) (e.g., a riparian corridor); (2) <10% of a 5-mile buffer contains suitable summer habitat; or (3) other site-specific reasons.

If a project proponent of an "outer-tier" project coordinates with a USFWS FO upfront and conducts a valid summer mist-netting (Appendix B) or acoustic (Appendix C) survey using the appropriate LOE and does not capture/detect an Indiana bat(s), then no Indiana bat-related restrictions will be required for that specific project area. However, all restrictions/assumptions of Indiana bat presence outside of a completed outer-tier project survey area shall remain intact indefinitely within the 5-mile buffer zone or until additional negative survey data or discovery of roost trees indicate adjustments to a buffer are warranted by USFWS. Negative survey results from "outer-tier" projects are valid for 5 years for that particular project area. If an Indiana bat(s) is captured/detected/radio-tracked during the survey, then the project area will be presumed to be occupied, restrictions will remain in place, and the FO will reassess/adjust the original buffer(s) if warranted using the newly acquired bat location data.

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 $<sup>^{72}\</sup> https://www.fws.gov/midwest/Endangered/mammals/inba/pdf/inbaS7 and 10W ind Guidance Final 26Oct 2011.pdf$ 

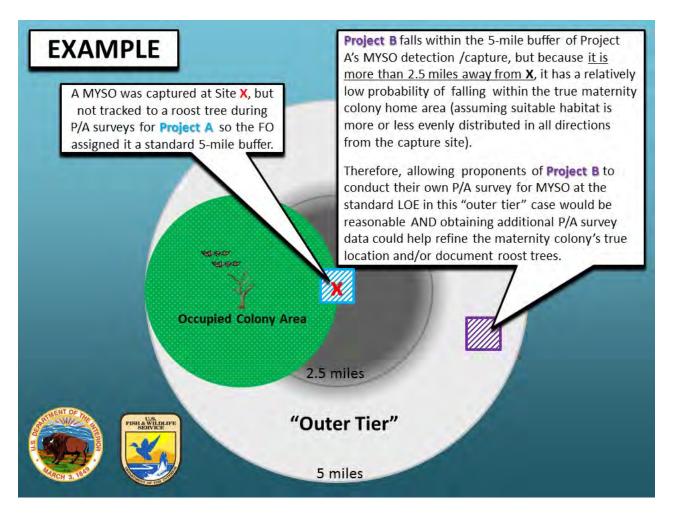


FIGURE 4. Graphical example depicting the proper application of the outer-tier guidance.

## APPENDIX G: THE OUTER-TIER GUIDANCE

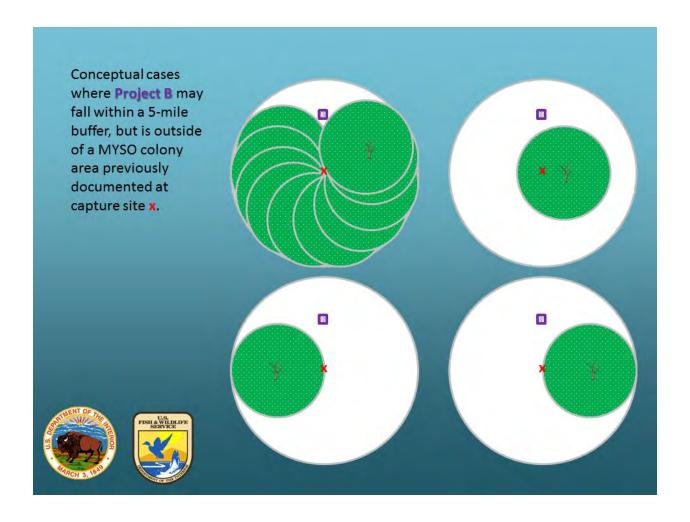


FIGURE 5. Hypothetical outer-tier scenarios where a proposed project area (depicted by a purple square) falls outside of the "true" Indiana bat maternity colony area(s) (depicted in green).

## APPENDIX H: POTENTIAL HIBERNACULUM SURVEY GUIDANCE

Indiana bats have been documented using caves (and their associated sinkholes, fissures, and other karst features), as well as anthropogenic features such as mines and tunnels as winter hibernation habitat (i.e., hibernacula). Project proponents need to evaluate whether any potentially suitable Indiana bat hibernacula exist within a proposed project area. This knowledge will be derived from a variety of sources. The following phased process should be followed to determine presence or probable absence of Indiana bats in potential hibernaculum:

## PHASE 1 – INITIAL PROJECT SCREENING

Step 1. Coordinate with the USFWS FO(s) and appropriate state natural resource agencies regarding existing federally listed bat hibernaculum or other occurrence information.

Prior to initiating P/A surveys (Phase 2) of potential Indiana bat hibernacula (as determined by the Phase 1 Habitat Assessment), the USFWS FO(s) and appropriate state natural resource agencies must be contacted to determine if any caves or other underground features have been previously documented as hibernacula or other habitat for federally listed bat species. Any proposed surveys of previously documented hibernacula must be coordinated directly with these agencies to ensure that adverse effects to listed species do not occur because of the survey.

## Step 2. Desktop Analysis and Initial Field Reconnaissance.

After coordinating with the FO and appropriate state natural resource agency (when applicable), a desktop analysis and initial field reconnaissance should be completed by individuals with a natural resource degree or equivalent work experience and a solid understanding of karst topography and/or surface features associated with underground mines. These initial assessments can be completed at any time of year.

For all projects, a FO-approved field survey of all land within 0.5 miles of the edge of the project footprint (where access can be obtained) and documentation (e.g., a literature search, maps and information provided by local cave survey groups or grottos, review of aerial photography and topographical maps, previous mining records (if applicable), forest inventories, previous species survey reports, and the work of consultants or other designees) of all known caves and abandoned mines within 3 miles of the outside edge of the project footprint should be conducted. If caves or abandoned mines are found, further detail about the known or estimated underground extent of the cave/mine should be provided to the USFWS FO(s), including minimum and maximum depth of features and where those features are located on a map(s).

In general, underground openings can be deemed unsuitable as a hibernaculum and dismissed from further assessment and surveys if:

- a) There is only one horizontal opening, and it is less than 6 inches (15.2 cm) in diameter;
- b) Vertical shafts are < 1 foot (0.3 m) in diameter;

#### APPENDIX H: POTENTIAL HIBERNACULUM SURVEY GUIDANCE

- c) Passage continues < 50 feet (15.2 m) and terminates with no visible fissures that bats can access:
- d) Openings are prone to flooding, collapsed shut and completely sealed, or otherwise are inaccessible to bats; and
- e) Openings that have occurred recently (i.e., within the past 12 months) due to human activity or subsidence. (Include written documentation verifying this determination).

The results of initial field assessments should be submitted to the USFWS and State regulatory partners (when applicable) for review and approval prior to proceeding to Step 3. FO-approved results from Step 2 will remain valid for a minimum of five years. **NOTE**: longer time frames may not be appropriate due to cave/mine dynamics.

## Step 3. Conduct a Phase 1 Habitat Assessment of Potentially Suitable Hibernacula.

If underground openings are documented during field surveys in Step 2 and cannot be dismissed during initial project screening above, then a qualified biologist<sup>73</sup> will need to conduct a Phase 1 Habitat Assessment to determine whether bats using a potentially suitable hibernaculum within a project area could be adversely affected by the proposed project as described below (see Phase 1 Habitat Assessment Sample Data Sheet).

Habitat assessments should include all entrances or openings that will be directly or indirectly impacted by the proposed project. This would include those caves (and their associated sinkholes, fissures, and other karst features), as well as anthropogenic features such as mines and tunnels that are within the project site or that are otherwise connected (i.e., by physical passageway, airflow or hydrologically) to any underground feature that will be directly or indirectly impacted by the proposed project.

The results of a Phase 1 Habitat Assessment should be submitted to the USFWS and State regulatory partners (when applicable) for review and approval prior to proceeding to Phase 2. FO-approved results from Step 3 will remain valid for a minimum of five years. **NOTE**: longer time frames may not be appropriate due to cave/mine dynamics.

## PHASE 2 – PRESENCE/ABSENCE SURVEYS

Surveys to Confirm Use of Suitable Winter Habitat

If suitable winter habitat is discovered as a result of the Phase 1 Habitat Assessment above, do not alter, modify, or otherwise disturb entrances or internal passages of caves, mines, or other entrances to underground voids (potential hibernacula) within the action area before completing a Phase 2 survey. The survey protocols for determining occupancy are detailed below. Some

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<sup>&</sup>lt;sup>73</sup> A qualified biologist is an individual who holds a USFWS Recovery Permit (Federal Fish and Wildlife Permit) for Indiana and/or northern long-eared bats in the state/region in which they are surveying. Alternatively, in States within Region 5 of the USFWS, state agencies assess qualifications and provide authorization to net, handle, and conduct hibernaculum surveys of/for Indiana and/or northern long-eared bats in that State (authorization is only valid in the State that provides the authorization). Several USFWS offices maintain lists of qualified bat surveyors, and if working in one of those states with authorizations in lieu of a Recovery Permits, the individual will either need to be on that list or submit qualifications to receive USFWS approval prior to conducting any field work.

surveys may require modification (or clarification) of these guidelines; therefore, submittal of a study plan and coordination with the USFWS FO(s) and state natural resource agency is necessary prior to initiating suitable winter habitat/hibernacula surveys. Submit results of completed summer and/or winter surveys to the appropriate FO(s) prior to clearing or altering of identified bat habitat. The USFWS FO will review the results of P/A surveys conducted according to these guidelines for the purposes of determining whether Indiana bats are occupying hibernacula in the project area and whether they may be adversely affected by any proposed actions.

# WINTER (INTERNAL), FALL, AND SPRING SURVEY PROTOCOLS FOR IDENTIFYING POTENTIAL INDIANA BAT HIBERNACULA

White-nose syndrome (WNS) is a devastating fungal disease that has killed unprecedented numbers of hibernating bats in eastern North America. WNS and/or *Pseudogymnoascus destructans* (Pd), the fungus causing the disease has been detected throughout the range of the Indiana bat. Users of this guidance must follow the recommendations provided in the most recent USFWS Cave Advisory<sup>74</sup> as they relate to reducing the potential for humans to disturb hibernating bats or inadvertently transporting Pd to uncontaminated bat habitats. All surveys conducted at caves/mines should be coordinated with the USFWS FO(s) and appropriate state natural resources agencies prior to initiation (see example USFWS Project Proposal Form).

#### Winter (Internal) Surveys

Working near and within abandoned mines and caves can be inherently dangerous due to a variety of potential hazards (e.g., ceiling collapse and presence of toxic gases)<sup>75</sup>. Therefore, surveyors must thoroughly assess their work sites for any known and potential health and safety hazards and must use appropriate personal protective equipment and take proper precautions to avoid and minimize identified risks. Only sites that are deemed safe should be entered at the surveyor's discretion.

Potential hibernacula that are deemed safe to enter should be entered and all of its accessible passages visually surveyed for the presence of Indiana bats during mid-winter (i.e., beginning January 1st and ending prior to March 1st of the same calendar year (also see Appendix 4 of the USFWS 2007 Indiana Bat Draft Recovery Plan: first revision). NOTE: The use of direct internal surveys is not adequate for northern long-eared bats due to the difficulty in visually detecting the species inside hibernacula (i.e., it typically roosts in deep cracks and crevices). Only properly trained and qualified individuals with the appropriate federal and/or state permits and equipment should attempt internal presence/absence surveys for the Indiana bat. If the qualified biologist, who completed the Phase 1 Habitat Assessment, does not have the necessary experience/permits to complete internal survey work, then this portion of the project should be subcontracted to another individual or group that does. If a site is unsafe or too difficult to enter or it is believed that significant portions of the underground system are inaccessible, it should be surveyed using the Fall or Spring emergence survey guidance to determine presence or probable absence of federally listed bat species, including the Indiana bat (also see Sample Data Sheet for Fall or Spring Surveys of Potential Hibernacula).

<sup>75</sup> The Service highly recommends that surveyors seek counsel from an occupational health and safety professional(s) prior to working underground or under other potentially hazardous field conditions.

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<sup>&</sup>lt;sup>74</sup> https://www.whitenosesyndrome.org/sites/default/files/files/final-cave\_access\_advisory\_2016\_2.pdf.

### Fall or Spring Emergence Surveys

1A. Fall surveys of mine/cave entrances must be conducted between September 15 and October 31<sup>76</sup> and prior to any tree clearing by the project applicant. A minimum of one night of harp trap sampling per week for 6 weeks (i.e., 6 nights of sampling) is required at each suitable entrance as determined by the Phase 1 Habitat Assessment. Each night of sampling should be separated by at least one week of the survey window if weather conditions allow it. However, multiple nights of sampling per week can be accepted in the last two weeks of October if forecasted weather conditions require it, at least 3 nights of sampling were completed during the first 3 weeks of the survey period, and the modification is approved by the appropriate USFWS FO(s). Survey effort may be suspended if no bats (of any species) are captured after the first 2 nights of acceptable survey effort in the fall. Surveys of a potential hibernaculum are in addition to any summer P/A surveys that may be required for a proposed project.

#### OR

1B. Spring surveys of mine/cave entrances must be conducted between April 1 and April 21<sup>77</sup> and prior to any tree clearing by the project applicant. Conducting surveys during the spring emergence is typically more complex than conducting fall surveys due to a greater number of uncontrollable factors (e.g., weather related factors). Thus, a minimum of three nights of harp trap sampling per week for three weeks (i.e., 9 nights of sampling) is required at each suitable entrance as determined by the Phase 1 Habitat Assessment. Due to the need to monitor weather conditions closely, each proposed spring mine/cave survey must be coordinated with the USFWS FO(s) and appropriate state natural resource agencies prior to surveying to ensure that adequate survey results are achieved. Surveys of a potential hibernaculum are in addition to any summer P/A surveys that may be required for a proposed project.

- 2. Unless otherwise approved by the USFWS FO<sup>78</sup>, the capture of an Indiana and/or northern long-eared bat during a fall or spring mine/cave survey requires that the applicant complete three additional nights of sampling per week for three consecutive weeks (9 additional nights LOE) in order to determine the relative significance of the mine(s) and/or cave(s) and their associated underground workings to the Indiana and/or northern long-eared bat. If the mine/cave survey season (i.e., September 15 to October 31 for fall sampling and April 1 to April 21 for spring sampling) ends prior to the completion of the required additional sampling, then sampling must be completed the following fall or spring.
- 3. Harp traps are the preferred method for sampling entrances as they are less stressful on captured bats. Mist nets can also be deployed along corridors immediately adjacent to the entrance to increase survey effectiveness. Mist nets may also be used at the entrance but only when the mine or cave configurations are not suitable to harp trapping. The use of mist nets must be approved by the USFWS FO(s) and appropriate state natural resource agency prior to

<sup>76</sup> Timing of fall surveys may need adjustment based on location and weather conditions leading up to the survey. Coordination with local USFWS FO(s) and State regulatory partners (when applicable) during development of the

Coordination with local USFWS FO(s) and State regulatory partners (when applicable) during development of the study plan/project proposal form is required.

77 Timing of spring surveys may need adjustment based on location and weather conditions leading up to the survey.

Coordination with local USFWS FO(s) and State regulatory partners (when applicable) during development of the study plan/project proposal form is required.

78 Additional survey effort may not be recommended in cases where a project proposal to modify their

<sup>&</sup>lt;sup>78</sup> Additional survey effort may not be recommended in cases where a project proponent agrees to modify their project to completely avoid adverse impacts to newly documented hibernacula or the survey was conducted solely to determine if abandoned mine openings can be closed or if bat-friendly gates need to be installed.

initiation of survey. Mist nets should be made of the finest, lowest visibility mesh commercially available. Currently, this is 2-ply, 50-denier nylon (denoted 50/2). The mesh should be approximately 1.5-inch in size. No other specific mist netting hardware is required.

- 4. Entrances must be entirely enclosed by the survey gear when harp trapping. If mist nets are used, entrances should not be entirely enclosed by the survey gear.
- 5. All entrances that are potentially inter-connected should be surveyed on the same night. In cases where one team of surveyors cannot feasibly sample all entrances in one night, a modified method could also be used. This method should only be used in situations where the entrances are known to be interconnected. In this modified method, half of the interconnected entrances are surveyed on the first night, and the other half of the entrances are completely blocked using bird-exclusion netting, plastic sheets or other impervious material. On the second night, survey efforts are reversed. Any materials used to block the entrances must be removed each night immediately after conducting the survey. No entrances should be left blocked over-night. Plastics or other materials used to block the entrances should be removed each night immediately after conducting the survey. Entrances that are not connected (e.g., as determined by existing mine maps) do not have to be surveyed simultaneously.
- 6. The sampling period should begin at sunset and continue for at least 5 hours each night. During this time, harp traps (most preferable method) and/ or mist nets (acceptable method, but less preferable from a bat-handling perspective) should be monitored for captured bats on 30-and 10-minute intervals, respectively, to minimize the number of bats that escape.
- 7. If captures increase during the survey or if 6 or more bats of any species were captured during the last hour of monitoring, the survey effort must continue until activity declines or fewer than 6 bats are captured per hour. A total of 30 (fall) or 45 (spring) hours of sampling should take place for a mine/cave survey to be approved.
- 8. Severe weather adversely affects the activity levels of bats. If any of the following weather conditions exist during the fall or spring mine/cave survey, the time and duration of such conditions must be noted on the data sheets and in the survey report, and the survey effort for that night must be repeated: (a) winds sufficiently strong and variable enough to move equipment (i.e., traps or nets) more than 50 percent of the time; and (b) precipitation, including rain and/or fog, that does not stop within 30 minutes or continues intermittently during the survey period; and (c) temperatures that are less than  $50^{\circ}$  F ( $10^{\circ}$  C) for the first 2 hours, and that drop below  $40^{\circ}$  F ( $1.6^{\circ}$  C) at any point during the survey.
- 9. All bats captured during fall or spring surveys must be temporarily marked with a FO-approved non-toxic material that will last for the remainder of the survey period in order to identify any recaptures during subsequent survey nights.
- 10. If Indiana and/or northern long-eared bats (or other federally listed species) are captured during fall or spring mine/cave surveys, notification to the local USFWS FO is required within 48 hours (or in accordance with permit conditions), and the sex and reproductive condition of the bat and GPS coordinates of the capture site should be provided.
- 11. A bat detector/roost logger should be on site to monitor general bat activity when trapping or netting. Bat passes should be monitored and tallied hourly. Bat tallies should be reported

along with the time sampled. Report the beginning time and number of bat passes in hour blocks. Analysis of recorded bat calls to attempt species identification should not be completed as these calls are not expected to be foraging calls.

- 12. Noise, the use of lights, or other potential disturbances should be kept to, at a minimum, no closer than 300 feet (91.4 m) of the sampling site.
- 13. At least one member of each survey crew must hold, and have in his or her possession, a valid endangered species collection permit issued by USFWS and/or<sup>79</sup> the appropriate state natural resource agency that allows the qualified biologist to collect bats, including federally listed species. All activities must be carried out with strict adherence to permit conditions and authorizations specified in your federal permit, as well as any State authorizations. A qualified biologist(s) must (1) select/approve harp trap/mist-net set-ups, (2) be physically present at each site throughout the survey period, and (3) confirm all bat species identifications. This biologist may oversee other biological technicians and manage set-ups in close proximity to one another as long as the trap/net-check timing (i.e., every 30 min. for harp traps and every 10 min. for mist-nets) can be maintained while walking between sites.
- 14. All survey efforts must follow the most recent USFWS decontamination protocols regarding WNS.

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<sup>&</sup>lt;sup>79</sup> Surveyors working in States within Region 5 of the USFWS only require a permit from the State where the survey is taking place.

# Phase I Habitat Assessment Sample Data Sheet

Location Observers (include permit numbers)					
Latitude		L	ongitude <sup>80</sup>		
Date	Time			Temp (outside)	
		Opening #1	Opening #2	Opening #3	Open #4

	Opening	Opening	Opening	Opening
	#1	#2	#3	#4
Opening Type (e.g., cave, portal, shaft)				
Opening vertical or horizontal				
Opening Size: Height x Width (or				
Diameter)				
Internal Dimensions: Height x Width				
Slope (up or down from entrance)				
Entrance Stable?				
Direction of Airflow (In or out?)				
Amount of Airflow (e.g., none, slight,				
heavy)				
Internal air warmer or cooler than				
outside temp.?				
Evidence of collapse?				
Ceiling Condition				
Amount of water in opening				
Evidence of past flooding?				
Observed length of internal passage				
Distance to nearest water source				
% Canopy Cover at entrance				
Foraging Signs? (e.g., moth wings)				

Are any portals suspected or known to be connected? Which ones?

Any observable side passages?

Additional comments:

Entry of abandoned mine portals, quarries, or caves can be extremely dangerous because of the potential for ceiling collapse and presence of toxic gases. Safety or health problems may occur as a result of entering abandoned mines. The FWS does not authorize or require anyone to enter any potential hibernaculum that is or could be unsafe while implementing surveys. These guidelines do not require any applicant or applicant employee, consultant, lessee, or other such designee to enter into any cave, quarry, or mine portal.

<sup>&</sup>lt;sup>80</sup> Provide coordinates for each opening.

# Sample Data Sheet for Fall or Spring Surveys of a Potential Hibernaculum

DATE:				7	EMPERAT	ΓURE	Start:	End:
	PITATION*:						WIND*:	
MOON	LIGHT:			]	IME		Start:	End:
PERSO	NNEL (include permit numbers):							LOCATION (lat/long):
Time	Species	Age	Sex	Repro Cond.	RFA (mm)	Mass (g)	Flight Direction (in or out)	Notes and General Comments

<sup>\*</sup>Precipitation and Wind should be measured hourly
\*\*Repro. Cond (Reproductive Condition): (P) pregnant; (L) lactating; (PL) post-lactating; (NR) non-reproductive, (TD) testes descended

# USFWS Potential Hibernaculum Project Proposal Form

CONTACT INFORMATION
Permittee Name(s):
State Permit # Section 10 USFWS Permit #
Institution/Company Name (as on Permit):
Address:
City: State: Zip:
Email address:
Phone #:
PROPOSED PROJECT OR ACTIVITY INFORMATION
County: Quad:
Project location: latitude: longitude:
(You must include an 8.5" x 11" topo or aerial map with project/activity location and proposed sites identified)
USFWS Project Number (if known):
Mining Project SMCRA Permit Number:
Transportation Project DOT Item Number:
Utility Project:
AML Project:
Other:
Acres of suitable Indiana bat habitat within project/activity area:
Is the project/activity linear? Yes: No:
If yes, indicate length of suitable Indiana bat habitat in km (mi):
Are caves or portals present? Yes: No:
METHODOLOGY & SURVEY EFFORT
Coordinates of cave/portal (if multiple, please provide locations on project map): latitude: longitude:
Name of cave (if known):
Estimated Start Date of Fieldwork:
# of Acoustic Activity Nights: Number of Mist Net/Harp Trap Nights:
Other
Signature Date

Appendix B: Study Plan

322 Borealis Way Bellefonte, PA 16823 814-659-8257 (cell) sanders@batgate.com



June 17, 2021

Jenny Wong, Biologist U.S. Fish and Wildlife Service East Lansing (Ecological Services) Field Office 2651 Coolidge Road East Lansing, MI 48823

Tammy Giroux, Wildlife Biologist – Thumb Region Michigan DNR Wildlife Division Cass City Field Office 4017 E Caro Road Cass City, MI 48726

Re: Riverbend Presence/Absence Acoustic Survey Study Plan

Riverbend Wind Energy Facility is in the early stages of the development process for the 45,721-acre (ac; 18,503-hectare [ha]) Riverbend Wind Project (Project) in southern Sanilac County, Michigan. The Project is requesting the United State Fish and Wildlife Service (USFWS) and Michigan Department of Natural Resources (MDNR) to please review a presence/absence bat acoustic sampling plan for the Project.

Sanders Environmental (Sanders) conducted a Phase 1 desktop analysis as described in the 2020 USFWS Range Wide Indiana Bat Survey Guidance (Guidance): Appendix A. The dominant landcover within the Project area is agricultural land. Forest in the Project area consists primarily of deciduous species. According to the National Cover Database (NLCD) the Project area contains approximately 24.4 square kilometers of potential summer habitat. Two detector sites are required per square kilometer; therefore, Sanders proposes collecting acoustic data at 49 sites (Attachment 1) consisting of two detectors per site, deployed for four successful nights. This will complete the USFWS recommendation of 8 detector nights per site for a total of 392 detector nights for the Project. The survey will occur within the timeframe in the USFWS guidance in 2020.

Wildlife Acoustics Song Meter SM4BAT FS recorders (detectors) will be deployed at each detector location for four nights, weather permitting. Detectors will start recording 30 minutes prior to sunset and continue until 30 minutes after sunrise. Detectors will be deployed in accordance with the Guidance and at least 2.5 meters above ground level for an optimal zone of detection. Detectors will be deployed in locations where they are most likely to be effective in detecting threatened, endangered, and candidate

TOTAL CONTROL OF THE CONTROL OF THE



species. Sampling locations were selected from aerial imagery and are shown in Attachment 1. Proposed detector locations are subject to change based on conditions found by permitted biologist onsite. If any shifts in detector locations are needed, most will be under 200 meters from the shown locations. Acoustic detector locations were selected based on occurrence of suitable bat habitat and property access limitations.

Files recorded will be processed and analyzed by site and by night with the most recent version of Kaleidoscope Pro software. If the analysis indicates that there is probable presence of federally threatened, endangered, or candidate species by the Maximum Likelihood Estimator (MLE), we will proceed with qualitative identification of all files recorded from that night at that site. If the MLE determines probable presence of federally threatened/endangered or candidate species, USFWS will be notified within 20 days. Furthermore, the final report on this study will be provided to the USFWS and MDNR upon completion of the acoustic survey.

Please let me know if you have any questions or concerns about the study plan and level of effort. We look forward to your review and continuing working together on this Project.

Sincerely,

Christopher Sanders, President

Attached:

Attachment 1 - Map of Project area with proposed acoustic sites

# **Appendix C: Completed Datasheets and Location Photographs**

Site Name:		_A		Proj	ect Name: _	2021	Riverb	end
Biologists:	E. N	Perrill, R.Fit	Zaatrick				Date:	7/16/21
Location Information:		•	4					
State:	Mich	ia an	County:	Sanilac		Datum	/Format: N	AD 83/D.D
Latitude:		.24000	Longitude:				UTC: -4	
Site Description:		1	COM	full of	fore	4	_	
				4191-4-				
Habitat being		Riparian Pteld Edge	Open Field	Bottomland Fores	st Upland	Forest F	Pond Othe	er
		Microphone #:	64	Directional PVC	nrocont7.	10.0		
		_				110		
Mic Height (m):	3_	Mic Inclination: _	O	Mic Azimuth:	280			
User Profile/Settings:  WA SM4BAT FS Firmware:  Comments:		Samp. Freq: 2 HP-Filter: Input Gain:	On	Min. Dur.: _ Max Dur.: _ Trig Freq: _	none	Trig.	rig. Level . Window x Length:	12db 3 sec 5 Sec
Photos: Detection area:	(X)	Site:	( X	Mic orientation:	( X,			
		com	1-210	Δ	,	1		
		forest	-					



Site Name:	A		_	Project Name :	2021 K	ive bend
Biologists: E. Merr	IL R.Fit	zpatcick			Date:	7/20/202
Detector:/O		-	Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:						
Did detector location/orientation ch	ange? If so, how?:	No				
If detector has moved, been tampered wit	h, knocked over, o	or changed orientat	tion then take phot	tos before picking u	p.	
Weather conditions		*Weather data (sou		checked and entered	d below prior to pick	лр. 
	1	2	3	4	5	6
Date	7/16/21	7/17/21	7/18/21	7/19/21		
Start time	2038	2038	2037	2036		
End time		0638				
	Do any of	the following cond	litions apply to the	first 5 hours of sam	ipling? (Y/N)	
Temp. below 10°C(50°F)?	N	N_	N	$\Delta$		
>9m/h wind speeds?	N	N	N	$\sim$		
>30 min of precip./fog?	N	L N_	N	$\sim$		
		* If YE	S to any of the cond	itions, resample the	night.	
Was the night successful?	<del></del>	<u> </u>	<u> </u>	L \		
Data download	1	1	/	1		
Card iD: 149		-		Card ID:		
Log file Present? / TS		-		Log file Present?		



**Site 01 Location A** 





Site Name: 9   B	Project Name: 2021 R: verbend
Biologists: E. Merrill, R. Fitzpatrick	Date: 7/16/21
Location Information:	
State: Michigan County:	
	-082.83096 UTC: -4
Site Description: Grand Locust grove	along forest edge and field
of hay field - Shooting	along forest edge and tield
Habitat being sampled: Riparian Rield Edge pen Field	Bottomland Forest Upland Forest Pond Other (circle one)
Deployment Information:	
Detector #: 68 Microphone #: 73	Directional PVC present?:
Mic Height (m): 3 Mic Inclination: 0	Mic Azimuth: 268
User Profile/Settings:       Samp. Freq:       384kHz         WA SM4BAT FS       SMM-U2       HP-Filter:       On         Firmware:       2.3.1       Input Gain:       0 or 22db         Comments:       Comments:       Comments:	Min. Dur.: 1.5 ms Trig. Level 12db  Max Dur.: none Trig. Window 3 sec  Trig Freq: 16kHz Max Length: 5 Sec
Photos:  Detection area: (X) Site: (X)	Mic orientation: (X )
	Com
hay	
W W W W	1 forested



Site Name: Ol	В			Project Name :	2021 R	iverbend		
Biologists: E. Merr	ill R.Fitz	atrick				7/20/202		
Detector: 68	,	-	Detector Status:	ON:Armed		OFF: Dead		
Reason for OFF:								
Did detector location/orientation ch	ange? If so, how?:	No						
if detector has moved, been tampered wit	h, knocked over, o	r changed orientat	ion then take phot	os before picking u	p.			
*Weather data (source: NOAA) must be checked and entered below prior to pickup.  Night								
<del></del>	1	2	3	4	55	6		
Date	7/16/21	7/17/21	7/18/21	7/19/21				
Start time	2038	2038	2037	2036				
End time	0637	0638	0639	0640				
	Do any of	the following cond	litions apply to the	first S hours of san	npling? (Y/N)			
Temp. below 10°C(50°F) ?	N	N	N	$\mathcal{N}$				
>9m/h wind speeds?	N	N	N	N				
>30 min of precip./fog?	N	N	N	$\wedge$				
		*If YE	S to any of the cond	itions, resample the	night.			
Was the night successful?	<u> </u>	Y	<u> </u>	$\mathcal{A}$				
Data download		1	/					
Card ID: 147		-		Card ID:				
Log file Present?		-		Log file Present?				



Site 01 Location B





Site Name: 02 A	Project Name:	1021 Riverbend
Biologists: A. Groebel, E. Merrill		Date: 06/25/2021
Location Information:		. ,
State: Michigan County:	Sanilac	Datum/Format: NAD 83/D.D
Latitude: 43, 22 403 Longitude:		UTC: <u>-4</u>
Site Description: Shooting down Field	edge in farm	field
	Bottomland Forest Upland Forest Upland Forest	prest Pond Other
Deployment Information:	Disastinas   DVC second2	\\\\\
Detector #: 24 Microphone #: 78	Directional PVC present?:	NO
Mic Height (m) Mic Inclination:	Mic Azimuth: 295°	
User Profile/Settings:  WA SM48AT FS SMM-U2 HP-Filter: On Input Gain: 0 or 12 db (circle one)	Min. Dur.: 1.5 ms Max Dur.: none Trig Freq: 16kHz	Trig. Level 12db Trig. Window 3 sec Max Length: 5 Sec
Comments:		
Photos:  Detection area: (x) Site: (x)	Mic orientation: (X)	
Farm Field  Drainage F  Farm Field  Forest	Forest Forest	N T
401.62		



Site Name: 02 P	<u> </u>			Project Name :	2021.	Kiverben
Biologists: E.M.	cmll					7/1/21
Detector: 2			Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:						
Did detector location/orientation ch	nange? If so, how?:	OK				
If detector has moved, been tampered wi			ion then take phot	os before picking u	p.	
Weather conditions		*Weather data (sou	rce: NOAA) must be	checked and entere	d below prior to pick	kup.
	1	2	3	4	5	6
Date	6/25/21	6/26/21	6/27/21	6/28/21	6/29/21	6/30/21
Start time			2045	2045	2045	2045
End time	_	-	0624	0624	0625	0625
	Do any of t	the following cond	itions apply to the	first 5 hours of san	pling? (Y/N)	
Temp. below 10°C(50°F) ?	No	No	No	No	No	N.
>9m/h wind speeds?	No	No	No	No	No	No
>30 min of precip./fog?	425	Yes	No	N.	No	16
		*If YE	S to any of the cond	itions, resample the	night.	
Was the night successful?	No	No	YES	125	725	YES
Data download						,
Card ID: 48				Card ID:		
Log file Present?				Log file Present?		



# Site 02 Location A





Site Name:	02 B		Project Name: 2	OZI Riverb	end
	sel, E. Merri	11, M. Zo			/25/202
Location Information:		,			, ,
State: Michi	gan	County: San	ilac	Datum/Format: N	AD 83/D.D
Latitude: 43.22 L	127	ongitude: <u>-82.</u>			<u> </u>
Site Description: Shootia	ng down	Fiell edge	in farm	Field	
Habitat being sampled: R	liparian Field Edge C	Open Field Botto (circle one)	omland Forest Upland	Forest Pond Oth	er
Deployment Information:					
Detector #: 44	Microphone #:		ectional PVC present?:_	<u> </u>	
Mic Height (m): 3	Mic Inclination:	Ø Mi	c Azimuth: 10		
User Profile/Settings:  WA SM4BAT FS SMM-U2 Firmware: 2.3.1  Comments:	HP-Filter:	On	Min. Dur.: 1.5 ms Max Dur.: none Trig Freq: 16kHz	Trig. Level Trig. Window Max Length:	12db 3 sec 5 Sec
Photos: Detection area: (X)	Site:	(x) Mic o	rientation: (X)		
	Farm	ge Dro	Far Fire	~ \d	24-
		Farm	Field		



Site Name:	ULE	>			Project Name :	2021 K	1 ver Dene
Biologists:	E.M.	Ilms				Date:	7/1/21
Detector: (circle one)	44			Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector location	n/orientation ch	ange? If so, how?:	No				
If detector has moved, bee	n tampered wit	n, knocked over, o	r changed orientat	ion then take phot	os before picking u	р.	
Weather conditions	1		*Weather data (sou	ırce: NOAA) must be Nî	checked and entered	d below prior to pick	sup.
_		1	2	3	44	5	6
	Date	6/25/21	6/26/21	6/27/21	6/28/21	6/29/21	6/30/21
	Start time		/_'	2015	2045	2045	2045
_	End time		_	0624	0624	e625	OCSE
		Do any of	the following cond	litions apply to the	first 5 hours of san	npling? (Y/N)	
Temp. beid	ow 10°C(50°F) ?	No	No	No	No	No	Nı
>9m/	h wind speeds?	No	No	No	No	No	Na
>30 min	of precip./fog?	YZS	Yes	No	No	No	No
			*If YI	S to any of the cond	itions, resample the	night.	
Was the ni	ght successful?	No	No	Yas	25	YTS	YES
<u>Data download</u>	46					•	
Card ID:					Card ID:		
Card ID:	YCS				Log file Present?		



# Site 02 Location B





Site Name: 03 A	Project Name: 2021 Riverbend
Biologists: E. Mercill, R. Fitzpatrick	Date: 7/16/21
Location Information:	
State: Michigan County:	Sanilac Datum/Format: NAD 83/D.D
Latitude: 43.2/162 Longitude:	- 082.87230 UTC: -4
Site Description: grassy spenne in	Gottom and forcet gurrounder
by can fields	
/	
Habitat being sampled: Riparian Field Edge Open Field	Bottomland Forest Upland Forest Pond Other
Deployment Information:	(and disc)
Detector #: _/2 Microphone #:(oC)	Directional PVC present?:
Mic Height (m): 3 Mic Inclination: 0	Mic Azimuth: 50
User Profile/Settings:Samp. Freq:384kHzWA SM4BAT FS SMM-U2HP-Filter:OnFirmware:2.3.1Input Gain:0 or (2)db	Min. Dur.: 1.5 ms Trig. Level 12db  Max Dur.: none Trig. Window 3 sec  Trig Freq: 16kHz Max Length: 5 Sec
(circle one)  Comments:	
Photos: Detection area: (X) Site: (X)	Mic orientation: (x)
A Come fred.  N  Forest  A  T	orn fields  W  W  finalds  W  famigt



Site Name: 0.5	<u> </u>			Project Name :	2021 K	verbend
Biologists: E. Mes	rill, R.Fitz	patrick			. Date:	7/20/2021
Detector: 12		-	Detector Status:	6N:Armed	ON:Triggered	OFF: Dead
Reason for OFF:						
Did detector location/orientation	change? If so, how?	No				
f detector has moved, been tampered v	with, knocked over, c	or changed orientat	ion then take phot	os before picking u	ip.	
Weather conditions	1	*Weather data (sou	,	checked and entere	d below prior to pic	sup.
	1	2	33	4	5	6
Da	te 7/16/21	7/17/21	7/18/21	7/19/21		
Start tin	ne 2038	2038	2037	2036		
End tin	ne 0637	<i>©</i> 638	0639	0640		
	Do any of	the following cond	litions apply to the	first 5 hours of san	npling? (Y/N)	
Temp. below 10°C(50°F	1? N	N	N	//		
>9m/h wind speed	s? N	N	N	\\ \		
>30 min of precip./fo	B? N	l N	N	N		
		*If YE	S to any of the cond	litions, resample the	night.	
Was the night successfu	11?	LV		Y		
Data download	1	1	/	•		
card ID: 150		-		Card ID:		
Log file Present?		-		Log file Present?		



**Site 03 Location A** 





Site Name: $03$	Project Name:	2021 Riverbond
Biologists: E. Mercill, R. Fitzato		Date: 7/16/21
Location Information:		./ /
State: Michigan		Datum/Format: NAD 83/D.D
Latitude: 43.2//65 Lo		UTC: <u>-4</u>
Site Description: Shorting for a	vas grassy + v=	tlands in
Cotton and forest 81	wounded by	antields
Habitat being sampled: Riparian Field Edge Op	en Field Rottomland Forest Uplend (circle one)	Forest Pond Other
Deployment Information:  Detector #: 59 Microphone #: \$3	Directional PVC present?:	no
Mic Height (m): 3 Mic Inclination: 0	Mic Azimuth: 170	
WA SM4BAT FS SMM-U2 HP-Filter: 0 Firmware: 2.3.1 Input Gain: 0 or	4kHz         Min. Dur.:         1.5 ms           On         Max Dur.:         none           (2)db         Trig Freq:         16kHz	Trig. Level 12db Trig. Window 3 sec Max Length: 5 Sec
Photos: Detection area: (X) Site: (	$X$ ) Mic orientation: ( $\chi$ )	
countield of the forestate of the	nh J	Tevn Fizid



Site Name:	<u>03</u>	<u></u>			Project Name :	2021 K	iverbend
Biologists:	E. Merri	II, R.Fitz	patrick			Date:	7/20/202
	59			Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:		<u> </u>					
Did detector location,	orientation cha	ange? If so, how?:	No				
If detector has moved, beer	tampered with	n, knocked over, o	r changed orientati	ion then take phot	os before picking u	p.	
Weather conditions	1		*Weather data (sou		checked and entered	d below prior to pick	:up.
		11	2	33	44	5	6
	Date	7/16/21	7/17/21	7/18/21	7/19/21		
	Start time	2038	2038	2037	2036		
	End time	0637	0638	0639	9640		
_		Do any of	the following cond	itions apply to the	first 5 hours of san	npling? (Y/N)	
Temp. belo	w 10°C(50°F) ?	N	N	N	$\sim$		
>9m/h	wind speeds?	N	N	N	$N_{c}$		
>30 min (	of precip./fog?	N	N	N	$\wedge$		
_	*If YES to any of the conditions, resample the night.						
Was the nig	tht successful?	V	V	V	Y		
Data download		7		7	7		<del></del>
Card ID:	149		-		Card ID:		
Log file Present?_	Yas				Log file Present?		



Site 03 Location B





Site Name: Ø4 A	Project Name: 2021 Riverbend
Biologists: E. Merrill, A. Goebel,	M. Zollars Date: 06/26/2021
Location Information:	
State: Michigan County	Sanilac Datum/Format: NAD 83/D.D
Latitude: 43.18465 Longitude:	:-82.853,5 UTC:-4
Site Description: Shooting down trant	- tree row leading into
forested wood lot	
Habitat being sampled: Riparian Field Edge Open Field	d Bottomland Forest Upland Forest Pond Other (circle one)
Deployment Information:	<b>5.1.</b>
Detector #: 09 Microphone #: 55	Directional PVC present?:
Mic Height (m): 3 Mic Inclination:	Mic Azimuth: 5
WA SM4BAT FS SMM-U2 HP-Filter: On Input Gain: Circle one)  Comments:	Min. Dur.: 1.5 ms Trig. Level 12db  Max Dur.: none Trig. Window 3 sec  Trig Freq: 16kHz Max Length: S Sec
Photos:  Detection area: () Site: ()	Mic orientation: (AD)
W Galbraith Liv	u Rd.
Rosture	Trees N Corn Field AA AB



Site Name: 94	<u> </u>			Project Name :	20211	7iver Ja
Biologists: E - M	evnI				Date:	7/1/21
Detector:	·		Detector Status	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:						
Did detector location/orientation ch	hange? If so, how?:	No				
f detector has moved, been tampered wit	h, knocked over, o	r changed orientati	ion then take phot	os before picking u	p.	
Weather conditions	1	"Weather data (sou		checked and entered	d below prior to pick	υр.
	1	22	3	44	5	6
Date	6/26/21	6/27/21	6/28/21	6/29/21	6/30/21	
Start time		2045	2045	2045	2045	
End time		0624	0625	0625	0626	
	Do any of	the following cond	itions apply to the	first 5 hours of san	ppling? (Y/N)	
Temp. below 10°C(50°F) ?	No	No	No	No	No	
>9m/h wind speeds?	No	No	No	No	N-	
>30 min of precip./fog?	Yrs	1/10	No	No	No	
	<del></del>	*If YE	S to any of the cond	itions, resample the	night.	
Was the night successful?	No	TS	YTS	725	103	
Data download						
Card ID:				Card ID:		
Log file Present?				Log file Present?		



# Site 04 Location A





Site Name: 04 B	Project Name: 2021 Riverbend
Biologists: E. Merrill, A. Groebel, M	.Zollars Date: 06/26/2021
Location Information:	1 '
State: Michigan County:	Sanilac Datum/Format: NAD 83/D.D
Latitude: 43.18463 Longitude: ~	-82.85187 UTC: -4
Site Description: Shooting down tigh	t tree row that surrounds
small corn field	
Habitat being sampled: Riparian Field Edge Open Field	Bottomland Forest Upland Forest Pond Other
Deployment Information:	
Detector #: $32$ Microphone #: $57$	
Mic Height (m): 3 Mic Inclination: 0	Mic Azimuth: 8
User Profile/Settings: Samp. Freq: 384kHz	Min. Dur.: 1.5 ms Trig. Level 12db
WA 5M4BAT FS 5MM-U2 HP-Filter: On	Max Dur.: none Trig. Window 3 sec
Firmware: 2.3.1 Input Gain: 0 or 12 db (circle one)	Trig Freq: 16kHz Max Length: 5 Sec
Comments:	
Photos: Detection area: (1) Site:	Mic orientation:
W Galbraith L	ine Rd.
	Trees al
Rostura	30 Corn 30
205	1 Lield
`	77.60
	[E]   F
	/ (NAA BB)
	) (AA DB



Site Name:					Project Name :	2021	PIVENCE
Biologists:	E.M	emll				Date:	7/1/21
Detector: (circle one)	32			Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							<del>.</del>
Did detector location	n/orientation ch	ange? If so, how?:	No				
If detector has moved, bee				on then take photo	os before picking u	р.	
Weather conditions	ĺ		*Weather data (sou	rce: NOAA) must be Nig		1 below prior to pick	up.
		1	2	3	4	5	6
	Date	6/26/21	6/27/21	6/28hi	6/29/21	6/30/21	
	Start time		2045	2045	2045	2045	
	End time		0624	0625	0625		
		Do any of t	the following condi	itions apply to the	first 5 hours of san	npling? (Y/N)	
Temp. bel	ow 10°C(50°F) ?	No	No	No	No	No	
>9m/	'h wind speeds?	No	No	No	No	No	
>30 min	of precip./fog?	Yas	No	No	No	No	
			*If YE	S to any of the condi	tions, resample the	night.	
Was the n	ight successful?	No	YZS	Y75	100	100	
Data download	<b>-</b>						
Card ID:	211				Card ID:		
Card ID: Log file Present?	105				Log file Present?		



# Site 04 Location B





Site Name: 05	Project Name:	2021 Riverbend
Biologists: E. Meccill, R. Fitzpatrick		Date: 7/16/21
Location Information:		
State: Michigan County:	Sonilac	Datum/Format: NAD 83/D.D
	-082.87492	UTC: -4
Site Description: eder of soybcan fro	eld and treeln	ie connecting
to forested lot		
Habitat being sampled: Riparian Field Edge Open Field	Bottomland Forest Upland Forest Upland Forest	prest Pond Other
Deployment Information:		
Detector #: 22 Microphone #: 68	Directional PVC present?:	no
Mic Height (m): 3 Mic Inclination: 0	Mic Azimuth: 276	
User Profile/Settings: Samp. Freq: 384kHz	Min. Dur.: 1.5 ms	Trig. Level 12db
WA SM4BAT FS SMM-U2 HP-Filter: On	Max Dur.: none Trig Freq: 16kHz	Trig. Window 3 sec  Max Length: 5 Sec
Firmware: 2.3.1 Input Gain: 0 or 2 db (circle one)	Trig Freq	Wax Length. 3 Sec
Comments:		
Photos: Detection area: (X) Site: (X)	Mic orientation: (X )	
P. A.P.	forested lot	? (PEN
trechne Go	1 sears	
0 //		
	. /	
1 1 1 /		
GP III		
	0	



Site Name: 05	A		-	Project Name :	2021 R	verbend
Biologists: E. Merri	11. R. Fitze	patrick			Date:	7/20/202
Detector: 22		_	Detector Status:	N:Armed	ON:Triggered	OFF: Dead
Reason for OFF:						
Did detector location/orientation ch	ange? If so, how?	No				
If detector has moved, been tampered with			tion then take pho	tos before picking u	p.	
Weather conditions		*Weather data (so	-	checked and entered	d below prior to picku	ıp.
	1	2	3	4	5	6
Date	7/16/21	7/17/21	7/18/21	7/19/21		
Start time	2038					
End time	0637	0638	0639	2036 0640		
	Do any of	the following cone	itions apply to the	first 5 hours of san	npling? (Y/N)	
Temp. below 10°C(50°F) ?	N	N	N	$\wedge$		
>9m/h wind speeds?	N	N	N_	$\sim$		
>30 min of precip./fog?	N	N	N	$\wedge$		
		*If Y	ES to any of the cond	litions, resample the	night.	
Was the night successful?	У	V	1	L Y		
<u>Data download</u>	/	1	/	·		
Card ID: 152		_		Card ID:		
Log file Present?		_		Log file Present?		



# **Site 05 Location A**





Site Name:		B		Pro	oject Name: _	2021 River	bend
Biologists:	E. Mec	cill, R. Fitz	patrick			Date:	7/16/21
Location Information:		•	•				
State:	Michigo		County:	Sarilac		Datum/Format: 1	NAD 83/D.D
	_43.17	7768	Longitude:	-082.874	78	UTC: _	4
Site Description:	nowe	t trail	thro	ugh no	odlot		
Habitat being	sampled: Ri	parian Field Edge	Open Field	Bettomland For	est Upland F	Forest Pond Ot	ner
Deployment Information			-				
Detector #:	34	Microphone #:_	5/	Directional PV	C present?: _	<u>no</u>	
Mic Height (m):	3	Mic Inclination:	0	Mic Azimuth:	185		
User Profile/Settings: WA SM4BAT FS Firmware: Comments:	2.3.1	Samp. Freq: HP-Filter: Input Gain:	On	Min. Dur.: Max Dur.: Trig Freq:	none	Trig. Level Trig. Window _ Max Length: _	12db 3 sec 5 Sec
Photos: Detection area:	(x )	Site:	(X)	Mic orientation:	(x)		
	R	Mos		3	1 N	Act P	



Site Name:		<u>R</u>		_	Project Name :	2021 Ki	verbend
Biologists:	E. Merc	ill, R. Fit	zatock			Date:	7/20/202
Detector: (circle one)	30	1		Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector location	n/orientation ch	ange? If so, how?:	N				
if detector has moved, bee	en tampered wit	h, knocked over, o	r changed orientat	tion then take phot	tos before picking u	p.	
Weather conditions	1		*Weather data (soc		checked and entered	d below prior to pick	µр.
		1	2	3	4	5	6
	Date	7/16/21	7/17/21	7/18/21	7/19/21		
	Start time	2038	2038	2037	2036		
_	End time	0637	0638	0639	0640		
		Do any of	the following cond	litions apply to the	first 5 hours of sam	pling? (Y/N)	
Temp. belo	ow 10°C(50°F) ?	N	N	N	N		
>9m/	h wind speeds?	N	N	N	$\sim$		
>30 min	of precip./fog?	N	N	N	$\wedge$		
			*If YE	S to any of the cond	itions, resample the	night.	
Was the ni	ight successful?	<u> </u>		V	Y		
Data download		/	1	/			
Card (D:	5		-		Card ID:		
Log file Present?	YES		-		Log file Present?		



Site 05 Location B





Site Name:	26	A				Project	Name:	2021 1	liver k	end
Biologists:	E. Mer	cill, R. F	1+200	atrick_		<del></del>				116/21
Location Information:			•						/	,
State:	Michig	ΔΛ		County:	Sanila	٠٠.		Datum/Fo	ormat: NA	D 83/D.D
Latitude:	43.16	3 25		Longitude:	-082-8	76839	<del>-</del> -		UTC: <u>-4</u>	
Latitude: Site Description:	ede	rd o	<u>←</u>	for elo	red	lot	and	-Sva	ssla	nds
Habitat being	sampled: R	iparia Fiel	d Edge		Bottomlan	d Forest	Upland F	orest Pon	d Othe	r
Deployment Information  Detector #:		B 80 la -	#.	45	Discostinu	-		na		
	_					nal PVC pre	_	_110_		
Mic Height (m):	_3	Mic Inclina	ation:	0	Mic Azin	nuth:6	5			
User Profile/Settings:  WA SM4BAT FS Firmware:  Comments:	2.3.1			384kHz On 0 or 12 db (circle one)	Max	Dur.: 1.! Dur.: n Freq: 16	one	Trig. Wi	Level indow ength:	12db 3 sec 5 Sec
Photos: Detection area:	(X)		Site:	(X)	Mic orienta	otion: (	x)			
fo,	vest ed	lot							/	
	<b>↑</b>			7	S	. <sub>a</sub> ss l	ave	15		



Site Name: 06	A		-	Project Name :	2021 K	verbend
Biologists: E. Mer Ci	II, R. Fitz	atrick			Date:	7/20/202
Detector: 69		-	Detector Status	ON:Armed	> ON:Triggered	OFF: Dead
Reason for OFF:						
Did detector location/orientation ch	nange? If so, how?	No				
f detector has moved, been tampered wit	th, knocked over, o	or changed oriental	tion then take pho	tos before picking u	ıp.	
Weather conditions	1	*Weather data (so		e checked and entere	d below prior to pick	ιр.
	1	2	3	4	5	6
Date	7/16/21	7/17/21	7/18/21	7/19/21		
Start time	2038	2038	2037	2036		
End time	0637	0638	0639	0640		
	Do any of	the following cond	ditions apply to the	first 5 hours of sar	npling? (Y/N)	
Temp. below 10°C(50°F) ?	N	N	N	N		
>9m/h wind speeds?	N	N	L N	N		
>30 min of precip./fog?	N	N	N	N		
		*If Y	ES to any of the con	litions, resample the	night.	
Was the night successful?	Y		y	L Y		
Data download	1		/			
Card ID: 138		-		Card ID:		
Log file Present?		-		Log file Present?		



# Site 06 Location A





Site Name: 06 B	Project Name: 2021 Riverbend
Biologists: E. Merrill, R. Fitzpatrick	Date: 7/16/2/
Location information:	
State: Michigan County:	Sanilac Datum/Format: NAD 83/D.D
Latitude: 43./6282 Longitude:	-082.86893 UTC: -4
Site Description: edge of forested	lot and grasslands
Habitat being sampled: Riparian Field Edge Open Field	Bottomland Forest Upland Forest Pond Other
Deployment Information:	
Detector #: 49 Microphone #: 18	Directional PVC present?:
Mic Height (m): 3 Mic Inclination:	Mic Azimuth: 275
User Profile/Settings:     Samp. Freq:     384kHz       WA SM4BAT FS     SMM-U2     HP-Filter:     On       Firmware:     2.3.1     Input Gain:     0 or 12 db       Comments:     Comments:     Comments:	Min. Dur.: 1.S ms Trig. Level 12db  Max Dur.: none Trig. Window 3 sec  Trig Freq: 16kHz Max Length: 5 Sec
Photos: Detection area: $(X)$ Site: $(X)$	Mic orientation: $(X)$
forest  P  P  gvasslands	A N



Site Name: 06	В			Project Name :	2021 R	iverbend
Biologists: E. Mec	cill, R. Fitz	patrick			Date:	7/20/202
Detector: 49		-	Detector Status:	DN:Armed	ON:Triggered	OFF: Dead
Reason for OFF:						
Did detector location/orientation	change? If so, how?:	No	7			
f detector has moved, been tampered w	rith, knocked over, o	r changed orientat	ion then take phot	os before picking u	ıp.	
Neather conditions	1	*Weather data (sou	irce: NOAA) must be Ni	checked and entere	d below prior to picl	kup.
	1	2	3	4	5	6
Date	e 7/16/21	7/17/21	7/18/21	7/19/21		
Start tim		2038	1			
End tim	e 0637	0638	0639	0640		
		the following cond			npling? (Y/N)	
Temp. below 10°C(50°F)	<sup>7</sup> N	N	N	N		
>9m/h wind speeds	P N	N	N	N		
>30 min of precip./fog	N	N	N	N		
		*If YE	S to any of the cond	itions, resample the	night.	
Was the night successfu	12	Y	V	Y		
Data download						
Card iD: 137		_		Card ID:		
Log file Present?		_		Log file Present?		



# Site 06 Location B





Site Name: 07 A	Project Name: 2	2021
Biologists: E. Merrill, A. Gio	ebel, M. Zollars	Date: 06/26/2021
Location Information:		1 /
State: Michigan	county: Sanilac	Datum/Format: NAD 83/D.D
	Longitude: - 82 .834 01 *	UTC: <u>-4</u>
Site Description: Soybean field	edge shooting dow	n tight
Forest tree row.	<u> </u>	
Habitat being sampled: Riparian Field Edge	Open Field Bottomland Forest Upland Forest (circle one)	prest Pond Other
Deployment Information:	75-	۸ ۱۰
Detector #: 28 Microphone #: _		170
Mic Height (m): 3 Mic Inclination:	Mic Azimuth: 307°	
User Profile/Settings:  WA SM4BAT FS SMM-U2 HP-Filter: Firmware: 2.3.1 Input Gain:  Comments:	On Max Dur.: none	Trig. Level 12db Trig. Window 3 sec Max Length: 5 Sec
Photos:  Detection area: ( Site:	(D) Mic orientation: (D)	
Soybean Field	Brech Resolution	in Field
Soybean Field	pean Field  Torest	Rox Bed
J 3	1	



Site Name: _	UTF	<u> </u>			Project Name :	2021	KIVENSE
Biologists:	E.M.	cml				Date:	-11
Detector: (circle one)	28			Detector Status:	N:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector location	n/orientation ch	ange? If so, how?:	No				
If detector has moved, bee	n tampered wit	h, knocked over, o	r changed orientat	ion then take phot	os before picking u	p.	
Weather conditions			*Weather data (sou	rce: NOAA) must be Ni	checked and entered	í below prior to pick	up.
_		1	2	3	4	5	6
	Date	6/26/21	6/27/21	6/28/21	6/29/21	6/30/21	
	Start time		2045	2045	2045	2045	
_	End time	_	0624	0625	0625	0625	
		Do any of	the following cond	itions apply to the	first 5 hours of san	npling? (Y/N)	
Temp. belo	ow 10°C(50°F) ?	No	N-	No-	No	No	
>9m/	h wind speeds?	No	No	No	No	No	
>30 min	of precip./fog?	You	No	No	No	No	
			*If YE	S to any of the cond	itions, resample the	night.	
Was the ni	ght successful?	No	YTS	175	YES	YES	
Data download				-			
Card ID:	202				Card ID:		
Log file Present?	YTS				Log file Present?		



# **Site 07 Location A**





Site Name: 07 B	Project Name: 2021 Riverbend
Biologists: E. Merrill, A. Goebel	M. Zollars Date: 00/26/2021
Location Information:	, ,
State: Michigan County:	Sanilac Datum/Format: NAD 83/D.D
Latitude: 43, 16433 ° Longitude:	-82.43408° UTC: -4
Site Description: Tight forest edge a	long soubean field.
Habitat being sampled: Riparian Field Edge Open Field	Bottomland Forest Upland Forest Pond Other circle one}
Deployment Information:	
Detector #: 54 Microphone #: 74	Directional PVC present?: Na
Mic Height (m): 3 Mic Inclination:	Mic Azimuth: 270°
User Profile/Settings:     Samp. Freq:     384kHz       WA SM4BAT FS     SMM-U2     HP-Filter:     On       Firmware:     2.3.1     Input Gain:     0 or (12 db)       Comments:     Comments:     Comments:	Min. Dur.: 1.S ms Trig. Level 12db  Max Dur.: none Trig. Window 3 sec  Trig Freq: 16kHz Max Length: 5 Sec
Photos: Detection area: ( Site: ( Site: )	Mic orientation:
Suybean Field The Row	Farm Field N
Scybean field	Brcs Tier Row Ray
Soybean Field Fores	+ Forest Forest



Site Name: O+	5		_	Project Name:	2021	Kurle
Biologists:	emll				Date:	7/1/21
Detector: 54		-	Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:						
Did detector location/orientation ch	nange? If so, how?	No				
If detector has moved, been tampered with	th, knocked over, o	or changed orientat	ion then take phot	os before picking u	p.	
Weather conditions	l	*Weather data (sou	urce: NOAA) must be Nij	checked and entere	d below prior to pick	up.
	11	2	3	4	5	6
Date	6/26/21	6/27/21	6/28/4	6/29/21	6/30/21	
Start time		2045	2045	2045	2045	
End time		0624	0625	0625	0626	
	Do any of	the following cond	litions apply to the	first S hours of san	npling? (Y/N)	
Temp. below 10°C(50°F) ?	No	No	No	No	No	
>9m/h wind speeds?	No	No	No	No	No	
>30 min of precip./fog?	Yes	No	No	No	No	
		*If YE	S to any of the cond	itions, resample the	night	
Was the night successful?	No	Y-75	Y75	YTS	475	
Data download	•		,			
Card ID: 20L	<del> </del>	_		Card ID:		
Log file Present?		_		Log file Present?		



# **Site 07 Location B**





Site Name: Ø8 A	:	Project Name: 2	021 Riverbe	nd
Biologists: E. Mevr	II, A. Goebel, M	Zollars	Date: 🚫	6/26/2021
Location Information:				, ,
State: Mi (Ni	an County:	Sanilac	Datum/Format: NA	D 83/D.D
	54 Longitude:		UTC: <u>-4</u>	
Site Description: Open	Wetland at	try point of a	forested i	wood
10+.				
Habitat being sampled: Rip  Deployment Information:	arian Field Edge Open Field	Bottomland Forest Upland Forest Upland Forest	prest Pond Othe	) wetland
	Microphone #: 6	Directional PVC present?:	No	
		Mic Azimuth:		
User Profile/Settings:	Samp. Freq: 384kHz	Min. Dur.: 1.5 ms	Trig. Levei	12db
WA SM4BAT FS SMM-U2 Firmware: 2.3.1	HP-Filter: On Input Gain: 0 or 12 db	Max Dur.: none Trig Freq: 16kHz	Trig. Window Max Length:	3 sec 5 Sec
	(circle one)			
Comments:				
Photos: Detection area: (\sqrt{\phi})	Site: (YD)	Mic orientation: ()		
	Forest		Forest	74
Soybean				
Field	wetland	Fores+		
			Forest	
				\
		Corn Field		\
Farm				



Site Name:	08 1	4			Project Name :	2021	2,020 G
Biologists:	EM	errill				Date:	7/1/21
Detector: (circle one)	52			Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF: _							
Did detector location	orientation ch	ange? If so, how?:	No				·
If detector has moved, been	n tampered wit	h, knocked over, o	r changed orientat	ion then take photo	os before picking u	p.	
Weather conditions	1	l	*Weather data (sou	rce: NOAA) must be		l below prior to pick	up.
_		1	2	3	4	5	6
	Date	6/24/21	6/27/21	6/28/21	6/29/21	6/30/21	
	Start time		2045	2045	2045	2045	
	End time	_	0624	0625	0625	0626	
_		Do any of	the following cond	itions apply to the	first 5 hours of sam	piing? (Y/N)	
Temp. belo	w 10°C(50°F) ?	No	No	No	No	No	
>9m/h	wind speeds?	No	No	No	No	No	
>30 min	of precip./fog?	4-75	Na	No	No	No	
_			*If YE	S to any of the condi	tions, resample the	night.	
Was the nig	tht successful?	No	YTS	YTS	YES	Y75	
Data download				,			
Card ID: _	216				Card ID:		
Log file Present?_	77	S			Log file Present?		



# Site 08 Location A





Site Name: 08 B	Project Name: 2021 Riverbeild
Biologists: F. Murrill A. Groebel M	. Zollars Date: 06/26/2021
Location Information:	, ,
State: Michigan County:	Sanilac Datum/Format: NAD 83/D.D
Latitude: 43. 17658 Longitude:	
Site Description: Open Field right	inside forested woodlot.
Habitat being sampled: Riparian Field Edge Open Field	Bottomland Forest Upland Forest Pond Other (circle one)
Deployment Information:  Detector #: 2   Microphone #: 52	
Mic Height (m): 3 Mic Inclination:	Directional PVC present?: NO  Mic Azimuth: 510
User Profile/Settings:  WA SM4BAT FS SMM-U2 HP-Filter: On Or (12 db)  Firmware: 2.3.1 Input Gain: (circle one)	Min. Dur.: 1.5 ms Trig. Level 12db  Max Dur.: none Trig. Window 3 sec  Trig Freq: 16kHz Max Length: 5 Sec
Photos: Detection area: (**)  Site: **	Mic orientation: ya
Soybean Field	Forest  Forest  Grassy  Forest  Grassy
	Forest Forest



Site Name: O	5			Project Name :	2021	1 verlier	
Biologists: E. M	evall				Date:	1 7	
Detector: 31			Detector Status:	ON:Armed	ON:Triggered	OFF: Dead	
Reason for OFF:							
Did detector location/orientation ch	Did detector location/orientation change? If so, how?:						
If detector has moved, been tampered wit	h, knocked over, o	r changed orientat	ion then take phot	os before picking u	p		
Weather conditions	l	*Weather data (sou		checked and entered	l below prior to pick	up.	
	1	2	3	4	5	6	
Date	6/26/21	6/27/21	6/28/21	6/29/21	6/30/21		
Start time		2045	2045	2045	2045		
End time	-	0624	0624	0625	0625		
	Do any of	the following cond	itions apply to the	first 5 hours of sam	pling? (Y/N)		
Temp. below 10°C(50°F) ?	13:	No	No	No	No		
>9m/h wind speeds?	No	No	No	No	No		
>30 min of precip./fog?	Yes	No	No	No	No		
		*If YE	S to any of the cond	itions, resample the	night.		
Was the night successful?	No	175	Trs	425	Y75		
Data download							
Card ID: 214				Card ID:			
Log file Present?				Log file Present?			



# Site 08 Location B





Site Name: 09 A	Project Name:	06 2021 Riverbend
Biologists: E. Marvill A. G	sebel, M. Zollars	Date: 06/26/2021
Location Information:	,	,
State: Michigan	county: Sanilac	Datum/Format: NAD 83/D.D
Latitude: 42 18687 °	Langitude: - 92 91774	UTC: <u>-4</u>
Site Description: Open Field Sc	urrounded by dense	Forest edge.
Site Description: Open Field So Grood Foraging area.	<u> </u>	<u>_</u>
· ·		
Habitat being sampled: Riparian Field Edge	e Open Field Bottomland Forest Upland (circle one)	d Forest Pond Other
Deployment Information:		
Detector #: $26$ Microphone #:	07 Directional PVC present?:	No
Mic Height (m): 3 Mic Inclination:	Ø Mic Azimuth: 185	
User Profile/Settings: Samp. Freq: WA SM4BAT FS SMM-U2 HP-Filter:	384kHz Min. Dur.: 1.5 ms On_ Max Dur.: none	Trig. Level 12db Trig. Window 3 sec
Firmware: 2.3.1 Input Gain:	0 of 12 db) Trig Freq: 16kHz	Max Length: 5 Sec
Comments:	(circle one)	
Photos:  Detection area: (X) Site:	(x) Mic orientation: (x)	
Detection area. (A) Site.	(A) Wite Offerfication (A)	
Galbra	ith Line Rd	
	)	± (N)
		Forest 1
Forest	Forest (	
	>	
		BA
		\ \ \
Foresx	Field	
\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	Field	(3)
		N
.4	Tree Row	
Forest Forest	Field	AAF
	Fie'	



Site Name:				Project Name :	20218	Joen Jem	
Biologists:	E. A	1-evall				Date:	7/1/21
Detector:(circle one)	26	<u> </u>		Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF: _							
Did detector location/orientation change? If so, how?:							
If detector has moved, bee	n tampered wit	h, knocked over, o	r changed orientat	ion then take phot	os before picking u	ρ.	
Weather conditions			*Weather data (sou		checked and entered	d below prior to pick	up.
-		1	22	3	4	5	6
	Date	6/26/21	6/27/21	10/28/21	6/29/21	6/30/21	
	Start time		2045	2045	2045	2045	
	End time	_	0624	0624	0625	0625	
-		Do any of	the following cond	itions apply to the	first 5 hours of sam	pling? (Y/N)	
Temp. belo	ow 10°C(50°F) ?	No	No	No	No	No	
>9m/I	h wind speeds?	No	No	No	No	No	
>30 min	of precip./fog?	475	No	No	No	No	
-			*If YE	S to any of the cond	itions, resample the		
Was the ni	ght successful?	No	YTS.	YTG	YTS	175	
Data download							
Card ID:	_ <u>,                                    </u>	206			Card fD:		
Log file Present?_	125		-		Log file Present?		



# **Site 09 Location A**





Site Name:(	Ø9 B	Project Na	me: 2021 River bend
Biologists: <u>£</u>	Merrill, A. Gros	ebel M. Zollars	Date: 06 26 2021
Location Information:	,	,	, ,
State: 1	11chigan_	county: Sanilac	Datum/Format: NAD 83/D.D
Latitude:	13.18683°	Longitude: -82 - 81226°	UTC: <u>-4</u>
Site Description: <u>(</u>	pen Field Su	rrounded by tight	t forest
Habitat being sa	mpled: Riparian Field Edge	Open Field Bottomland Forest Up	oland Forest Pond Other
Deployment Information:			
Detector #:	Microphone #:	54 Directional PVC preser	nt?: <u>No</u>
Mic Height (m):	3 Mic Inclination:	Mic Azimuth: 278	· ·
User Profile/Settings:  WA SM4BAT FS S Firmware: 2.  Comments:	_	On Max Dur.: none	Trig. Window 3 sec
Photos: Detection area:	(x) Site:	(x) Mic orientation: (x)	
ļ ————	Glatistait	h Line Rol.	> Small
Forest	Forest	Forest (	wood Lot
Forest	Forest	Field Tree Row	A B B B B B B B B B B B B B B B B B B B
Forest	Forest	Field	A Lee



Site Name:	09 B				Project Name :	2021 1	Rivertie
Biologists:	E. N	1 even1				Date:	7/1/2
Detector: (circle one)	57		-	Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:	_						
Did detector location	n/orientation ch	ange? If so, how?:	No				
If detector has moved, bee	n tampered wit	h, knocked over, o	r changed orientat	ion then take phot	os before picking u	p.	
Weather conditions		l	*Weather data (sou		checked and entered	d below prior to pick	up.
		1	2	3	4 ,	S	6
	Date	6/26/21	6/27/21	6/28/21	6/2924	6/20/21	
	Start time	/	2046	2045	2045	2045	
-	End time	_	0624	0624	0625	0625	
-		Do any of	the following cond	itions apply to the	first 5 hours of san	pling? (Y/N)	
Temp. belo	ow 10°C(50°F) ?	No	No	No	No	No	
>9m/	h wind speeds?	No	No	No	No	No	
>30 min	of precip./fog?	YTS	No	No	No	No	
			*If YE	S to any of the cond	itions, resample the	night.	
Was the ni	ght successful?	No	YTS	1/75	Y25	1000	
Data download							
Card ID:	208	3	_		Card ID:		
Log file Present?	V70				Log file Present?		



**Site 09 Location B** 





Site Name:	10	_A		Pro	ject Name: _	2021	River	bend_
Biologists:	E. Mercill	R.Fitzpa	tock				Date: 7	/14/21
Location Information:	•	•						
State:	Michigan		County:	Sanilac		Datum/F	ormat: <u>N</u> A	D 83/D.D
			,	-082.660	-			
Site Description:	Grassy	open	ns/	along	Scy	non C	reek	
Habitat being	sampled: Ripariar	Field Edge	Open Field	> Bottomland Fore (circle one)	st Upland	Forest Por	nd Othe	r
Deployment Information			27			_		
Detector #:	20 Mic	rophone #:	<u> </u>	Directional PV0	C present?: _	<u>no</u>		
Mic Height (m):		Inclination:	0	Mic Azimuth:	178			
User Profile/Settings:  WA SM4BAT FS Firmware:  Comments:	SMM-U2	amp. Freq: HP-Filter: Input Gain:	On	Min. Dur.: Max Dur.: Trig Freq:	none	Trig. W	Level Vindow Length:	12db 3 sec 5 Sec
<u>Photos:</u> Detection area:	(x)	Site:	(x)	Mic orientation:	(x)			
	fors	Hal		Cod	year		17	
forest				Geynur	Cres	Pon	4	
ROAD				Guy				
				G	reste	}		



Site Name:	A		-	Project Name :	2021 K	iverbend
Biologists: E. Merci	11, R.F.42	patack			Date	7/18/-
Detector: 20		-	Detector Status	: ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:						
Did detector location/orientation ch	ange? If so, how?:	No				
If detector has moved, been tampered wit	h, knocked over, c	or changed orientat	tion then take pho	tos before picking u	p.	
Weather conditions		*Weather data (sou		e checked and entered	l below prior to pic	kup.
	11	2	3	4	5	6
Date	7/14/21	7/15/21	7/16/21	7/17/21		
Start time	2039	2038	2038	2037		
End time	0635	0635	0636	0637		
	Do any of	the following cond	litions apply to the	first 5 hours of sam	pling? (Y/N)	,
Temp. below 10°C(50°F) ?	_N	N	N	N		
>9m/h wind speeds?	N	N	L N_	N		
>30 min of precip./fog?	N	N	N	N		
		*If YE	S to any of the cond	ditions, resample the r	night.	
Was the night successful?	У	У	V	Y		
Data download	•	7	/	1		
Card ID: 134		-		Card ID:		
Log file Present?		-		Log file Present?		



**Site 10 Location A** 





Site Name: 10 B	Project Name: 2021 Riverbend
Biologists: E. Merrill, R. Fitzpat	
Location Information:	
State: Michigan	County: Sanilac Datum/Format: NAD 83/D.D
, ,	ongitude: -082.65982 UTC: -4
Site Description: opening of p	and and Geyman Creek.
sheeting away from	
	pen Field Bottomland Forest Upland Forest Pond Other (circle one)
Deployment Information:	2
Detector #: 53 Microphone #: 52	Directional PVC present?: NO
Mic Height (m): 3 Mic Inclination:	Mic Azimuth: 255
	84kHz Min. Dur.: 1.5 ms Trig. Level 12db
WA SM4BAT FS SMM-U2 HP-Filter: Firmware: 2.3.1 Input Gain: 0 o	On         Max Dur.:         none         Trig. Window         3 sec           (12)db         Trig Freq:         16kHz         Max Length:         5 Sec
	rcle one)
Photos: Detection area: (X) Site:	(X) Mic orientation: (X)
	3
Goyban field	
10	m Period
CPSP CSTEIR	Bristed
	12
100	IP V
gayman C	rece
Corested	



Site Name:		<u>r</u>		-	Project Name :	2021 R	iverbend
Biologists:	E. Mercill	RiFitzpa	trick			Date:	7/18/2021
Detector: (circle one)	53			Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector locatio	n/orientation cha	ange? If so, how?:	140				
If detector has moved, bee	en tampered with	, knocked over, o	r changed orientat	tion then take phot	os before picking u	p.	
Weather conditions	1		*Weather data (sou	urce: NOAA) must be Ni	checked and entered	d below prior to pick	up.
		1	22	3	4	5	6
	Date	7/14/21	7/15/21	7/16/21	7/17/21		
	Start time	2039	2038	2038	2037		
	End time	°G35	0635	9636	9637		
		Do any of	the following cond	itions apply to the	first 5 hours of san	npling? (Y/N)	
Temp. bel	ow 10°C(50°F) ?	N	N	N	N		
>9m/	h wind speeds?	N	N	N	N		
>30 min	of precip./fog?	N	N	N	N		
			*If Y	ES to any of the cond	itions, resample the	night.	
Was the n	ight successful?	У	У	У	y		
Data download		7	7		7		
Card ID:	133		_		Card ID:		
Log file Present?	YES		-		Log file Present?		



**Site 10 Location B** 





Site Name: 1) A		121 Riverbend
Biologists: E. Murrill, A. Goebel	M. Zollars	Date: 06 27 2021
Location Information:		, ,
State: Michigan County:	Sanilac	Datum/Format: NAD 83/D.D
Latitude: 43.18598 Longitude:	-82.73155	UTC: <u>-4</u>
Site Description: Shooting down t Wheat field	ignt tree edge	next to
Habitat being sampled: Riparian Field Edge Open Field	Bottomland Forest Upland Fo (circle one)	rest Pond Other
Deployment Information:  Detector #: 53 Microphone #: 76	Directional PVC present?:	<u> </u>
Mic Height (m): Mic Inclination:	Mic Azimuth: 1966	
User Profile/Settings:     Samp. Freq: 384kHz       WA SM4BAT FS SMM-U2 Firmware: 2.3.1     HP-Filter: On Input Gain: 0 or 12 do (circle one)       Comments:	Min. Dur.: 1.5 ms Max Dur.: none Trig Freq: 16kHz	Trig. Level 12db Trig. Window 3 sec Max Length: 5 Sec
Photos:  Detection area:   Det	Mic orientation:	
Small Wood Lot	Corn Field	21
Field Brain	wheat	
		house



Site Name:				Project Name :	2021 K	1124 cm
Biologists: E-Me	mll				Date:	7/1/21
Detector: 53			Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:						
Did detector location/orientation change? If so, how?:						
If detector has moved, been tampered wi	th, knocked over, or	r changed orientat	ion then take phot	os before picking u	p.	
Weather conditions	1	*Weather data (sou	rce: NOAA) must be Nij	checked and entered	d below prior to pick	up.
	1	2	3	4	5	6
Date	6/27/2021	4/28/21	6/29/21	6/30/21		
Start time	2045	2045	2045	2045		
End time	0624	0624	0624	0625		
	Do any of	the following cond	itions apply to the	first 5 hours of san	npling? (Y/N)	
Temp. below 10°C(50°F)	No	No	No	No		
>9m/h wind speeds	No	No	No	No		
>30 min of precip./fog	N =	No	No	No		
		*If YE	S to any of the cond	itions, resample the	night.	
Was the night successful	Y-5	175	Yes	176		
Data download		•				
Card ID:	2			Card ID:		
Log file Present?	22			Log file Present?		



# **Site 11 Location A**





Site Name: 11 B	Project Name: 2021 Riverband
Biologists: E. Merrill A. Groebel	M. Zollavs Date: 06/27/2021
Location Information:	
State: MICHIGAN County:	SavilaC Datum/Format: NAD 83/D.D
Latitude: 43. 18679° Longitude:	-82.73129° UTC: -4
Site Description: Shooting along ed	ge of woodlot and corn Field
Habitat being sampled: Riparian Field Edge Open Field	Bottomland Forest Upland Forest Pond Other (circle one)
Deployment Information:	W. \.
Detector #: 1 Microphone #: 43	
Mic Height (m): Mic Inclination:	Mic Azimuth: 283°
WA SM4BAT FS SMM-U2 HP-Filter: On Input Gain: O or 2 db  Comments:	Min. Dur.: 1.5 ms Trig. Level 12db  Max Dur.: none Trig. Window 3 sec  Trig Freq: 16kHz Max Length: 5 Sec
Photos:  Detection area:   Site:	Mic orientation: (42)
Small wood Lot	Corn Field N
Riack Ried Bo	wheat Field &
	/ 100 Pe



Site Name: 11 B			_	Project Name :	2021	2, ver Lene
Biologists:	Manil	<u>.                                    </u>			Date	7/1/21
Detector: O			Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
(circle one)		•				
Reason for OFF:					<u> </u>	
Did detector location/orientation	change? If so, how?:	No				
If detector has moved, been tampered to	vith, knocked over, o	r changed orientat	ion then take phot	os before picking (	ıp.	
Weather conditions	1	*Weather data (sou	rce: NOAA) must be		d below prior to p	ckup.
	1	2	إنايا 3	ght 4	5	6
Da	te 6/27/21	6/28/21	6/29/21	6/30/21		
Start tin	2045	2045	2045	20 45		
End tin	ne 0624	0624	0624	0625		
	Do any of	the following cond	litions apply to the	first 5 hours of sar	mpling? (Y/N)	
Temp. below 10°C(50°F)	17 No	No	No	No		
>9m/h wind speed	s? No	No	No	No		
>30 min of precip./fo	B3 NO	No	No	No		
	<del></del>	. /	5 to any of the cond	itions, resample the	night.	
Was the night successfu	17 YTS	425	175	100		
Data download	,					
Card ID:		-		Card ID:		
Log file Present?	>	-		Log file Present?		



# Site 11 Location B





Site Name:			t Name: 2021	Riverbend
Biologists:	Merrill, R. Fitz,	patrick		Date: 7/13/2
Location Information:	,			. ,
State:/	lichiaan	County: Sanilac	Datum/F	format: NAD 83/D.D
Latitude: 4		ongitude: -082.68/		UTC: -4
Site Description:		Shooting along d		turnip field
Habitat being sam	npled: Riparian (Field Edge) O	pen Field Bottomland Forest	Upland Forest Po	nd Other
Deployment Information:  Detector #:	/ Microphone #: 8	5 Directional PVC p	present?:	
Mic Height (m):	3 Mic Inclination:	Mic Azimuth: 2	250	
User Profile/Settings:  WA SM4BAT FS SM Firmware: 2.3.  Comments:	MM-U2 HP-Filter:	On Max Dur.:	none Trig. V	y. Level 12db Vindow 3 sec Length: 5 Sec
Photos: Detection area:	(x) Site:	(x ) Mic orientation:	(x)	
	↑ Swee	t beets		<u>A</u>
	dif	zh.	fn-st	



Site Name: _	12	A		-	Project Name :	2021 K	iverberd
Biologists: ¿	E. Mero	Il RFitz	patrick			Date:	7/17/2
Detector:(circle one)				Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector location/orientation change? If so, how?:							
If detector has moved, bee	n tampered wit	h, knocked over, o	r changed orientat	ion then take phot	os before picking u	р.	
Weather conditions	1		*Weather data (sou		checked and entered	d below prior to pick	up. 
-		11	2	3	4	5	6
	Date	7/13/21	7/14/21	7/15/21	7/16/21		
	Start time	2040	2039	2038	2038		
_	End time	0634	0635	0636	0637		
		Do any of	the following cond	litions apply to the	first 5 hours of sam	npling? (Y/N)	
Temp. belo	ow 10°C(50°F) ?	N	N	N_	N		
>9m/l	n wind speeds?	N_	N	N	N		
>30 min	of precip./fog?	N	M	N	N		
-		-	*If YE	ES to any of the cond	litions, resample the	night.	
Was the ni	ght successful?	<b>Y</b>	<u> </u>	1	1		
Data downicad		1	1	1	l		
Card ID:	. /				Card ID:		
Log file Present?	Yes				Log file Present?		



**Site 12 Location A** 





	Site Name: 12 B Project Name: 2021 River bend	
	Biologists: E. Merrill, R. Fitzpatrick Date: 7/13/21	
Loca	ition Information:	
	State: Michigan County: Sanilac Datum/Format: NAD 83/D.D	
	Latitude: 43 18195 Longitude: -082. 68307 UTC: -4	
	site Description: Open area at start of trail through bottomland	forest
Donl	Habitat being sampled: Riparian Field Edge Open Field Bottomland Forest Upland Forest Pond Other loyment Information:	
DEDI	Detector #: 47 Microphone #: 39 Directional PVC present?: 10	
	Mic Height (m): 3 Mic Inclination: 0 Mic Azimuth: 280	•
<u>User</u>	WA SM4BAT FS SMM-U2 HP-Filter: On Max Dur.: none Trig. Level 12db  Firmware: 2.3.1 Input Gain: 0 or 12 db (circle one)  Comments:	
Phot	Detection area: (X) Site: (X) Mic orientation: (X)	
	N	
+	difeh	
R		
9		
A	K-4 /	
D	trul through woods	
	P PP P	
Sket	ch site with detector location; label streams, roads, and other features.	

Site Name:	12	B		-	Project Name :	2021	River bend
Biologists:	Merr	ill, R. Eit.	zpatrick			Date:	7/17/2
Detector: (circle one)	47_			Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector location/orientation change? if so, how?: No							
If detector has moved, been tarr	pered with	, knocked over, o	r changed orientat	ion then take phot	os before picking u	p.	
Weather conditions	1		*Weather data (sou		checked and entered	d below prior to pick	up.
		1	2	3	4	5	6
	Date	7/13/21	7/14/21	7/15/21	7/16/21		
!	Start time	2040	2039	2038	2038		
	End time	0634	9635	0036	0637		
		Do any of	the following cond	itions apply to the	first 5 hours of sam	pling? (Y/N)	
Temp. below 10	°C(50°F) ?	_N_	N	N	N		
>9m/h win-	d speeds?	N	N_	N	N		
>30 min of pro	ecip./fog?		N	N	N		
			*If YE	S to any of the cond	itions, resample the	night.	
Was the night so	uccessful?	y	<u> </u>	L-V			
Data download		(	(	7	1		
Card ID:	22_				Card ID:		
Card ID:	(-05				Log file Present?		



Site 12 Location B





Site Name: 13 A Project Name: 2021 River bend
Biologists: A. Goebel, E. Merrill, M. Zollars Date: 06/28/2021
Location Information:
State: Michigan County: Sanilac Datum/Format: NAD 83/D.D
Latitude: 43.18382° Longitude: -82.67357° UTC: -4
Site Description: Bottom land Forest IN/ good Foraging area
Habitat being sampled: Riparian Field Edge Open Field Bottomland Forest Upland Forest Pond Other
Deployment Information:
Detector #: 12 Microphone #: 60 Directional PVC present?: No
Mic Height (m): S Mic Inclination: Mic Azimuth: 83°
User Profile/Settings:     Samp. Freq:     384kHz     Min. Dur.:     1.5 ms     Trig. Level     12db       WA SM4BAT FS SMM-U2 Firmware:     4.3.1     1.5 ms     1.5
Photos:  Detection area: ( Site: ( Mic orientation: ) Mic orientation:
Turn: P Field  Field  Poster  Field  Field



Site Name: 13 A				Project Name :	2021 P	ilver bend
Biologists: E. Mu	<u>m11</u>				Date:	7/2/2
Detector: 2			Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:						
Did detector location/orientation ch	ange? If so, how?:	No				
f detector has moved, been tampered wit	h, knocked over, o	r changed orientati	on then take photo	os before picking u	р.	
Veather conditions	l	*Weather data (sou	rce: NOAA) must be Nig	checked and entered	d below prior to pic	kup.
	11	2	3	4	5	6
Date	6/28/21	6/29/21	6/30/21	7/1/21		
Start time	2044	2044	2044	2044		
End time	0624	0624	0626	0625		
	Do any of	the following cond	itions apply to the	first S hours of san	pling? (Y/N)	
Temp. below 10°C(50°F)?	No	No	No	No		
>9m/h wind speeds?	No	No	No	No		
>30 min of precip./fog?	No	No	No	No		
		*If YE	S to any of the cond	itions, resample the	night.	
Was the night successful?	475	YES	425	Y75		
Data download						
Card ID:				Card ID:		
Log file Present? 175		-		Log file Present?		



Site 13 Location A





Site Name: 13 B	Project Name:	2021 Riverbend
Biologists: E Merrill, A. Gic	selvel, M. Zollars	Date: 06/28/2021
Location Information:	·	-1 (
State: Michigan	County: Sauilac	Datum/Format: NAD 83/D.D
Latitude: 43 18303°	Longitude: -82.67122°	UTC: <u>-4</u>
Site Description: Bottom Land	forest connecting	turnip
field, next to drain	age diten	
Habitat being sampled: Riparian Field Edge	Open Field Bottomland Forest Upland	Forest Pond Other
Deployment Information:	1 -	Δ
Detector #: 75 Microphone #:		No_
Mic Height (m): Mic Inclination: _	8 Mic Azimuth: 235 °	
User Profile/Settings:  WA SM4BAT FS SMM-U2 HP-Filter: Firmware: 2.3.1 Input Gain:  Comments:	384kHz         Min. Dur.:         1.5 ms           On         Max Dur.:         none           0 ol 12 db         Trig Freq:         16kHz	Trig. Level 12db Trig. Window 3 sec Max Length: 5 Sec
Photos:  Detection area:   Site:	Mic orientation:	
Trees Turnip	Field S	2

E Wellman Line Kd

Sketch site with detector location, label streams, roads, and other features.



Site Name: 1 3 3				Project Name :	2021 K	wertene
Biologists: E. M	cvill				Date:	7/2/21
Detector: 75			Detector Status:(	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:						
Did detector location/orientation ch	nange? If so, how?:	No				
If detector has moved, been tampered wit	th, knocked over, o	r changed orientati	on then take photo	os before picking u	p.	
Weather conditions		*Weather data (sou	rce: NOAA) must be Nig		d below prior to pick	kup.
	1	2	3	4	5	6
Date	6/2=/21	6/29/21	6/30/21	7/1/21		
Start time	2044	2044	2044	2044		
End time	0624	0624	0625	0625		
	Do any of	the following condi	tions apply to the	first 5 hours of san	npling? (Y/N)	
Temp. below 10°C(50°F) ?	No	No	No	No		
>9m/h wind speeds?	No	No	1/0	No		
>30 min of precip./fog?	No	No	No	No		
		*tf YE	S to any of the condi	tions, resample the	night.	
Was the night successful?	405	Yes	425	Yes		
Data download						
Card ID: 64		_		Card ID:		
Log file Present?				Log file Present?		



Site 13 Location B





Site Name: 14 A	Project Name: 2021 River bend
Biologists: A. Groebel, E. Merrill	M. Zollars Date: 06/27/2021
Location Information:	
State: HICHIGAN County:	Savilac Datum/Format: NAD 83/D.D
Latitude: 43.17398 Longitude:	
	I lot forest edge next
to enclosed soubean field	
Habitat being sampled: Riparian Field Edge Open Field	Bottomland Forest Upland Forest Pond Other circle one)
Deployment Information:	
Detector #: Microphone #: O	Directional PVC present?: No
Mic Height (m): 3 Mic Inclination:	Mic Azimuth: 159°
User Profile/Settings: Samp. Freq: 384kHz	Min. Dur.: 1.5 ms Trig. Level 12db
WA SM4BAT FS 5MM-U2 HP-Filter: On	Max Dur.: none Trig. Window 3 sec
Firmware: 2.3.1 Input Gain: 0 or (2 db) (circle one)	Trig Freq: 16kHz Max Length: 5 5ec
Comments:	
Photos: Detection area: (JP Site: (JD)	Mic orientation:
E. Wellman L	ine Rol.
	Subject
Saybean	Soybean
3	Field
Fireld	/ /
Drainage Ditch Tree Row	7/ 8: 1:
Corn Field	Private
1	Residence
80->	_/
wood Lot	V



Site Name: ILIA				Project Name :	2021	Proce Jen
Biologists:	Imol				Date	7/1/21
Detector: 06			Detector Status:	ØN:Armed	ON:Triggered	OFF: Dead
Reason for OFF:						
Did detector location/orientation ch	ange? if so, how?:	No				
f detector has moved, been tampered wit	h, knocked over, o	r changed orientat	ion then take phot	os before picking $a_i$	o.	
Weather conditions		*Weather data (sou	ırce: NOAA) must be Niį	checked and entered	below prior to pic	kup.
	1	2	3	4	5	6
Date	6/27/21	6/28/21	6/29/21	10/30/21		
Start time	2045	2045	2044	2044		
End time	0623	0624	0624	0625		
	Do any of	the following cond	litions apply to the	first 5 hours of sam	pling? (Y/N)	1
Temp. below 10°C(50°F)?	No	No	No	No		
>9m/h wind speeds?	No	No	No	No		
>30 min of precip./fog?	No	No	No	No		
		*If Y	S to any of the cond	itions, resample the i	night.	
Was the night successful?	Yrs	Yrs	YES	YTS		
Data download		,		1		
Card (D:				Card ID:		
Log file Present?				Log file Present?		



## **Site 14 Location A**





Site Name: 14 B Project Name: 2021 R
Biologists: A. Goebel, E. Murrill M. Zollars Date: 06/27/202
Location Information:
State: Michigan County: Sanilac Datum/Format: NAD 83/D.D
Latitude: 43.17360° Longitude: -82.68964° UTC: -4
Site Description: Shooting down forest edge next to soybean field.
Habitat being sampled: Riparian Field Edge Open Field Bottomland Forest Upland Forest Pond Other
Deployment Information:
Detector #: 19 Microphone #: 22 Directional PVC present?: No
Mic Height (m): 3 Mic Inclination: 0 Mic Azimuth: 89 6
User Profile/Settings:     Samp. Freq:     384kHz     Min. Dur.:     1.5 ms     Trig. Level     12db       WA SM4BAT FS SMM-U2     HP-Filter:     On     Max Dur.:     none     Trig. Window     3 sec
Firmware: 2.3.1 Input Gain: 0 or 12 db Trig Freq: 16kHz Max Length: 5 Sec
Comments:
Photos:  Detection area: (XP) Site: (A) Mic orientation: (XP)  E. Wellman Line Rd.
Soybean Field >oybean
Field
Tree FOW
a Corn Field Private
B △→> Residence
wood Lot



Site Name: _	14/3				Project Name :	2021 K	WEN Den
Biologists: _	E.M	col				Date:	7/1/24
Detector:	19		-	Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector location	/orientation ch	ange? If so, how?:	No				
If detector has moved, beer	n tampered wit	h, knocked over, o	r changed orientat	ion then take phot	os before picking u	р.	
Weather conditions		Ī	*Weather data (sou	ırce: NOAA) must be Nij	checked and entered	d below prior to pick	up.
_		11	2	3	4	5	6
	Date	6/27/21	6/28/21	6/29/21	6/30/21		
	Start time	2019	2045	2044	2044		
	End time	0623	0624	0824	0625		
_		Do any of	the following cond	litions apply to the		pling? (Y/N)	
Temp. belo	w 10°C(50°F) ?	lin	No	No	No		
>9m/l	wind speeds?	No	No	No	No		
>30 min	of precip./fog?	No	No	No	No		
_			*If YE	S to any of the cond	itions, resample the	night.	
Was the nig	ght successful?	775	175	Yes	YES		
Data download							
Card ID:	24				Card ID:		
Log file Present?	Ves		_		Log file Present?		



## **Site 14 Location B**





Site Name: 15	_A	Project Name:	2021 Riverbend
Biologists: E. Mero	ill, R. Fitzpatack		Date: 7/14/21
Location Information:			
State: Michiga	County:	Sonilac	Datum/Format: NAD 83/D.D
Latitude: <u>43.180</u>	77 Longitude:	-082.68878	UTC: <u>-4</u>
Site Description:	e of coun field	and trackhe	- Sheeting town
wetlands	·		
Habitat being sampled: Ripa		Bottomland Forest Upland For circle one)	est Pond Other
	Microphone #: 72	Directional PVC present?:	no
Mic Height (m): 3	Mic Inclination:	Mic Azimuth: 181	
User Profile/Settings:  WA SM4BAT FS SMM-U2 Firmware: 2.3.1  Comments:	Samp. Freq: 384kHz HP-Filter: On Input Gain: 0 o 12 lib (circle one)	Min. Dur.: 1.5 ms Max Dur.: none Trig Freq: 16kHz	Trig. Level 12db Trig. Window 3 sec Max Length: 5 Sec
Photos:  Detection area: (X )	Site: (x )	Mic orientation: (X)	
	Cover	A Bann extreos	1 N



Site Name:		<u>A</u>	. <u>.                                   </u>	_	Project Name :	2021 K	?iverbend
Biologists:	E.Mecci	II, R. Fitz	patrick			Date:	7/18/21
Detector:(circle one)	26		-	Detector Status	: ••N:Armed	ON:Triggered	OFF: Dead
Reason for OFF: _							
Did detector location	/orientation ch	ange? If so, how?:	No				
If detector has moved, bee	n tampered wit	h, knocked over, o	r changed orienta	tion then take pho	tos before picking up	).	
Weather conditions			*Weather data (so		e checked and entered	below prior to pick	<sub>Ј</sub> р.
_		1	2	3	4	5	6
	Date	7/14/21	7/15/21	7/16/21	7/17/21		
	Start time	2039	2008	2038	2037		
_	End time	0635	0636	0637	0637		
	ı	Do any of	the following cond	ditions apply to the	first 5 hours of sam	pling? (Y/N)	
Temp. belo	w 10°C(50°F) ?	N	N	N	N		
>9m/h	wind speeds?	N	N	N	N_		
>30 min	of precip./fog?	N	L_N	N	N		
_			*If Y	ES to any of the cond	litions, resample the n	ight.	
Was the ni	ght successful?	Y	У	V	<u> </u>		
Data download			1	1	1		
Card ID: _	131				Card ID:		
Log file Present? _	Y-26				Log file Present?		



**Site 15 Location A** 





Site Name:	15	B		Proj	ject Name:	2021	Rive	chead
Biologists:	E. Me	vill, R. Fitza	atrick				Date:	
Location Information:				-				7
State:	Michi	300	County:	Socilar		Datum/Fo	ormat: <u>N</u> A	D 83/D.D
Latitude:	43.15	2024	Longitude:	-082.6	8879		UTC: <u>-4</u>	
Site Description:	on ed	es of c	ern fel.	-082.6	trus	treem	nen	
Habitat being  Deployment Information		Riparian Field Edgr	,	Bottomland Fores	st Upland	Forest Pon	d Othe	r
Detector #:	63	Microphone #:	67	Directional PVC	present?:	Ŋο		
		Mic Inclination:		Mic Azimuth: _	_			
User Profile/Settings: WA SM4BAT FS Firmware: Comments:		Samp. Freq: HP-Filter: Input Gain:	384kHz On 0 on 12 db (circle one)	Min. Dur.: Max Dur.: Trig Freq:	none	Trig. Trig. Wi Max Le		12db 3 sec 5 Sec
Photos: Detection area:	(X)	Site:	(X)	Mic orientation:	(X)		<u> </u>	
	C	from the state of		Avec 3	iveste 1-t	4 11	3	



Site Name:	15	В		_	Project Name :	2021 R	iverbend
Biologists:	E. Merril	l, R.Fitzp	strick			Date:	7/18/2
Detector: (circle one)	10		-	Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:				<u></u>			
Did detector locatio	n/orientation ch	ange? If so, how?:	No				
If detector has moved, bee	en tampered witl	n, knocked over, o	r changed orientat	tion then take pho	tos before picking u	р.	
Weather conditions	ı		*Weather data (sou		checked and entered	d below prior to pick	tup.
	_	1	2	3	ght4	5	6
	Date	7/14/21	7/15/21	7/16/21	7/17/21		
	Start time	2039	2038	2038	2037		
	End time	0635	0636	0637	0637		
		Do any of	the following cond	litions apply to the	first 5 hours of sam	pling? (Y/N)	
Temp. bel	ow 10°C(50°F) ?	N	N	N	N		
>9m/	'h wind speeds?	N	N	N_	N		
>30 min	of precip./fog?	N	N	N	N		
			*If Yi	ES to any of the cond	litions, resample the	night.	
Was the n	ight successful?	<b>Y</b>	<u> </u>	Ly	<u>Ly</u>		
Data download				1	1		
Card ID:	122 YES		-		Card ID:		
Log file Present?	YES	<u></u>	<del></del>		Log file Present?		



Site 15 Location B





Site Name:	16	<u> </u>			Project N	ame:	2021 R:	ver bend
Biologists:	E. Me	ccill, R. Fitze	atrick				Date:	
Location Information:		•						77
		<u> </u>					Datum/Format:	NAD 83/D.D
Latitude:	43.1	7387	Longitude:	<u>-082.</u>	70958		UTC:	-4
Site Description:	trecl	me along	dvarr	0150	dydeh	and	Goy or	ean frelo
		liparian Field Edge	<b>)</b> Open Field	Bottom (circle one)	and Forest U	Ipland Fo	rest Pond C	ther
Deployment Information			0-					
Detector #:	32	Microphone #: _	<u>%0</u>	Direct	ional PVC pres	ent?:	no	
Mic Height (m):	3_	Mic Inclination: _	0	Mic A	zimuth: <u>/</u>			
User Profile/Settings:  WA SM4BAT FS Firmware:  Comments:		Samp. Freq: HP-Filter: Input Gain:	On	M	n. Dur.: 1.5 ax Dur.: nor ig Freq: 16k	ne	Trig. Level Trig. Window Max Length:	3 sec
Photos: Detection area:	(X)	Site:	(X)	Mic orie	ntation: {X	)		
Produ	1	9	oy be	ns		77		
	Fore	87rd 10	FT?					



Site Name:	16	A	_		Project Name :	2021 Riv	rechend
Biologists:	E. Meccil	. R. Fitzp	atrick			Date: _	7/18/2
Detector;	32	<u> </u>		Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector location/	orientation cha	ange? If so, how?:	No				
If detector has moved, been	tampered with	n, knocked over, o	r changed orientat	ion then take phot	os before picking u	p.	
Weather conditions			*Weather data (sou	•	checked and entered	l below prior to picku	ир. 
	_	11	2	3	4	5	- 6
	Date	7/14/21	7/15/21	7/16/21	7/17/21		
	Start time	2039	2038	7/16/21 2038 0637	2037		
	End time	0635	0636	0637	0638		
				itions apply to the			
Temp. belov	v 10°C(50°F) ?	N	N	N	Ν		
>9m/h	wind speeds?	N	N	N	2		
>30 min a	f precip./fog?	N	N	N	2		
_			*If YE	5 to any of the cond	itions, resample the	night.	
Was the nigi	ht successful?	Y	y	у	y		
Data download		'	/	/	1		
	143				Card ID:		
Card ID: Log file Present?	105						



**Site 16 Location A** 





Site Name:	16	В		Proj	ect Name:	021 R:V	erbend
Biologists:	E. M.	erill, R. Fitz	epatricK			Date:	7/14/21
Location Information:			•				
State:	Michiga	<u> </u>	County; _	Sunilac		Datum/Format:	NAD 83/D.D
				-082.708		UTC:	
Site Description:	ede	e of 600	/ sean -	field and h	1 Force	ed lot	shoetin
_ toward	<u> ~</u>	dat of	force	- and h	ayfrel	=	
Habitat being	sampled:	Riparian Field Edg	e Open Field	Bottomland Fores	/		ther
Deployment Information			7/				
Detector #:	_2.7	Microphone #:	/6	Directional PVC	present?:	no	
Mic Height (m):	3_	Mic Inclination:		Mic Azimuth:	160		
User Profile/Settings: WA SM4BAT FS Firmware: Comments:		Samp. Freq: HP-Filter: Input Gain:	384kHz On 0 o (13 db (circle one)	Min. Dur.: _ Max Dur.: _ Trig Freq: _	none	Trig. Level Trig. Window Max Length:	12db 3 sec 5 Sec
Photos: Detection area:	(x)	Site:	(x)	Mic orientation:	(x)		
	1 1 N	Fo lo	vided +	2	La-	Jocan	



Site Name:	16	B			Project Name :	2021 R	iverbend.
Biologists:	E. Merril	1. R. Fitza	atrick			Date:	7/18/21
Detector: (circle one)	24			Detector Status:	ON:Armed	riggered_	OFF: Dead
Reason for OFF:		_				·	
Did detector location	n/orientation cha	ange? If so, how?:	No				
If detector has moved, bee	n tampered with	, knocked over, o	r changed orientat	ion then take phot	os before picking up	).	
Weather conditions	ı		*Weather data (sou		checked and entered	below prior to picku	p.
_		1	2	3	4	5	6
	Date	7/14/21	7/15/21	7/16/21	7/17/21		
	Start time	2039	7038	2038	2037	_	
	End time	9635	06 36	0637	0638		
	1	Do any of	the following cond	litions apply to the I	first 5 hours of sam	pling? (Y/N)	
Temp. belo	ow 10°C(50°F) ?	N	N	N	N		
>9m/	h wind speeds?	N	N_	N	N		
>30 min	of precip./fog?	N	N	N_	N		
			*if Yi	ES to any of the cond	litions, resample the r	night.	
Was the n	ight successful?	<u> </u>	<u> </u>	<u> </u>	<u> </u>		
Data download			•	ı	1		
•	144		-		•		
Log file Present?	100		-		Log file Present?		



Site 16 Location B





Site Name: 17	A	Project Name:	2021 Reverberal
	errill, R.F. Tapatri	CK.	Date: 1/18/2
State: Michie	gan County:	Sanlac	Datum/Format: NAD 83/D.D
Latitude: 43.20	0/43 Longitude:	-082.66430	UTC: -4
	-		nd frest
at forcest apa	ng along convung to Blac	k Creek	
Habitat being sampled: R	iparian Field Edge Open Field	Bottomland Forest Upland F	orest Pond Other
eployment Information:			
Detector #: 48	Microphone #: 82	Directional PVC present?:	no
Mic Height (m): 3	Mic Inclination:	Mic Azimuth: 4	
wa sm4Bat FS SMM-U2 Firmware: 2.3.1	Samp. Freq: 384kHz HP-Filter: On Input Gain: 0 or 12 db	Min. Dur.: 1.5 ms Max Dur.: none Trig Freq: 16kHz	Trig. Level 12db Trig. Window 3 sec Max Length: 5 Sec
Comments:	(circle one)		
Detection area: (X)	Site: (x)	Mic orientation: (X)	
forest			77
D BI	acy A		
	ack work	fnest	



Site Name:	17	A			Project Name :	2021	River bend	
Biologists:	E. Merr	II, R. Fit	zpatrick			Date:	7/17/21	
Detector: (circle one)	4	8	-	Detector Status:	ON:Armed	ON:Triggered	OFF: Dead	
Reason for OFF:								
Did detector location/orientation change? If so, how?:								
If detector has moved, bee	en tampered with	n, knocked over, o	r changed orientat	ion then take phot	os before picking u	р.		
Weather conditions	I		*Weather data (sou		checked and entered	l below prior to pick	<b>ч</b> р.	
-		1	2	3	4	5	6	
	Date	7/13/21	7/14/21	7/15/21	7/16/21			
	Start time	2039	2039	2038	2038			
	End time	0634	0635	0035	0636			
•		Do any of	the following cond	itions apply to the	first 5 hours of sam	pling? (Y/N)		
Temp. beld	ow 10"C(50"F) ?	N	N	N	2	4.0		
>9m/	h wind speeds?	N	N	N	2			
>30 min	of precip./fog?	Ν	N	N	N			
•			*If YE	S to any of the cond	itions, resample the	right.		
Was the n	ight successful?	Y	У	у	l y			
Data download			,	1	1			
Card (D:	37		-		Card ID:			
Log file Present?	YES		-		Log file Present?			



**Site 17 Location A** 





Site Name:	<u> </u>	Project Name:	2021 Riverbend
Biologists: E. M	1errill Refitepate	ick	Date: 7/13/2
Location Information:	, ,		,
State: Mick	Digan County	v: Sanilac	Datum/Format: NAD 83/D.D
	20/48 Longitude		UTC: <u>-4</u>
Site Description:	ong confil	d edge and	forested 1 st
MHL Black	Creek whin	me Through	
	Riparian <u>Field Edge</u> Open Fiel		
Deployment Information:  Detector #: 72	Microphone #: 59	Directional PVC present?:	กอ
Mic Height (m): 3	Mic Inclination:	Mic Azimuth:	
User Profile/Settings:  WA SM4BAT FS SMM-U2 Firmware: 2.3.1  Comments:		Min. Dur.: 1.5 ms Max Dur.: none Trig Freq: 16kHz	Trig. Level 12db Trig. Window 3 sec  Max Length: S Sec
Photos:  Detection area: (X)	Site: (X)	Mic orientation: (X )	Sp.
Crest	con	old	1
Black Cue		forest	



Site Name: _	17	B			Project Name :	2021	Kiverbend		
		·II, R.Fit	2 patrick			Date:	7/17/21		
Detector: _ {circ e one}	72		•	Detector Status:	ON:Armed	ON:Triggered	OFF: Dead		
Reason for OFF: _									
Did detector location/orientation change? If so, how?:									
If detector has moved, bee	n tampered with	n, knocked over, o	r changed orientati	ion then take phot	os before picking u	р.			
Weather conditions	1		*Weather data (sou		checked and entered	l below prior to pick	kup.		
		1	2	] 3	4	5	6		
-	Date	7/13/21	7/14/21	7/15/21	7/16/21				
	Start time	2039	2039	2038	2038				
-	End time	0634	06 36	0635	0636	- D - 2 (V/A)			
	1	Do any of	the following cond	litions apply to the I	first 5 hours of san	ipling? (Y/N)	1		
Temp. bel	ow 10°C(50°F) ?	2	N	N_	N				
>9m/	h wind speeds?	2	N	N_	N				
>30 min	of precip./fog?	7_	N_	N	N				
			*If YI	ES to any of the cond	litions, resample the	night.	, —		
Was the n	ight successful?	Y	У	Y					
Data download			1	•	1				
Card ID:	38		_		Card ID:				
Log file Present?	YES		_		Log file Present?				



Site 17 Location B





Site Name: /8 A	Project Name: 2021 Riverbend
Site Name: 18 A Biologists: E. Mercill, R. Fitz patrick	Date: 7/17/21
Location Information:	
State: Michigan County: Sanilac Latitude: 43.22462 Longitude: 082.66	Datum/Format: NAD 83/D.D
Latitude: <u>93.22.462</u> Longitude: <u>108.2.66</u>	810 UTC: -4
Site Description: Edge of forested lot and	I grassy way with ditch
Habitat being sampled: Riparian Field Edge Open Field Bottomland	Forest Upland Forest Pond Other
Deployment Information:	
Detector #: 46 Microphone #: 77 Directiona	I PVC present?: NO
Mic Height (m): Mic Inclination: Mic Azimu	th: <u>274</u>
WA SM4BAT FS SMM-U2 HP-Filter: On Max Du	ur.: 1.5 ms Trig, Level 12db ur.: none Trig, Window 3 sec eq: 16kHz Max Length: 5 Sec
Photos: Detection area: (X) Site: (X) Mic orientation	on: (X)
gradby Y W	
orested N	



Site Name:	A			Project Name :	2021 Ri	verbond			
Biologists: <u>E. Me</u>	rill, R. Fit	zpatrick			Date:	7/21/202			
Detector: 46		<b>,</b>	Detector Status:	ON:Armed	ON:Triggered	OFF: Dead			
Reason for OFF:									
Did detector location/orientation change? If so, how?:									
If detector has moved, been tampered wit	h, knocked over, o	r changed orientat	ion then take phot	os before picking u	p.				
Weather conditions	I	*Weather data (sou	erce: NOAA) must be		d below prior to pick	up.			
	1	2	3	ght 4	5	6			
Date	7/17/21	7/18/21	7/19/21	7/20/21					
Start time	2037	203C	2035	2035					
End time	0631	0638	06 39						
	Do any of	the following cond	litions apply to the	first 5 hours of sam	npling? (Y/N)				
Temp. below 10°C(50°F) ?	N	N	N	$\Delta$					
>9m/h wind speeds?	N	N	N	$\sim$					
>30 min of precip./fog?	N	N	N	N					
<del></del>		"If YE	S to a y of the cond	itions, resample the	night.				
Was the night successful?	<u> </u>	<u> </u>	<u> </u>	\ \frac{1}{2}					
Data download	1	ı	1	ſ					
Card ID: 159		•		Card ID:					
Log file Present? \\ \tag{7.5}		-		Log file Present?	_				



**Site 18 Location A** 





Site Name:		B		Project Name	2021 Riverbend	
Biologists:	E. Mer	cill, R.Fitzp	atrick		Date: 7/17/	21
Location Information:		, ,				
					Datum/Format: NAD 83/D.0	<u>D</u>
Latitude:	43.2	2372	Longitude:	-082.66942	UTC: <u>-4</u>	
Site Description:	eder	of ag.	field	and wooded	lot	
				<del></del>		_
Habitat being	sampled: R	iparian Field Edge	e Open Field	Bottomland Forest Uplar (circle one)	nd Forest Pond Other	
Deployment Information	<u>n:</u>					
Detector #:	74	Microphone #:	38_	Directional PVC present?	no	
Mic Height (m):	3_	Mic Inclination:	0	Mic Azimuth: 190	_	
User Profile/Settings: WA SM4BAT FS Firmware: Comments:	2.3.1	Samp. Freq: HP-Filter: Input Gain:		Min. Dur.: 1.5 ms Max Dur.: none Trig Freq: 16kHz	Trig. Level 12db Trig. Window 3 sec Max Length: 5 5ec	<u> </u>
Photos: Detection area:	(X)	Site:	(x)	Mic orientation: $(\mathbf{x})$		
0%	field		R	Jooded Le		



Site Name:	B		_	Project Name :	2021	Riverbend
Biologists: E. Mer	cill, R.Fit	trepatrick			•	7/21/202
Detector: 74		-	Detector Status:	ØN:Armed	ON:Triggered	OFF: Dead
Reason for OFF:						
Did detector location/orientation ca	nange? If so, how?:	No				<del>.</del>
If detector has moved, been tampered wit	th, knocked over, o	r changed oriental	tion then take phot	os before picking u	D.	
Weather conditions	[	*Weather data (sou		checked and entered	below prior to pick	кир. 
	1	2	3	4	5	6
Date	7/17/21	7/18/21	7/19/21	7/20/21		
Start time	2037	2036	2035	2035		
End time	0637	0638	0639	0640		
	Do any of	the following cond	litions apply to the	first 5 hours of sam	pling? (Y/N)	
Temp. below 10°C(50°F)?	N	N	Λ	$\sim$		
>9m/h wind speeds?	_ N	N	N	$\sim$		
>30 min of precip./fog?	N	N	N	//		
		*if YE	S to any of the cond	itions, resample the n	ight.	
Was the night successful?	y	V	\ \ \	_ \		
Data download	1	1				
Card ID:				Card tD: _		
Log file Present? YTS				Log file Present?		



Site 18 Location B





Site Name: 19 A	Project Name: 2021 River bend
Biologists: E. Merrill, A. Goebel	M Zollars Date: 06/29/2021
Location Information:	
State: Michigan County:	Sanilac Datum/Format: NAD 83/D.D
Latitude: 43, 24582 Longitude:	-82.67827° UTC: -4
	on of Pond across
travel corrictor	
Habitat being sampled: Riparian Field Edge Open Field	Bottomland Forest Upland Forest Pond Other
Detector #: 49 Microphone #: 36	Directional PVC present?: No
Mic Height (m): 3 Mic Inclination:	
WA SM4BAT FS SMM-U2 HP-Filter: On Input Gain: Comments:	Min. Dur.: 1.5 ms Trig. Level 12db Max Dur.: none Trig. Window 3 sec Trig Freq: 16kHz Max Length: S Sec
Photos:  Detection area: (X) Site: (X)	Mic orientation: (A
Sheridan Lin	
Soybean Field	None (See)
Soybean	oybean Field



Site Name:			_	Project Name :	2021 P	y ver beno		
Biologists: F. Mu	Ilm				Date:	7/3/21		
Detector: HQ			Detector Status:	ON Armed	ON:Triggered	OFF: Dead		
Reason for OFF:								
Did detector location/orientation change? If so, how?: 16								
If detector has moved, been tampered wit	h, knocked over, o	r changed orientat	ion then take phot	os before picking u	p.			
Weather conditions	I	*Weather data (sou	ırce: NOAA) must be Ni	checked and entere	d below prior to picl	kup.		
	1	2	3	4	5	6		
Date	6/29/21	6/30/21	7/1/21	7/2/21				
Start time	2045	2045	2044	2044				
End time	0624	0625	0625	0626				
	Do any of	the following cond	litions apply to the		npling? (Y/N)			
Temp. below 10°C(50°F)?	No	No	No	No				
>9m/h wind speeds?	No	No	No	No				
>30 min of precip./fog?	No	No	No	No				
		"If YE	S to any of the cond	itions, resample the	night.			
Was the night successful?	Yes	Yrs	Yes	Yes				
<u>Data download</u>								
Card ID: 25				Card (D:				
Log file Present?		-		Log file Present?				



**Site 19 Location A** 





	98		_	ne: 2021 River	
Biologists: A.	Goebel, 1	E. Merri	1, M.Zollars	Date:	16/29/
cation Information:					, ,
State: Mi	chigan	County	Sanilac	Datum/Format: N	AD 83/D.D
			-82.67899°	UTC: _4	
Site Description:	hooting a	across.	travel corrido	or along for	est
edge.	,			7	
	pled: Riparian Field I	Edge Open Fiel	d Bottomland Forest Upla (circle one)	and Forest Pond Othe	er
Detector #:	Microphone	#: 42	Directional PVC present	17: No	
Mic Height (m):	Mic Inclination	on: Ø	Mic Azimuth: 52°	_	
WA SM4BAT FS SM Firmware: 2.3.1		er: On	Min. Dur.: 1.5 ms Max Dur.: none Trig Freq: 16kHz	Trig. Window	12db 3 sec S Sec
connents.					
notos:		te: KD	Mic orientation: Ja		N
hotos:	Sheridan				2
Detection area:	Sheridan	Line	Rd.	ean	7
notos:	Sheridan	Line	Rd.	ean Field	2
Detection area:	Sheridan	Line an Field	Rd.	ean	2 4
Detection area:	Sheridan	Line an Field Soybe	Rd.	ean Field	2 1



Site Name: 193	1			Project Name :	2021 F	Ziver Je
Biologists: 2 1V  Detector: 03	fan []		Detector Status:	QN:Armed	Date: ON:Triggered	OFF: Dead
Reason for OFF:		N (				
Did detector location/orientation cha			-		-	
etector has moved, been tampered with ather conditions	n, knocked over, o		rce: NOAA) must be	checked and entered		kup.
	1	2	Ni 3	ght /	5	6
Date	6/29/21	6/30/21	7/1/21	7/2/21		
Start time	2045	2045	2044	2044		
End time	0624	0625	0625	0626		
1	Do any of		itions apply to the	first 5 hours of sam	ipling? (Y/N)	1
Temp. below 10°C(50°F)?	No	No	No	No		
>9m/h wind speeds?	No	No	No	No		
>30 min of precip./fog?	No	No	No	No		
		*If YE	S to any of the cond	itions, resample the	night.	
Was the night successful?	Yes	YES	Yes	Yes		
ta download						
card ID: 35				Card ID:		
Log file Present?				Log file Present?		



Site 19 Location B





Site Name: 20 R	Project Name: 2021 RIVERDEND
Site Name: 20 R  Biologists: E. Merri II , A. Groebel	M. Zollars Date: 06/29/2021
Location Information:	, ,
State: Michigan Coun	ty: Sanila( Datum/Format: NAD 83/D.D
Latitude: 43.24272° Longitud	de: <u>-82 67805°</u> UTC: <u>-4</u>
edge next to soupean fi	eld
3	
Habitat being sampled: Riparian Field Edge Open Fi	eld Bottomiand Forest Upland Forest Pond Other (circle one)
Deployment Information:	(circle one)
Detector #: 40 Microphone #: 77	Directional PVC present?: 6
Mic Height (m): 3 Mic Inclination:	
Ivite neight (III).	Mile Azimutti. 6
<u>User Profile/Settings:</u> Samp. Freq: 384kHz	Min. Dur.: 1.5 ms Trig. Level 12db
WA SM4BAT FS SMM-U2 HP-Filter: On Firmware: 2.3.1 Input Gain: 0 of 12 di	Max Dur.: none Trig. Window 3 sec Trig Freq: 16kHz Max Length: 5 Sec
(circle one)	7
Comments:	
Photos:	
Detection area: (XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	Mic orientation: 49
	N
Farm Field	( ) Cores
Field	
3 Soybean	
Tree ROW N	
Field	. [ ]
] a	AA
Farm Field	Koreth (
Field	7 7
	12 Ta 12 Page
\ \	II de



Site Name: $20A$				Project Name :	2021	Rivergend				
Biologists:	Frankl					te: 7-13/2				
Detector: 40			Detector Status:	ON:Armed	ON:Triggere	d OFF: Dead				
Reason for OFF:		<u> </u>								
Did detector location/orientation change? If so, how?:										
If detector has moved, been tampered wit	h, knocked over, o	r changed orientati	on then take phot	os before picking u	p.					
Weather conditions		*Weather data (sou	rce: NOAA) must be Niį		d below prior to	pickup.				
	1	2	3	4	5	6				
Date	6/29/21	6/30/21	7/1/21	7/2/21						
Start time	2045	2045	2045	2044						
End time	0624	0625	9625	0626						
	Do any of	the following condi			pling? (Y/N)					
Temp. below 10°C(50°F)?	No	NU	No	No						
>9m/h wind speeds?	No	No	No	No						
>30 min of precip./fog?	No	No	No	No						
		*If YE	S to any of the cond	tions, resample the	night.					
Was the night successful?	Ves	Yrs	YCS	YCS						
Data download										
Card ID: 13				Card ID:						
Log file Present?		•		Log file Present?						



Site 20 Location A





Site Name: 20 B		lame: 2021 Riverbend
Biologists: A. Goebel, E. M	Lervill, M. Zollars	Date: 06/29/202
Location Information:		1 .
State: Michigan	county: Sanilac	Datum/Format: NAD 83/D.D
Latitude: 43. 24157°	Longitude: -82 .67795°	UTC: -4
Site Description: Shooting acro	ss travel corridor	along forested
Site Description: Shooting acro	in field	J
0	_	
Habitat being sampled: Riparian Field E	Open Field Bottomland Forest L (circle one)	Jpland Forest Pond Other
Deployment Information:		
Detector #: 69 Microphone	#: 7Ø Directional PVC pres	ent?: No
Mic Height (m): 3 Mic Inclination	n: Ø Mic Azimuth: 180	<u>),                                     </u>
User Profile/Settings:		
WA SM4BAT FS SMM-U2 HP-Filte		
Firmware: 2.3.1 Input Gain		Hz Max Length: 5 Sec
Comments:	(circle one)	
Photos:  Detection area: ((x)) Site	e: Mic orientation: Mc	2
	BA	
Tree Row		Fovest



Site Name: 20 3				Project Name :	20.21 K	ver Jend			
Biologists: 1	ernll				Date:	7/3/2			
Detector: 69			Detector Status:	ON:Armed	N:Triggered	OFF: Dead			
(circle one)									
Reason for OFF:									
Did detector location/orientation change? If so, how?:									
If detector has moved, been tampered wi	th, knocked over, o	r changed orientat	ion then take photo	os before picking u	p				
Weather conditions	1	*Weather data (sou	urce: NOAA) must be Nig		d below prior to pick	kup.			
	1	2	3	4	5	6			
Date	1/29/21	6/30/21	7/1/21	7/2/21					
Start time	2045	2045	2044	2044					
End time	1000	0625	0625	0626					
	Do any of	the following cond	litions apply to the	first Thours of san	npiing? (Y/N)	,			
Temp. below 10°C(50°F)	No	No	No	11 0					
>9m/h wind speeds	No	No	No	NO					
>30 min of precip./fog	No	No	No	1/6					
		*1f YE	S to any of the cond	tions, resample the	night,	,			
Was the night successful	YES	Yes	Yes	YES					
Data download	1			•					
Card ID: 80		•		Card ID:					
Log file Present?				Log file Present?					



Site 20 Location B





Site Name:	21	Α		Project Name:	2021 Riverbead
		rill R.Fitz	patrick		Date: 7/17/21
Location Information:					
State:	Michia	an	County: _	Sonilac	Datum/Format: NAD 83/D.D
Latitude:	43.	23957	Longitude:	Sonilar -082.65789	UTC:4
Site Description:	Ediz	of ag	field	and woode	d lot
		parian Field Edge		Bottomland Forest Uplan	d Forest Pond Other
Deployment Information		Microphone #: _	140	Discribing 1000 and 1000	100
				Directional PVC present?	
Mic Height (m):	8	Mic Inclination: _		Mic Azimuth:	_
User Profile/Settings:  WA SM4BAT FS Firmware:  Comments:	2.3.1	Samp. Freq: HP-Filter: Input Gain:	On	Min. Dur.: 1.5 ms Max Dur.: none Trig Freq: 16kHz	Trig. Level 12db Trig. Window 3 sec Max Length: 5 Sec
Photos: Detection area:	(x)	Site:	(x )	Mic orientation: (X )	
1 1	ac.	Reld		P F	0,25
<u></u>	r entra			G,	



Site Name: _	21_	A			Project Name :	2021 Ri	verbend			
Biologists:	E.Meri	cill, C.Fit	zpatrick			Date:	7/21/2021			
Detector: (circle one)	75		•	Detector Status:	ON:Armed	ON:Triggered	OFF: Dead			
Reason for OFF:										
Did detector location/orientation change? If so, how?:										
If detector has moved, been tampered with, knocked over, or changed orientation then take photos before picking up.										
Weather conditions	"Weather data (source: NOAA) must be checked and entered below prior to pickup.  Night									
-		1	2	3	4	5	6			
	Date	7/17/21	7/18/21	7/19/21	7/20/21					
	Start time	2037	2036	2035	2035					
	End time	0637	0638	0639	0640					
-		Do any of	the following cond	itions apply to the	first 5 hours of sam	pling? (Y/N)				
Temp. belo	ow 10°C(50°F) ?	N	N	N	$\setminus$					
>9m/	h wind speeds?	N	N	N	N					
>30 min	of precip./fog?	N	N	N	$\mathcal{N}$					
			*If YE	S to any of the cond	litions, resample the	night.				
Was the ni	ight successful?	<u> </u>	<u> </u>	Y	Y					
Data download		1	/	,	ι					
Card ID:	158		-		Card ID:		<del>,</del>			
Log file Present?	Yes_	YeS Log file Present?								



Site 21 Location A





		В			Project Name:	2021 River	end,
Biologists:	E.Me	rrill R.F.	tzpatric	K		Date:	7/17/21
Location Information:							
State:	Michig	an	County:	Sanilac	·	Datum/Format: N	AD 83/D.D
Latitude: _	43.2	39 48	Longitude:	-082.6	5993	UTC:4	·
Site Description:	Shoo	Hing alon	Z edg	= -f tv	ochne	utc:-4	field
Habitat being	sampled: R	iparian Field Edge		Bottomland Fo	orest Upland	Forest Pond Oth	er
Deployment Information  Detector #:		Microphone #:	36	Directional I	PVC present?:	no	
Mic Height (m):	_3	Mic Inclination:	0	Mic Azimuti	h: <u>272</u>		
User Profile/Settings: WA SM4BAT FS Firmware: Comments:		Samp. Freq: HP-Filter: Input Gain:	On	Max Dur	r.: 1.5 ms r.: none q: 16kHz	Trig. Level Trig. Window Max Length:	12db 3 sec 5 Sec
Photos: Detection area:	(x)	Site:	(X)	Mic orientation	n: (X)		
			fr	,1d		12	
	CTF f	Twee tro		tves tres			



Site Name:	21	B			Project Name :	2021	Riverbend			
Biologists:	E. Mer	ill, R. Fin	tapatrick	<u>:</u>		Date	7/21/202			
Detector: (circle one)	6_			Detector Status:	ON:Armed	ON:Triggered	, ,			
Reason for OFF:										
Did detector location/orientation change? If so, how?:										
If detector has moved, been tampered with, knocked over, or changed orientation then take photos before picking up.										
Weather conditions	*Weather data (source: NOAA) must be checked and entered below prior to pickup.  Night									
-		1	2	3	4	5	6			
	Date	7/17/21	7/18/21	7/19/21	7/20/21					
	Start time	2037	2036	2035	2034					
	End time	0638	0638	0639	0640					
-		Do any of	the following cond	itions apply to the	first 5 hours of sam	pling? (Y/N)	,			
Temp. belo	ow 10°C(50°F) ?	N	N		$\sim$					
>9m/	h wind speeds?	N	N	$\sim$	$\sim$					
>30 min	of precip./fog?	N	N	$\sim$	$\sim$					
-			*If YE	S to any of the cond	itions, resample the	night.				
Was the n	ight successful?	V	<u>y</u>	<u> </u>	L Y					
Data download			/	,	,					
Card ID:	157				Card ID:					
Log file Present?	Y-75				Log file Present?					



Site 21 Location B





Site Name: 22	roill, R. Fitzpatr	Project Name:	2021 R	iverbend
Biologists: E.Me	will R. Fitzpatr	ick	Date: _	7/18/21
Location Information:				
State: Michie	coun	ty: Sanilac	Datum/Format: N	AD 83/D.D
Latitude: <u>43.2</u>		de: <u>-082.655</u> 21		
Site Description:	, com hold one	ec and forest. 1	Black creek	c nearly
	iparian Field Edge Open Fie	eld Bottomland Forest Upland (circle one)	Forest Pond Oth	er
Deployment Information:  Detector #: 9	74	0: 10:0	20	
			110	-
Mic Height (m): 3	Mic Inclination:	Mic Azimuth: 182		
User Profile/Settings:	Samp. Freq: 384kHz	Min. Dur.: 1.5 ms	Trig. Level	12db
WA SM4BAT FS SMM-U2	HP-Filter: On	Max Dur.: none	Trig. Window	3 sec
Firmware: 2.3.1	Input Gain: 0 or 12) dt		Max Length:	5 Sec
Comments:	(circle one)			
Photos: Detection area: (x)	5ite: (x)	Mic orientation: (X)		
Black deep		N		
O Comment	<u>b</u>	1		
	<b>V</b>	Corn		



Site Name:	22	<u> </u>		_	Project Name :	2021	Riverbea
Biologists:	E. Mer	cill, R.F.	tzpatrick	<u> </u>		Date:	7/17/2
Detector: {circle one}	9		_	Detector Status	: ON:Armed	ON:Triggered	Off: Dead
Reason for OFF:			<u> </u>				
Did detector locatio	n/orientation ch	ange? If so, how?	No				
If detector has moved, be-	en tampered wit	h, knocked over,	or changed orienta	tion then take pho	tos before picking u	p.	
Weather conditions	1		*Weather data (so		checked and entered	d below prior to picku	p.
		11	2	3	4	5	6
	Date	7/13/21	7/14/21	7/15/21	7/16/21		
	Start time	2039	2039	2038 0635	2038		
	End time	0634	0635	0635	0636		
	1	Do any of	the following cond	ditions apply to the	first S hours of sam	pling? (Y/N)	
Temp. bel	ow 10°C(50°F) ?	N	N_	N	N		
>9m/	h wind speeds?	N	N	N	N		
>30 min	of precip./fog?	N	N	N	L N		
			*If YE	ES to any of the cond	itions, resample the	night.	
Was the n	ight successful?	<u> </u>	<u> </u>	Y	V		
Data download			1		1	•	
Card ID:	135		-		Card ID:		
Log file Present?	YES		-		Log file Present?		



Site 22 Location A





Site Name:	22	B_		Р	roject Name:	2021 Riv	erbenel
Biologists:	E. Me	call, R.F	itzpato	ick		Date:	7/13/2
Location Information:		•	•				•
State:	Michia	gan	County:	Sanile -082.	ac	Datum/Format: N	AD 83/D.D
Latitude:	43.20	321	Longitude:	-082.	65479	UTC:4	<u> </u>
Site Description:	alone	corn 6-	old ede	c and	forest.	Black Core	t near.
Habitat being	sampled: Ripa	rian Field Edge		Bottomland Fo	prest Upland F	orest Pond Oth	er
Deployment Information			5/				
Detector #:	_3	Microphone #: _	56_	Directional F	VC present?:	<u>no</u>	
Mic Height (m):	3 .	Mic Inclination:	0	Mic Azimuth	184		
User Profile/Settings: WA SM4BAT FS		Samp. Freq: HP-Filter:	On	Max Dur		Trig. Level _ Trig. Window _	12db 3 sec
Firmware:	2.3.1	Input Gain:	(circle one)	Trig Fred	1: <u>16kHz</u>	Max Length:	5 Sec
Comments:					<u> </u>		
		<del>-</del>					
Photos: Detection area:	(x)	Site:	(x)	Mic orientation	n: (x)		
	6	3/			1		
1 110	m)	5/			ام		
	15				14		
Block Check			1				
13/13	) 3	C	ornfiel	d			
1 /4 / 1		·					
	,						
1//							
/							- 1



Site Name:	22	<u> </u>	_		Project Name :	2021	Kiver beno			
Biologists:	E. Mesci	11, R.Fitz	patrick			Date:	7/17/21			
Detector: (circle one)	31		-	Detector Status:	ON:Armed	ON:Triggered	OFF: Dead			
Reason for OFF:										
Did detector location/orientation change? If so, how?:										
If detector has moved, bee	n tampered wit	h, knocked over, o	r changed orientat	ion then take phot	os before picking u	p.				
Weather conditions		I	*Weather data (sou		checked and entere	d below prior to pick	up.			
		1	2	Ni,	ght   4	5	6			
	Date	7/13/21	7/14/21	7/15/21	7/16/21					
	Start time	2039	2039	2038	2038					
_	End time	0634	0635	0635	0636					
	_	Do any of	the following cond	itions apply to the	first 5 hours of san	pling? (Y/N)				
Temp. beld	ow 10°C(50°F) ?	N	N	2	N					
>9m/	h wind speeds?	N	N	N	N					
>30 min	of precip./fog?	N	N	N	N					
-			*If YE	S to any of the cond	itions, resample the	night.				
Was the ni	ght successful?	YES	У	<u> </u>	<u></u>					
Data download			/		/					
Card ID:	136		-		Card ID:					
Card ID: _ Log file Present? _	(25		-		Log file Present?		<u>-</u>			



Site 22 Location B





Site Name:	23	A		Proje	ct Name:	2021 Riverb	erd_
Biologists:	E. Mecs	ill. R. Fitza	utrick			Date:	
Location Information:		•					
State:	Michi	<u>gan</u>	County:	Sanilac		Datum/Format: NA	D 83/D.D
				-082.78			
Site Description:	Edge	at Goy's	dan 1	field and	-force	ated lot	
Habitat being	sampled: Ri	parian Field Edge	Open Field	Bottomland Forest (circle one)	Upland	Forest Pond Othe	r
Deployment Information  Detector #:		Microphone #: _	54	Directional PVC p	present?:_	<u> </u>	
Mic Height (m):	3_	Mic Inclination:		Mic Azimuth:	2_		
User Profile/Settings:  WA SM4BAT FS Firmware:  Comments:		Samp. Freq: HP-Filter: Input Gain:	On	Min. Dur.: Max Dur.: Trig Freq:	лоле	Trig. Level Trig. Window Max Length:	12db 3 sec 5 Sec
Photos: Detection area:	(x)	Site:	(x)	Mic orientation:	(x)		
			S	of Search		← 2	
1/~	ocded	•					



Site Name:	23_	A			Project Name :	2021	Riverbend
Biologists:	E. Merc	IL, R.F.H	zpatrick			Date:	7/22/2021
Detector:(circle one)	<u> 28</u>	· · · · · · · · · · · · · · · · · · ·	,	Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector location	n/orientation ch	ange? If so, how?:	No				
If detector has moved, bee	n tampered wit	h, knocked over, o	r changed orientat	ion then take phot	os before picking u	p.	
Weather conditions			*Weather data (sou		checked and entered	d below prior to pick	kup.
_		11	22	3	4	5	6
	Date	7/18/21	7/19/21	7/20/21	7/21/21		
	Start time	2037	2036	2035	2034		
_	End time	0639	0640	0641	0641	<u></u>	
		Do any of	the following cond	itions apply to the	first 5 hours of sam	pling? (Y/N)	
Temp. belo	ow 10°C(50°F) ?	N		$\sim$	N		
>9m/	h wind speeds?	N	N.	$\wedge$	N		
>30 min	of precip./fog?	N	N_	$\sim$	$\mathcal{N}$		
-			*if YE	S to any of the cond	itions, resample the	night.	
Was the ni	ight successful?	Y	<u> </u>	<u> </u>	<u> </u>		
Data download	_	1		,	-		
Card ID:	37				Card ID:		
Log file Present?	You		-		Log file Present?		



Site 23 Location A





Site Name: $23$ $\beta$	Project Name: 2021 Riverbend
Biologists: E. Merrill, R. Fitzpatoick	Date: 7/18/21
Location Information:	, ,
State: Michigan County:	Sanilac Datum/Format: NAD 83/D.D
Latitude: 43./96/3 Longitude:	-082.78134 UTC: -4
Site Description: etge-of wooded to	-082.78134 UTC:-4
Habitat being sampled: Riparian Field Edge Open Field	Bottomiand Forest Upland Forest Pond Other (circle one)
Deployment Information:	
Detector #: 29 Microphone #: 57	Directional PVC present?:
Mic Height (m): 3 Mic Inclination: 0	Mic Azimuth: 70
User Profile/Settings: Same Free: 384kHz	
WA SM4BAT FS SMM-U2 HP-Filter: On	Min. Dur.:         1.5 ms         Trig. Level         12db           Max Dur.:         none         Trig. Window         3 sec
Firmware: 2.3.1 Input Gain: 0 or 12 db (circle one)	Trig Freq: 16kHz Max Length: 5 Sec
Comments:	
Please	
Photos: Detection area: $(X)$ Site: $(X)$	Mic orientation: $(X)$
Coffeen	,
, ,	<i>/</i> \
) <u>)</u>	
ed	/ / /
, day X ee	
	\
Waded lat	



Site Name: _		<u></u>			Project Name :	2021 R	iverbend
Biologists:	E. Merc	ill, R.Fitz	patrick			Date:	7/22/20
Detector: _ (circle one)	2	1		Detector Status:	QN:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector location	n/orientation ch	ange? If so, how?:	No				
detector has moved, bee	n tampered witl	h, knocked over, o	r changed orientat	ion then take phot	os before picking u	ıp.	
eather conditions	ı		"Weather data (sou			d below prior to pick	up.
_		1	2	3	ght <u>4</u>	5	6
	Date	7/18/21	7/19/21	7/20/21	7/21/21		
	Start time	2037	2036	2035	2034		
_	End time	0639	0640	0641	0641		
		Do any of	the following cond	litions apply to the	first 5 hours of sar	npling? (Y/N)	
Temp. belo	w 10°C(50°F) ?	N	N	N	$\mathcal{N}$		
>9m/I	h wind speeds?	N	N	N	$\mathcal{N}$		
>30 min	of precip./fog?	N	N	N	$\sim$		
_			*If YE	S to any of the cond	litions, resample the	night.	
Was the ni	ght successful?	Y	<u> </u>	<u> </u>	L_Y		
ata download		1	•	ı	•		
Card ID:	135		L		Card 1D:		
Les file Bresont?	Vrc				Log file Process		



Site 23 Location B





Site Name: 24 1			2021 Riverbenc
	ebel, E. Mervill	M. Zollars	Date: 06/28/
ation Information:		Ca :\a.	Datum /Farrant NAD 83/D D
State: 19101	County:	-82 (54.17°	Datum/Format: NAD 83/D.D
Site Description: 3 K 00 (	ing along fore	tage next to	Tump Treid
Habitat being sampled: F	tiparian Field Edge Open Field	Bottomland Forest Upland F	orest Pond Other
ployment Information:		,	
Detector #: 35	Microphone #: 38	Directional PVC present?: _	No
Mic Height (m): 3	Mic Inclination:	Mic Azimuth: 95°	
or Brofile/Sottings			
er Profile/Settings: WA SM4BAT FS SMM-U2	Samp. Freq: 384kHz HP-Filter: On-	Min. Dur.: 1.5 ms Max Dur.: none	Trig. Level 12db Trig. Window 3 sec
Firmware: 2.3.1	Input Gain: 0 of 12 db	Trig Freq: 16kHz	Max Length: 5 Sec
Comments:	(circle one)		
Detection area: (🔊	Site: (50	Mic orientation:	
Detection area. (V)			
	Galbraith	ine Rd	
Naze			, N
8	- Man		rie 1
D	(r)		,
BA			
A			
		A	
		$\triangle \longrightarrow$	



Site Name:	24A				Project Name :	2021 4	wer our
Biologists:	E. M	unll				Date	7/2/21
Detector:	35			Detector Status:	ON:Armed	ON:Triggered	/ / OFF: Dead
Reason for OFF:	_			_			
Did detector location/c	orientation ch	ange? If so, how?:	No				
f detector has moved, been t	tampered wit	h, knocked over, o	r changed orientat	ion then take phot	os before picking u	р.	
Weather conditions	ı		*Weather data (sou	•	checked and entered	d below prior to pio	kup.
		1	2	3	4		6
	Date	6/28/21	6/29/21	6/30/21	7/1/20		
	Start time	2044	2044	2044	2044		
_	End time	0624		0625			
		Do any of	the following cond	itions apply to the	first 5 hours of san	npling? (Y/N)	, ]
Temp. below	10°C(50°F) ?	No	No	No	No		
>9m/h v	vind speeds?	No	No	No	No		
>30 min of	precip./fog?	No	No	10	itions, resample the	night	
Was the nigh	t successful?	75	Yes	Y-75	Yes	agnt.	
Data download	·						
Card ID:	22				Card ID:		
Log file Present?	\t8				Log file Present?		



Site 24 Location A





Site Name: 24 B  Biologists: E. Murrill, A. Goebel, M. Zo	Project Name: 2021 Riverbend
Biologists: E. Murrill A. Goebel, M. Zo	11ars Date: 06/28/2021
Location Information:	, ,
State: Michigan County: Sa	Datum/Format: NAD 83/D.D
Latitude: 43.18954° Longitude: - 87	15925" UTC:-4
Site Description: Shooting dawn Forested Towards Small Fond	edge next to turnip field
towards small fond	· · · · · · · · · · · · · · · · · · ·
Habitat being sampled: Riparian (eld Edge) Open Field Bot	
Deployment Information:	
Detector #: 16 Microphone #: 73 D	irectional PVC present?: No
Mic Height (m): 3 Mic Inclination: 0	Nic Azimuth: 4°
User Profile/Settings: Samp. Freq: 384kHz	Min. Dur.: 1.5 ms Trig. Level 12db
WA SM4BAT FS SMM-U2 HP-Filter: On	Max Dur.: none Trig. Window 3 sec
Firmware: 2.3.1 Input Gain: 0 or (2 db) (circle one)	Trig Freq: 16kHz Max Length: 5 Sec
Comments:	
Photos: Detection area: Mic	orientation:
Galbraith Rd.	
	1 N
@	12/1
(nov.	
	4
	//
Turni P Field	
1,00	
Los T	
LO AB	
Cores T	——————————————————————————————————————
tore,	(A)



Site Name:	24 B	3		_	Project Name :	2021	Riverlen
Biologists:	E.M	TUS			_	Date	7/2/21
Detector: (circle one)	16	·		Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector location	_						
If detector has moved, bee	n tampered wit	h, knocked over, o	r changed orientat	ion then take phot	os before picking u	p.	
Weather conditions		1	*Weather data (sou	rce: NOAA) must be Ni	checked and entere	d below prior to pic	kup.
_		1	2	3	4	5	6
	Date	6/28/21	6/29/21	6/30/21	7/1/21		
	Start time	2044	2044	2044	2044		
_	End time	00-1	0624	0625	0625		
	ı	Do алу of	the following cond	itions apply to the	first 5 hours of san	npling? (Y/N)	
Temp. belo	w 10°C(50°F) ?	No	Mp	No	16		
>9m/h	wind speeds?	No	No	No	No		
>30 min (	of precip./fog?	No	No	No	No		
-			*If YE	S to any of the cond	tions, resample the	night.	
Was the nig	tht successful?	YTS	Yes	Yrs	775		
Data download							
Card ID: _	68				Card ID:		
Log file Present?_	1765	-			Log file Present?		



Site 24 Location B





	5 A		Project Name: 202	21 Riverbe	nd
Biologists: £.	Merrill, A. G.	oebel, M.Zo	llars	Date: 06/2	29/20
cation Information:	,	•		1	1
State: N	lichigan	county: Savilar	Da	tum/Format: NAD 83	D.D
Latitude: 4	3.23832°	Longitude: -82.705	10"	UTC: -4	
Site Description: 5	hooting Pas-	corridor o	down Fore	est edge	
	soybean fiel	4		. 0	
Habitat being san	npled: Riparian Field Edge	Open Field Bottomland F	orest Upland Forest	Pond Other	
oloyment Information:	- 0	7.0			
Detector #:	Microphone #:	79 Directional	PVC present?: No	)	
Mic Height (m):	Mic Inclination:	Ø Mic Azimut	h: 266°		
was SM4BAT FS SM Firmware: 2.3		On Max Du		Trig. Level 120 Trig. Window 3 so Max Length: 5 So	ec
Detection area:	Soybean		Soyl	rean	)



Site Name:	25A				Project Name :	2-21 8	yver yourd
Biologists:	E.M	evvoll				Date:	7/3/21
Detector: {circle one}	59			Detector Status:	N:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector location	n/orientation ch	ange? If so, how?:	No				
If detector has moved, bee	n tampered wit	h, knocked over, o	r changed orientat	ion then take phot	os before picking u	p.	
Weather conditions	1	1	*Weather data (sou		checked and entere	d below prior to pick	up.
		1	2	3	44	5	6
	Date	6/29/21	6/30/21	7/1/21	7/2/21		
	Start time	2045	2045	2045	2044		
_	End time	0624	0625	0625	0626		
		Do any of	the following cond	litions apply to the	first 5 hours of san	npling? (Y/N)	
Temp. belo	ow 10°C(50°F) ?	No	Nu	No	No		
>9m/	h wind speeds?	No	No	No_	No		
>30 min	of precip./fog?	No	No	No	No		
-			*3f YE	S to any of the cond	itions, regample the	night.	
Was the ni	ght successful?	Yes_	Yes	Yes	100		
Data download							
Card ID:	75		-		Card ID:		
Log file Present?	Yes				Log file Present?		



**Site 25 Location A** 





Site Name: 25 B	Project Name: 2021 Riverbend
Biologists: E. Merrill, A. Guchel	M. Zouars Date: 06/29/2021
Location Information:	'
State: Michigan County:	Saniac Datum/Format: NAD 83/D.D
Latitude: 43.23831 Longitude:	-82.70358° UTC: -4
Site Description: Shooting down gras	iry drainage ditch between
two wood lots	
Habitat being sampled Riparian Field Edge Open Field	Bottomland Forest Upland Forest Pond Other (circle one)
Deployment Information:	
Detector #: 22 Microphone #: 64	Directional PVC present?: 0
Mic Height (m): Mic Inclination:	Mic Azimuth: 187°
User Profile/Settings: Samp. Freq: 384kHz	Min. Dur.: 1.5 ms Trig. Level 12db
WA SM4BAT F5 SMM-U2 HP-Filter: On Input Gain: 0 of 12 db	Max Dur.: none Trig. Window 3 sec Trig Freq: 16kHz Max Length: 5 Sec
(circle one)	
Comments:	
Photos:  Detection area: () Site: ()	Mic orientation:
Kilgore Rd	A TIL AB



Site Name:	25 P			_	Project Name :	2021 Ri	vediena	
Biologists.	E.M.	evall				Date:	7/3/2	
Detector: (circle one)	22		_	Detector Status:	ON:Armed	ON:Triggered	OFF: Dead	
Reason for OFF:				<u> </u>				
Did detector location/orientation change? If so, how?:								
If detector has moved, bee	en tampered wit	h, knocked over, c	or changed orientat	tion then take phot	os before picking u	ıp.		
Weather conditions			*Weather data (sou	arce: NOAA) must be Nij	checked and entere	d below prior to pick	<b>Ј</b> р.	
		1	2	3	44	5	6	
	Date	4/29/21	6/30/21	7/1/21	7/2/21			
	Start time	2045	2045	2048	2044			
	End time	9401	0625	0625	0626			
		Do any of	the following cond	itions apply to the	first 5 hours of san	pling? (Y/N)		
Temp. bele	ow 10°C(50°F) ?	No	No	No	No			
>9m/	h wind speeds?	No	No	No	No			
>30 min	of precip./fog?	No	No	1/Vo	No			
-			*If YE	S to any of the condi	tions, resample the	night.		
Was the ni	ght successful?	Yes	Yes	Yes	Yes			
Data download		•						
Card ID:	77				Card ID:			
Log file Present?_	Yes		-		Log file Present?			



Site 25 Location B





	Site Name: 26 A				2021 Riverbend
	Biologists: <u>E. M</u>	errill, A.G.	oebel 1	4. Zollar	Date: 0( 128 / 20 2
Locat	on Information:	•	,		' /
	State: Mich	igan	County:	Sanilac	Datum/Format: NAD 83/D.D
	Latitude: <u>43.18</u>	819°	Longitude:	-82.66119°	UTC: <u>-4</u>
20	Site Description: Open	Foraging	area	Shooting alon	ng forest
	9	Riparian Field Edge		Bottomland Forest Upland	Forest Pond Other
Deplo	oyment Information:  Detector #: 46	Microphone #:_		(circle one)  Directional PVC present?:	No
	Mic Height (m): 3	Mic Inclination:	<u> </u>	Mic Azimuth: 39°	
<u>User I</u>	Profile/Settings:  WA SM4BAT FS SMM-U2 Firmware: 2.3.1  Comments:		384kHz On 0 or (2 db) (circle ane)	Min. Dur.: 1.5 ms Max Dur.: none Trig Freq: 16kHz	Trig. Level 12db Trig. Window 3 sec Max Length: 5 Sec
Photo	DS: Detection area: (X)	Site:	(x)	Mic orientation: $\{_{\mathbf{X}}\}$	
Faryo Rol	Forest	S. S	For	nest AD	Forest
	Forest		For	· 51	Forest



Site Name:	26A				Project Name :	2021	Rverlene
Biologists:	= Meri	111				Dat	=7/2/2L
Detector: (circle one)	46			Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector location							
If detector has moved, bee	n tampered wit	h, knocked over, o	r changed orientat	ion then take phot	os before picking u	p.	
Weather conditions	1		*Weather data (sou		checked and entered	d below prior to p	ickup.
_		1	2	3	4	5	6
	Date	6/28/21	6/29/21	6/30/21	7/1/21		
	Start time	2044	2044	2044	2044		
_	End time	0624	0624	0625	0629		
		Do any of	the following cond	itions apply to the	first 5 hours of sam	pling? (Y/N)	
Temp. belo	w 10°C(50°F) ?	N-0	No	No	No		
>9m/h	n wind speeds?	No	No	No	No		
>30 min	of precip./fog?	No	No	NI	No		
_			*If YE	S to any of the cond	itions, resample the	night.	
Was the nig	ght successful?	1/76	Yes	Yes	YCS		
Data download		•			\		
Card ID: _ Log file Present? _	1-6						



Site 26 Location A





Site Name: 26 B	Project Name: 20	021 Riverbend
Biologists: E. Merri II, A. G	oebel, M. Zollars	Date: 06/28/2021
Location Information:		1 .
	county: Sanilac	Datum/Format: NAD 83/D.D
Latitude: 43.18807°	Longitude: -82.66225°	UTC: <u>-4</u>
Site Description: Shooting into	Field next to Fond	
Habitat being sampled: Riparian Field Edge	Open Field Bottomland Forest Upland Fo	rest Pond Other
Deployment Information:	Ø1 .	1.
Detector #: Microphone #:		Jo
Mic Height (m): 3 Mic Inclination:	Mic Azimuth: 6	
User Profile/Settings: Samp. Freq:	384kHz Min. Dur.: 1.5 ms	Trig. Level 12db
WA SM4BAT FS SMM-U2 HP-Filter:	On Max Dur.: none	Trig. Window 3 sec
Firmware: 2.3.1 Input Gain:	O or 12 db Trig Freq: 16kHz (circle one)	Max Length: 5 Sec
Comments:		
Photos: Detection area: (X) Site:	$(_{\mathbf{X}})$ Mic orientation: $(_{\mathbf{X}})$	
		11
		N I
Forest /	Thouse	′
		/
· · · · · · · · · · · · · · · · · ·		′
2		Forest
		'
& Forest		
of Forest		
	Forest	
	Γο.	
Forest		



Site Name: 26 B  Biologists: E. Mev  Detector: 10  (circle one)  Reason for OFF:	nll		Betector Status:	(A)(A)		7/2/21
Detector: 10			Betector Status:	ONLA		
Reason for OFF:				UN:Armed	ON:Triggered	OFF: Dead
Did detector location/orientation char	nge? If so, how?:	No				
detector has moved, been tampered with,	, knocked over, o	r changed orientati	ion then take phot	os before picking u	р.	
Veather conditions		*Weather data (sou	The state of the s	checked and entered	l below prior to pick	
	1	2	3	4	5	6
Date	6/28/21	6/29/21	6/30/21	7/1/21		
Start time	2044	2044	2044	2044		
End time	0624	0624	0625	0625		
1	Do any of	the following cond	itions apply to the	first 5 hours of sam	ipling? (Y/N)	1
Temp. below 10°C(50°F) ?	No	No	N.	No		
>9m/h wind speeds?	No	No	N.	No		
>30 min of precip./fog?	No	No	No	N.		10 - 11
		*If YE	S to any of the cond	itions, resample the	night.	
Was the night successful?	75	Yes	422	405		
ata download						
Card ID: 59				Card ID:		
Log file Present?				Log file Present?		



Site 26 Location B





Site Name:				Project Name:	2021 Riverbend
Biologists: _	E. Mer	-cill, R. I	Sitzpat	rick	Date: 7/13/2
Location Information:		-	•		, ,
State: _	Michig	<u>^</u>	County:	Sanilac	Datum/Format: NAD 83/D.D  UTC: -4
Latitude: _	43.	18601	Longitude:	-082.67915	UTC: <u>-4</u>
Site Description:	Edge	of beet	held	near forested to	+
Habitat being s	ampled: Rip	arian (Field Edge	,	Bottomland Forest Upland F	Forest Pond Other
Deployment Information		Microphone #: _	44	Directional PVC present?:	no
Mic Height (m): _	3	Mic Inclination: _	0	Mic Azimuth: 2	
User Profile/Settings: WA SM4BAT FS Firmware: 2		Samp. Freq: _ HP-Filter: _ Input Gain: _	On	Min. Dur.: 1.S ms Max Dur.: none Trig Freq: 16kHz	Trig. Level 12db Trig. Window 3 sec Max Length: 5 Sec
Photos: Detection area:	(x)	Site:	(x)	Mic orientation: ( x)	
A mic	450	eetald		1	forested not many



Site Name:		A		_	Project Name :	2021	Riverbeno
Biologists:	E.Merr	II. R. Fitz	putcick			Date:	7/17/2
Detector: (circle ane)	8		-	Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector location							
If detector has moved, bee	n tampered wit	h, knocked over, o	r changed orienta	tion then take phot	os before picking u	ıp.	
Weather conditions		i	*Weather data (soi	urce: NOAA) must be Ni	checked and entere	d below prior to pick	up. ]
-		1	2	3	4	5	6
	Date	7/13/21	7/14/21	7/15/21	7/16/21		
	Start time	2040	2039	2038	2038		
-	End time	9 0 0	9635	0636	0636		
			the following cond	litions apply to the	first 5 hours of sam	npling? (Y/N)	
Temp. belo	ow 10°C(50°F) ?	<u>N</u>	N	N	N		
>9m/l	h wind speeds?	N	N	N	N		
>30 min	of precip./fog?	N	N	N	N		
-			*IF YE	S to any of the condi	tions, resample the	night.	
Was the ni	ght successful?		У	<u> </u>	Υ.		
Data download	ſ		,		1		
Card ID: _	124				Card ID:		
Log file Present?_	17S				Log file Present?		



Site 27 Location A





Site Name:		<u> </u>			ject Name: _	2021 Rivo	bend
Biologists:	E. Merr	:11, R.F.	to patrick			Date:	7/13/21
Location Information:			,				/ /
State:	Michigan		County: _	Sanilac		Datum/Format: NA	D 83/D.D
Latitude:	43.1869	6	Longitude:	-082.6-	7815	UTC:4	
						lot	
Habitat being	sampled: Ripar	ian Field Edge		Bottomland Fore circle one)	st Upland	Forest Pand Othe	r
	<u>65</u> n	Microphone #:	22	Directional PV0	C present?:	no	
Mic Height (m):		lic Inclination:		Mic Azimuth:	_		
User Profile/Settings:  WA SM4BAT FS Firmware:  Comments:	2.3.1	Samp. Freq: HP-Filter: Input Gain:		Min. Dur.: _ Max Dur.: _ Trig Freq: _	поле	Trig. Level Trig. Window Max Length:	12db 3 sec 5 Sec
Photos: Detection area:	(x)	Site:	(x)	Mic orientation:	( <sub>X</sub> )		
N	ougar Geld	×			$\uparrow_{\triangle}$	Forested 10t	73



Site Name:	27	B		_	Project Name :	2021	Riverbend
Biologists:	E. Mesc	ill, R.Fitza	patrick			Date:	7/17/21
	_	-		Detector Status:	N:Armed	ON:Triggered	OFF: Dead
Reason for OFF:		<u> </u>	<u> </u>				
Did detector location/	orientation ch	ange? If so, how?:	No				
If detector has moved, been	tampered wit	h, knocked over, o	r changed orientat	ion then take phot	os before picking u	ρ.	
Weather conditions	I		*Weather data (sou		checked and entered	l below prior to pick	up.
_		1	2	3	4	5	6
	Date	7/13/21	7/14/21	7/15/21	7/16/21		
	Start time	2040	2089		2038		
	End time	6634	0635	0636	CC 36		
		Do any of	the following cond	litions apply to the	first 5 hours of sam	pling? (Y/N)	
Temp. below	v 10°C(50°F) ?	N	N	N	N		
>9m/h	wind speeds?	N	N	N	N		
>30 min o	f precip./fog?	N	N	N	N		
_			*If YE	S to any of the cond	itions, resample the r	night.	
Was the nig	ht successful?	7	У	Y	V		
Data download		<b>b</b>	,	r——	7		<del></del>
Card ID:	123				Card ID:		
Log file Present?	425				Log file Present?		



Site 27 Location B





Site Name:	28	A		Project Nar	ne: 2021 Kr	erbend
Biologists:	E.Me	ccill, R. Fil	z patric	<u>k</u>	Date	7/13/21
Location Information:		•	,			•
State: _	Michig	Δ	County: _	Sanilac	Datum/Format	:: NAD 83/D.D
		9949	Longitude: _	-082.680	2.4 UTC	: -4
Site Description:	along	c field/	forest e	dge by to	all cuffins	- through
forest tea	ding	+0	Créek			
Habitat being	sampled: Rij	parian Field Edge		Bottomland Forest Up	land Forest Pond	Other
Deployment Information	_		4		_	
Detector #: _	57	Microphone #:_	10	Directional PVC preser	nt?:	
Mic Height (m):	3	Mic Inclination:	0	Mic Azimuth: 15		
User Profile/Settings:  WA SM4BAT FS Firmware:  Comments:		Samp. Freq: HP-Filter: Input Gain:	On	Min. Dur.: 1.5 m Max Dur.: none Trig Freq: 16kH	Trig. Window	w 3 sec
Photos: Detection area:	( <sub>X</sub> )	Site:	( <sub>X</sub> )	Mic orientation: $\langle \chi \rangle$		
open fre	19/Enu			FO	prest edge	British



	Merc.	A :11, R.F.	tzputrick	Detector Status:			Riverbend 7/17/21 OFF: Dead
Did detector location/o	prientation cha	inge? If so, how?:	No				
If detector has moved, been t	tampered with	i, knocked over, o	r changed orientat	ion then take phot	os before picking up	0.	
Weather conditions			*Weather data (sou		checked and entered	below prior to picku	p.
		1	2	Ni   3	ght   4	5	6
_	Date	7/13/21	7/14/21	7/15/21	7/16/21		
	Start time	2040	2039	2038	2038		
	End time	0634	9635	0036	0836		
_			the following cond	itions apply to the	first 5 hours of sam	pling? (Y/N)	
Temp. below	10°C(50°F) ?	N	N	N	N		
>9m/h v	wind speeds?	N	N	N	N		
>30 min of	precip./fog?	N	N	N	N		
_			*If YE	S to any of the cond	itions, resample the r	night.	
Was the nigh	it successful?	<u> </u>	<u> </u>	У	l y		
Data download  Card ID:		· · · · · · · · · · · · · · · · · · ·		,	Card ID:		
Log file Present?	X-15				Log file Present?		



**Site 28 Location A** 





Site Name:		B_		Proje	ect Name: _	2021	River	bend
Biologists:	E. Me	ercill, R. Fin	tapatic	K			Date:	/13/21
Location Information:		•	•					/
State: _	Mich	gan	County:	Sarilae		Datum/Fo	rmat: NA	0.83/D.D
Latitude: _	43.	19933	Longitude:	-082.680	787		UTC:4	
Site Description:	Edge	of agoi	cultural	field & fo	rested	lot bla	ck or	cek
rear by.								
Habitat being	sampled: Ri	parian Field Edge		Bottomland Fores (circle one)	t Upland	Forest Pond	d Other	
Deployment Information								
Detector #: _	59	Microphone #: _	46	Directional PVC	present?: _	no		
Mic Height (m):	3	Mic Inclination:	0	Mic Azimuth:	270_			
User Profile/Settings:  WA SM4BAT FS Firmware:  Comments:		Samp. Freq: HP-Filter: Input Gain:	384kHz On 0 or ②db (circle ane)	Min. Dur.: _ Max Dur.: _ Trig Freq: _	1.5 ms none 16kHz	Trig. Trig. Wi Max Le		12db 3 sec 5 Sec
Photos: Detection area:	( <sub>X</sub> )	5ite:	(x)	Mic orientation:	(x)			
		odi. any	not frell			1 2		
-		$\epsilon \Delta$		Foresk	ed lot			



Site Name: 2	8 6	3			Project Name :	2021	Riverber	rd
Detector:		II, R.Fit	zpatrick	Detector Status:	ON:Armed	. Date: ON:Triggered	7/17/ OFF: Dead	121
Reason for OFF:								
Did detector location/orient	tation ch	ange? If so, how?:	NO					
detector has moved, been tamp	ered wit	h, knocked over, o	r changed orientat	ion then take photo	os before picking u	rp.		
Veather conditions	ı		*Weather data (sou	rce: NOAA) must be Nig		d below prior to pick	υρ. Ι	
			2	3	4	5	6	
	Date	7/13/21	7/14/21	7/15/21	7/16/21	7/20/21		
St	art time	0407	2039	2039	2038	2035		
E	ind time	0635	0635	0636	0637	0640		
		Do any of		itions apply to the	first 5 hours of san			
Temp. below 10°C	C(50°F) ?	N	N	N	N	N		
>9m/h wind	speeds?	Ν	N	N	N	N		
>30 min of pred	ip./fog?	N	N	7	N	N		
		. 14:	*If YE	S to any of the condi	tions, resample the	night.		
Was the night suc	cessful?	N	<u> </u>	У	4			
ata download		7/14		,	1	1		
Card ID: 2	-03	7/H (40	7- end)		Card ID:	33 (€	ERROR)	
Log file Present?	es				Log file Present?	No		
			•			)		
					G.	ARD A	- ERRO	RED
					(	0407	on 7/1	4
						0407 surfehe	d to co	·vd
	7							
	7							
,	Yes							

The section of the se

Site 28 Location B





Site Name: 29 A	Project N	Name: 202   River	pend
Biologists: E. Merr. 11, A. Grock	sel, M. Zollars	Date: 00	129/20
cation Information:			, ,
State: Michigan Co	unty: Sanilac	Datum/Format: NAC	83/D.D
Latitude: 43.23878 Longi			
Site Description: Shooting through	break in t	ref line tow	ards
Drainage ditch			
Habitat being sampled Riparian Field Edge Open	Field Bottomland Forest	Upland Forest Pond Other	
	(circle one)	opiana rolest rolla other	
ployment Information:	Directional PVC pres	Λ).	
Detector #: 7   Microphone #: 7	-		
Mic Height (m): 3 Mic Inclination:	Mic Azimuth: 4	0	
er Profile/Settings: Samp. Freq: 384k	Hz Min. Dur.: 1.5	ims Trig. Level	12db
WA SM4BAT FS SMM-U2 HP-Filter: On	Max Dur.: no	one Trig. Window	3 sec
Firmware: 2.3.1 Input Gain: 0 o 12	one)	kHz Max Length:	5 Sec
comments: Moved Site d	ue to po	int on uniq	ned
ropeity on map.			3 1
atos:		^	
Detection area:	Mic orientation: (-	A	
* 4 4	Δ		N
Forest	ß		1
	Fores	т /	1
	40.		
Forest	ybean		
	Field		
Saybean Field			
3	Sou	Jbean	
	F:	eld	
rouse	1,	Se south	
. 1/02			



Site Name: 29 A				Project Name :	2021	Siver 8
Biologists: ± M.	eml				Date:	7/3/
Detector: 7			Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:						
Did detector location/orientation cha	ange? If so, how?:	No				
tector has moved, been tampered wit			tion then take pho	tos before picking	up.	-
ther conditions		*Weather data (sou		checked and entere	d below prior to pick	rup.
	1	2	3	4	5	6
Date	6/29/21	6/30/21	7/1/21	7/2/21		
Start time	2015	2045	2044	2044		
End time	06 24	0625	0625	0626		
	Do any of	1 0	ditions apply to the	first 5 hours of sa	mpling? (Y/N)	
Temp. below 10°C(50°F)?	No	No	No	No		
>9m/h wind speeds?	No	No	No	No		
>30 min of precip./fog?	No	No	No	No		
	1	*If Y	ES to any of the cond	ditions, resample the	night.	
Was the night successful?	162	YES	YES	YCS		
download						
Card ID: 30				Card ID		
11-1						



Site 29 Location A





Site Name: 29 B	Project Name: 2021 River bend
Biologists: E. Merrill, A. Goebel,	M. Zollavs Date: 06/29/2021
Location Information:	1 1
State: MICHIQUY County	Sanilac Datum/Format: NAD 83/D.D
J ,	: <u>-82.68043°</u> UTC: <u>-4</u>
	it edge next to soybean
field	
Habitat being sampled: Riparian Field Edge Open Field  Deployment Information:	d Bottomland Forest Upland Forest Pond Other (circle one)
Detector #: 34 Microphone #: 40	Directional PVC present?: Vo
	Mic Azimuth: \\ \\ \\ \ \ \ \ \ \ \ \ \ \ \ \ \ \
Mic Height (m): 3 Mic Inclination: 8	
User Profile/Settings:     Samp. Freq:     384kHz       WA SM4BAT FS     SMM-U2     HP-Filter:     On       Firmware:     2.3.1     Input Gain:     0 or 12 db       (circle one)	Min. Dur.:         1.5 ms         Trig. Level         12db           Max Dur.:         none         Trig. Window         3 sec           Trig Freq:         16kHz         Max Length:         5 Sec
Comments: Moved site due to	point on unsigned property
on kml file	
Photos: Detection area: (X) Site: (X)	Mic orientation: (🕍
Forest	Forest N
Safrean Field Nouse	Soybean Field
Mortiner	Line Rd



Site Name: _	29 P			-	Project Name :	2021	RIVENDE
Biologists:	E.M.	unll				Date	7/3/21
Detector: [circle one]	34		-	Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:	<u> </u>						
Did detector location			No				
If detector has moved, beer	n tampered wit	h, knocked over, o	r changed orientat	ion then take phot	os before picking u	p	
Weather conditions		l	*Weather data (sou		checked and entered	l below prior to pic	kup.
_		1	2	3	4	5	6
	Date	6/29/21	6/30/31	7/1/21	7/2/21		
	Start time	2045	2045	2044	2044		
_	End time	1000	0625	9625	0626		
		Do any of t	the following cond	itions apply to the	first 5 hours of sam	pling? (Y/N)	,
Temp. below	w 10°C(50°F) ?	No	No	No	No		
>9m/h	wind speeds?	No	No	No	No		
>30 mln o	of precip./fog?	No	No	No	No		
_		<del></del>	*If YE	S to any of the cond	tions, resample the r	right.	
Was the nig	ht successful?	Y+95	YW	Yrs	Yes		
Data download							
Card ID:	40				Card ID:		
Log file Present?	11-6				Log file Present?		



Site 29 Location B





Site Name: 30 A	Project Name: 2021 Riverbend
Biologists: E. Merrill, R. Fitzpatrick	Date: 7/14/21
Location Information:	, .
State: Michigan County:	Sanilac Datum/Format: NAD 83/D.D
Latitude: 43.16417 Longitude:	-082.69791 UTC: -4
Site Description: on edge of hay field	and treetine whoding edge of
forested bot with a road or	through
Habitat being sampled: Riparian Field Edge Open Field	
Deployment Information:	
Detector #: 52 Microphone #: 6	
Mic Height (m): 3 Mic Inclination: 0	Mic Azimuth: 25
User Profile/Settings:  WA SM4BAT FS SMM-U2 HP-Filter: On Input Gain: 0 or 12 db (circle one)  Comments:	Min. Dur.: 1.S ms Trig. Level 12db Max Dur.: none Trig. Window 3 sec Trig Freq: 16kHz Max Length: S Sec
Photos:  Detection area: (X) Site: ½ )	Mic orientation: (X)
<u> </u>	forest
N	4 (3
	45 11
hay —	
	T vous
	y sed cuttors
	1
trucking 3	(76)



Site Name:	<u> 30</u>	A		_	Project Name :	2021 R	verbend
Biologists:	E. Mesci	II, R. Fitzpa	etrick			Date: _	7/18/2
Detector: (circle one)	52		-	Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:		-					
Did detector location	_						
If detector has moved, bee	n tampered wit	h, knocked over, o	r changed orientat	tion then take phot	os before picking up	).	
Weather conditions			*Weather data (sou		checked and entered	below prior to picku	p.
-		1	2	3	4	5	6
	Date	7/14/21	7/15/21	7/16/21	7/17/21		
	Start time	2039	2038	2038	2037		
	End time	0635	06 36	0637	0638		
-		Do any of	the following cond	litions apply to the	first 5 hours of sam	pling? (Y/N)	
Temp. belo	w 10°C(50°F) ?	N	N	N	N		
>9m/	n wind speeds?	N	N	N	N		
>30 min	of precip./fog?	N	N	N	N		
-			*If YE	ES to any of the cond	itions, resample the n	ight.	
Was the ni	ght successful?	V	У	Y	ý		
Data download		ı	/	1	7		
Card ID:	129				Card ID:		
Log file Present?					Log file Present?		



**Site 30 Location A** 





Site Name: 30 B	Project Name: 2021 Riverbend
Biologists: E. Meccill, R. Fitzpatrick	Date: 7/14/21
Location Information:	•
State: Michigan Count	e: - 082.69775 UTC: -4
Latitude: 43.16493 Longitud	e: <u>- 082.69775</u> UTC: <u>-4</u>
Site Description: Edge of hayfield	and forested lot
Habitat being sampled: Riparian Field Edge Open Fie	eld Bottomland Forest Upland Forest Pond Other (circle one)
Deployment Information:  Detector #: 17 Microphone #: 43	Directional PVC present?:
Mic Height (m): 3 Mic Inclination: 0	Mic Azimuth:
WA SM4BAT FS SMM-U2 HP-Filter: On Input Gain: Circle one)  Comments:	Min. Dur.: 1.5 ms Trig. Level 12db Max Dur.: none Trig. Window 3 sec Trig Freq: 16kHz Max Length: 5 Sec
Photos: Detection area: (x) Site: (x)	Mic orientation: (X)
hoy	Property forested 1 of 2



Site Name:	30	B		<del>_</del>	Project Name :	2021 R	liver bend
Biologists:	Mecc	III, R.F.T.	zpatrick_			Date:	7/18/2
Detector:(circle one)	17_		-	Detector Status	: ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector location/o	rientation ch	ange? If so, how?:	No				
If detector has moved, been t	ampered with	h, knocked over, c	r changed orienta	tion then take pho	tos before picking u	p.	
Weather conditions	I		*Weather data (sou		e checked and entered	d below prior to pick	up.
		1	2	3	4	5	6
	Date	7/14/21	7/15/21	7/16/21	7/17/21	1	
	Start time	2039	2038	2038	2037		
	End time	0638	0636	0637	0638		
		Do any of	the following cond	litions apply to the	first 5 hours of sam	pling? (Y/N)	
Temp. below	10°C(50°F) ?	N_	N	N	LN I		
>9m/h w	rind speeds?	N	N	N	N		
>30 min of (	precip./fog?	N	N	N	N		
			*If YE	5 to any of the cond	itions, resample the r	right.	
Was the night	successful?	<u> </u>	У		L v l		
Data download		•	/	/	7		
Card ID:	30				Card ID:		
Log file Present?	. <u>ひ</u>				Log file Present?		



**Site 30 Location B** 





Site Name:					2021 Riverbend
Biologists:	E.M.	errill R.Fit.	epatrick		Date: 7/17/21
Location Information:			•		72.7
State: _	Michig	<u>~</u>	County: _	Smilac -082,69743	Datum/Format: NAD 83/D.D
					UTC: <u>-4</u>
Site Description:	on e	lee of n	rooded	lot another +	examples grassy
avea/zdg	2 d	goybean	field	Seymon Eve	ek
Habitat being	sampled: R	parian Field Edge	Open Field	Bottomland Forest Upland F	orest Pond Other
Deployment Information					
		Microphone #:	10	Directional PVC present?:	<u>no</u>
Mic Height (m):	3_	Mic Inclination:		Mic Azimuth: 5	
User Profile/Settings:		Samp. Freq:		Min. Dur.: 1.5 ms	Trig. Level 12db
WA SM4BAT F5 Firmware: 2		HP-Filter: Input Gain:		Max Dur.: none Trig Freq: 16kHz	Trig. Window 3 sec  Max Length: 5 Sec
-			(circle one)		
Comments: _					
Photos: Detection area:	(x)	Site:	(x)	Mic orientation: ( x)	
				Buy mary (	viet-
Worder					
V					
				7	. 1
		0 1		4	roaded
	92	hald		. )/	V*
			. Up	5. //	
~+			4	4	
4,0		Say bears	`		
		/			



Site Name: 31	A			Project Name :	202	Riverbend
Biologists: E. Meri	rill R. Fi	tepatrick	· -		Date:	7/21/202
Detector:		,	Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:						
Did detector location/orientation cha	ange? If so, how?:	No				
If detector has moved, been tampered with	h, knocked over, or	r changed orientat	ion then take photo	os before picking u	p.	
Weather conditions		*Weather data (sou	urce: NOAA) must be Nig	checked and entered	d below prior to pick	up.
	1	2	3	4	5	6
Date	7/17/21	7/18/21	7/19/21	7/20/21	-	
Start time	2037	2036	2035	2035		
End time	0637	Q638	0639	040		
	Do any of	the following cond	ditions apply to the	first 5 hours of san	npling? (Y/N) i	1
Temp. below 10°C(50°F)?	N	N	$\wedge$	$\mathcal{N}_{-}$		
>9m/h wind speeds?	N.	N	N	N		
>30 min of precip./fog?	N	N _	N_	N		
		*If Y	ES to any of the cond	litions, resample the	night.	
Was the night successful?	У	\ \ \ \	У	V		
Data download	1	1		ι		
Card ID: 90		-		Card ID:		
Log file Present? VCS		_		Log file Present?		



Site 31 Location A





Site Name:	31	_B		Proj	ject Name:	2021 R:V	erbend
Biologists:	E. Mes	cill, R.Fitz,	patrick			Date:	117/21
Location Information:				_		ı	
				Sonilac			NAD 83/D.D
Latitude:	43.2	1828	Longitude:	082.69	846	UTC: <u>-</u>	4
Site Description:	edge	of goylor	con fic	ld and	foreste	al lof	Shooting
towards	TAP	1- force	+ ~+	h little	field .	gepavat	200
				Bottomland Fore (circle one)			
Deployment Information	<u>"</u>		29			00	
Detector #:	5/	Microphone #: _	<u> </u>	Directional PV	C present?:		
Mic Height (m):	_3	Mic Inclination:	0	Mic Azimuth:	///		
User Profile/Settings: WA SM4BAT FS Firmware: Comments:	2.3.1	Samp. Freq: HP-Filter: Input Gain:	On	Min. Dur.: Max Dur.: Trig Freq:		Trig. Level _ Trig. Window _ Max Length: _	3 sec
Photos: Detection area:	(x)	Site:	(x )	Mic orientation:	(X)		
*	1	goy d	caus	~		trees	
	10	1		S			
		Δ.		,			
		Δ.	~				
	L	ovested					
					,	Ì	



Site Name:	31	<u> </u>			Project Name :	2021 6	Siverbend
Biologists:	E.Merri	11, R.Fit	zpatrick				7/21/2021
Detector:	57			Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:					<del> </del>		
Did detector location/orientation change? If so, how?:							
If detector has moved, been	tampered with	s, knocked over, o	r changed orientat	ion then take phot	os before picking u	р.	
Weather conditions	I		*Weather data (sou	•	checked and entered	d below prior to pick	up.
_		1	2	3	4	5	6
	Date	7/17/21	7/18/21	7/9/21	7/20/21		131
	Start time	2037	2036	2035	2035		
	End time	0637	0638	0639	2640		
_		Do any of	the following cond	itions apply to the	first S hours of san	pling? (Y/N)	
Temp. belov	w 10°C(50°F) ?	N	N	$\sim$	N		
>9m/h	wind speeds?	N	N	<b>∧</b>	$\mathcal{N}$		
>30 min o	of precip./fog?	N	N	N	$\mathcal{N}_{\perp}$		
_			*If YE	S to any of the cond	litions, resample the	night.	
Was the nig	tht successful?	Y	l y	<u> </u>	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		
Data download	^	/	1		•		
Card (D:	97				Card ID:		
Log file Present?	Yrs				Log file Present?		



Site 31 Location B





Site Name: 32 A	Project Name: 2021 Riverbend
Biologists: E. Merrill, A. Goebel, M. Zo	
Location Information:	1 1
State: Michigan County: San	Datum/Format: NAD 83/D.D
Latitude: 43.19748° Longitude: -82.1	65627° UTC: -4
Site Description: Shooting down field and	ge next to torn; p
Field	0
Habitat being sampled: Riparian Field Edge Open Field Bottom (circle one)	land Forest Upland Forest Pond Other
Deployment Information:  Detector #:	tional PVC present?:
Mic Height (m): 3 Mic Inclination: Mic A	azimuth: 20
WA SM4BAT FS SMM-U2 HP-Filter: On M	in. Dur.: 1.5 ms Trig. Level 12db lax Dur.: none Trig. Window 3 sec rig Freq: 16kHz Max Length: 5 Sec
Photos:  Detection area: (10) Site: (10) Mic orie	ntation: (CP
Forest Forest	Corest*
Forest	
Torni P Field	Field
house house	
Gialbraith Line F	2.d



Site Name:	32 7	<u> </u>			Project Name :	2021 F	Ziver Jen.
Biologists:	E. M.	evill	<u>.</u>			Date:	7/2/21
Detector: (circle one)	68			Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector location	n/orientation ch	ange? If so, how?:	No				
If detector has moved, bee	n tampered wit	h, knocked over, o	r changed orientat	ion then take photo	os before picking u	p.	
<u>Weather conditions</u>			*Weather data (sou	rce: NOAA) must be Nig		l below prior to pick	cup.
-		1	2	3	4	5	6
	Date	6/2/2/21	6/24/21	6/30/21	7/1/21		
	Start time	2045	2044	2044	2044		
_	End time	0624	0624	0625	0625		
		Do any of	the following cond	itions apply to the	first 5 hours of sam	pling? (Y/N)	,
Temp. belo	ow 10°C(50°F) ?	No	No	No	No		
>9m/	h wind speeds?	No	No	No	No		
>30 min	of precip./fog?	No	No	No	No		
-			*If YE	S to any of the condi	tions, resample the	night.	
Was the ni	ght successful?	125	ICS	V15	Yes		
Data download		•		`			
Card ID:	72				Card ID:		
Log file Present?	(13				Log file Present?		



Site 32 Location A





Site Name: 32 B	Project Name: 2021 Riverband
Biologists: A. Groebel, E. Merrill, M. Zolla	
Location Information:	
State: Michigan County: Sanila	Datum/Format: NAD 83/D.D
Latitude: 43.19944 Longitude: -82.655	
site Description: Shooting across corridor of Edge Next to turnip field	ppening/along field
edge next to I tumip field	<u>,                                     </u>
Habitat being sampled: Riparian Field Edge Open Field Bottomland F	orest Upland Forest Pond Other
Deployment Information:	
	PVC present?: No
Mic Height (m): Mic Inclination: Mic Azimut	h: 264°
User Profile/Settings:	
Samp. Freq: 384kHz Min. Du WA SM4BAT FS SMM-U2 HP-Filter: On Max Du	r.: 1.5 ms
Firmware: 2.3.1 Input Gain: 0 or 12 db Trig Fre	q: 16kHz Max Length: 5 Sec
Comments:	
Photos:	
Detection area: ( Site: ( Mic orientatio	n: (\O
	N
/	
Forest Forest	
	PoreIT
	(
	\
Turnip Field	
1 1 1 1	field
Field E	{
Fie nouse nouse	
Galbraith Line R	d



Site Name: 32	16			Project Name :	2021	Ziverlen
Biologists: E.M	cvil				Date	7/2/21
Detector: (circle one)	· ·		Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:						
Did detector location/orientation ch	ange? If so, how?:	No				
If detector has moved, been tampered wit	h, knocked over, o	r changed orientati	on then take photo	os before picking u	р.	
Weather conditions	<b> </b>	*Weather data (sou	rce: NOAA) must be Nig		d below prior to pic	kup.
	1	2	3	4	5	6
Date	6/28/21	6/29/21	6/30/21	7/1/21		
Start time	2045	2044	2044	2044		
End time	0624	0624	0625	0625	-	
	Do any of t	the following cond	tions apply to the	first 5 hours of sam	pling? (Y/N)	
Temp. below 10°C(50°F) ?	N(-0	No	No	No		
>9m/h wind speeds?	No	No	No	No		
>30 min of precip./fog?	No	70	NIG	No		
		*If YE	S to any of the condi	tions, resample the	night.	
Was the night successful?	475	Yes	125	Ves		
Data download	•	<b>,</b>	· ·	•		
Card ID:				Card ID:		
Log file Present?				Log file Present?		



Site 32 Location B





Site Name:	33 /	<u> </u>	Project N	ame: 2021 Riv	verbend_
Biologists:	E. Mercill,	R. Fitzpatric	<u>K</u>	Date	7/14/21
Location Information:		,			
State:	Michigan	Coun	ity: Sanilac	Datum/Format	: NAD 83/D.D
Latitude:	43.1901	4 Longitue	de: <u>-082.70487</u>	UTC	:4
Site Description:	old tree	is h gras	by riparian	eveal Blace	c Creck
Shootn	12 into	wassy.	banna		
Habitat being	sampled: Riparian F	Field Edge Open Fi	ield Bottomland Forest U	Jpland Forest Pond (	Other
<b>Deployment Information</b>		<b>Λ</b> Γ			
Detector #:		hone #: <u>55</u>	Directional PVC pres	ent?: <u> </u>	
Mic Height (m):	3 Mic Incl	lination:	Mic Azimuth: 26	<u> </u>	
User Profile/Settings: WA SM4BAT FS Firmware: Comments:	SMM-U2 H 2.3.1 Inp	p. Freq: 384kHz P-Filter: On ut Gain: 0 or 12d (circle one)	Max Dur.: no b Trig Freq: 16k	ne Trig. Windov	v 3 sec
Photos: Detection area:	(x)	Site: (X)	Mic orientation: (X		treeline
	, N	// V			
BI	net creek	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Hay	Leld	77



Site Name: 35	A			Project Name :	2021 K	iverbend		
Biologists: E. Mer	ill, R.Fitz	patrick			Date	7/18/2		
Detector: 3	_	-	Detector Status:	ON:Armed	ON:Triggered	OFF: Dead		
Reason for OFF:		<del>_</del> ,,		_		<u> </u>		
Did detector location/orientation	Did detector location/orientation change? If so, how?: 10							
If detector has moved, been tampered v	vith, knocked over, o	or changed orientat	ion then take phot	os before picking u	ıp.	<u></u>		
Weather conditions	I	*Weather data (sou	ırce: NOAA) must be Ni	checked and entere	d below prior to pic	kup.		
	1	2	3	4	5	6		
Da	te 7/14/21	7/15/21	7/16/21	7/17/21				
Start tin	ne 2039	2038	2038	2037				
End tir	ne 0635	0036	0,637	0638				
	Do any of	the following cond	litions apply to the	first 5 hours of sar	npling? (Y/N)	_		
Temp. below 10°C(50°F	? N	N	N	N				
>9m/h wind speed	s? N	N	N	N				
>30 min of precip./fo	B <sub>5</sub>	N	N	N_		4.		
		*If Y	ES to any of the cond	litions, resample the	night.	T .		
Was the night successfu	117	У	1	Y	]			
Data download		,		1				
Card ID: Log file Present?		_		Card ID:				
Log file Present?		-		Log file Present?				



**Site 33 Location A** 





Site Name: 33 B	Project Name: 2021 Riverbend
Biologists: E. Merrill, R. Fitzpatric	L Date: 7/14/21
Location Information:	
State: Michigan Cou	inty: Sarilac Datum/Format: NAD 83/D.D
Latitude: <u>43, 17986</u> Longitu	
Site Description: Black Grok to North	(bolund) me. Microphone shooting
along truline edge w	Ah dramage withing Compastured 50
Habitat being sampled: Riparian Field Edge Open R	Field Bottomland Forest Upland Forest Pond Other
Deployment Information:	
Detector #: 40 Microphone #: 78	Directional PVC present?:
Mic Height (m): 3 Mic Inclination: 0	Mic Azimuth: 147
User Profile/Settings:  WA SM4BAT FS SMM-U2 HP-Filter: On Input Gain: 0 or 12 (circle one	Max Dur.: none Trig. Window 3 sec db Trig Freq: 16kHz Max Length: 5 Sec
Photos: Detection area: (X) Site: (X)	Mic orientation: {X}
<b>^</b>	
Black Creek	
	THE TOTAL PROPERTY OF THE PROP
Sketch site with detector location; label streams, roads, and othe	con pastic & G

Site Name:		<u> </u>			Project Name :	2021	Kiverbend
Biologists:	E. Mers	Il, R. Fitz	patrick			Date	7/18/21
Detector: (circle one)	11-			Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector location	n/orientation ch	ange? If so, how?:	No	,			
If detector has moved, bee	n tampered wit	h, knocked over, o	r changed orientat	ion then take phot	os before picking u	р.	
Weather conditions	I		*Weather data (sou		checked and entered	l below prior to pic	skup.
_		1	2	3	4	5	6
	Date	7/14/21	7/15/21	7/16/21	7/17/21		
	Start time	2039	20 38	2038	2037		
	End time	0635	0636	0637	0438		
		Do any of	the following cond	litions apply to the	first 5 hours of sam	pling? (Y/N)	,
Temp. bel	ow 10°C(50°F) ?	N	N	N	N		
>9m/	h wind speeds?	N	N	N	N		
>30 min	of precip./fog?	N	N	N	N		
			*If YE	ES to any of the cond	itions, resample the	night.	<u>,</u>
Was the n	ight successful?	Υ	У	Y	<u> </u>		
Data download			,	•	1		
	139		-		Card ID:		
Log file Present?	105		_		Log file Present?		



Site 33 Location B





Site Name: 34A	Project Name: _	2021 River	rend
Biologists: E. Merrill, R. Fitzpatrick		Date:	7/14/21
Location Information:			
State: Michigan County:	Sanilac	Datum/Format: N	AD 83/D.D
Latitude: 43./7299 Longitude:	-082.71937	UTC: <u>-4</u>	
Site Description: Shorting edge of	treeline / soy	bean frele	1 gras
edte.			/ >
Habitat being sampled: Riparian Field Edge Open Field	Bottomland Forest Upland (circle one)	Forest Pond Othe	er
Deployment Information:			
Detector #: 56 Microphone #: 57	Directional PVC present?:	<u>no</u>	
Mic Height (m): 3 Mic Inclination:	Mic Azimuth: / 9		
User Profile/Settings:     Samp. Freq:     384kHz       WA SM4BAT FS SMM-U2     HP-Filter:     On       Firmware:     2.3.1     Input Gain:     0 or 12db       Comments:     Comments:	Min. Dur.: 1.5 ms Max Dur.: none Trig Freq: 16kHz	Trig. Level Trig. Window Max Length:	12db 3 sec 5 Sec
Photos:  Detection area: (X)  Site: (X)	Mic orientation: {x}		
trans.	( a \	1	
	Goffia	SN	
Prested lot	CON SCO	<b>~</b> 5	



Site Name:	34	A			Project Name :	2021 R	iverbend
Biologists:	Mecc	ill. R.Fit	zputrick			Date:	7/18/2
	-			Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector location/or	Did detector location/orientation change? If so, how?:						
if detector has moved, been to	mpered with	n, knocked over, o	r changed orientat	ion then take phot	os before picking u	p.	
Weather conditions	ı		*Weather data (soc	urce: NOAA) must be Nij	checked and entered	l below prior to pick	up.
	_	11	2	3	4	5	6
	Date	7/14/21	7/15/21	7/16/21	7/17/21		
	Start time	2039	2038	2038	2037		
	End time	0635	0636	0637	0638		
_		Do any of	the following cond	litions apply to the	first 5 hours of sam	pling? (Y/N)	
Temp. below	10°C(50°F) ?	N	N_	N_	N_		
>9m/h w	ind speeds?	N_	N	N	N		
>30 min of	precip./fog?	N	N	N	N		
			*If Y	ES to any of the cond	itions, resample the	night.	
Was the night	successful?	У	У	<u> </u>	<u> </u>		
Data download	,	′	,	1	/		
Card ID:	142		-		Card ID:		
Log file Present?	Yeg		-		Log file Present?		



Site 34 Location A





Site Name:	34	B		Project Na	me: 2021	Riverbend
Biologists:	E. Me	cill, R. Fit	zpatrick			Date: 7/14/21
Location Information:					_	<del></del>
				Surilac	Datum/Fo	ormat: NAD 83/D.D
Latitude:	93.1	7266	Longitude:	082.71775		UTC: <u>-4</u>
Site Description:	edge	of coys	ear fie	ld and for	ce   16	<del>*************************************</del>
		parian Field Edge		Bottomland Forest Up	land Forest Pon	d Other
Deployment Information			5u			
Detector #:	_	Microphone #:_		Directional PVC preser	nt?: <u>// 0</u>	
Mic Height (m):		Mic Inclination:	0	Mic Azimuth: 180		
User Profile/Settings:  WA SM4BAT FS Firmware:  Comments:		Samp. Freq: HP-Filter: Input Gain:	384kHz On 0 o (12)db (circle one)	Min. Dur.: 1.5 m Max Dur.: none Trig Freq: 16kH	Trig. W	
<u>Photos:</u> Detection area:	(x )	Site:	(X)	Mic orientation: (X)		
P	C.	trech	e ) -	3 ??	7	
forested 1 ot	3	V	God se	am		
lot (	ک					
	13					



	34			_	Project Name :	2021 R	verbend
Biologists:	E. Merci	II. R.Fitza	patrick			*	7/18/2
Detector: (circle one)	28		-	Detector Status:	QN:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector location					os before picking u		
Weather conditions			*Weather data (sou		checked and entered	d below prior to pick	up.
		1	2	3	4	5	6
	Date	7/14/21	7/15/21	7/16/21	7/17/21		
	Start time	2039	2038	2038	2037		
	End time	9635	0636	0637	0638		
_		Do any of	the following cond	itions apply to the	first 5 hours of sam	pling? (Y/N)	
Temp. belo	ow 10°C(50°F) ?	N	N	N	N		
>9m/	h wind speeds?	_ N	N	N	N		
>30 min	of precip./fog?	2	N	N	N		
-			*If YE	S to any of the cond	itions, resample the	night.	
Was the ni	ght successful?	У	У		V		
Data download			7	1	/		
Card ID:	141				Card ID:		
Log file Present?	Yes				Log file Present?		



Site 34 Location B





Site Name: 35 A  Biologists: A. Gruebel, E. Merrill,	Project Name: 2021 Riverbend
Biologists: A. Gruebel, E. Merrill,	M. Zollars Date: 06/27/2021
Location Information:	
State: Michigan County:	Sanilac Datum/Format: NAD 83/D.D
Latitude: 43.18298 Longitude:	-82.72860° UTC: -4
Site Description: Shooting down field	edge/Tree edge
Habitat being sampled: Riparian Field Edge Open Field	Bottomland Forest Upland Forest Pond Other (circle one)
Deployment Information:	4.)
Detector #: 50 Microphone #: 72	Directional PVC present?: No
Mic Height (m): 3 Mic Inclination:	Mic Azimuth: 5°
User Profile/Settings:  WA SM48AT F5 SMM-U2 Firmware: 2.3.1  Comments: Change of Site due	Min. Dur.: 1.5 ms Trig. Level 12db  Max Dur.: none Trig. Window 3 sec  Trig Freq: 16kHz Max Length: 5 5ec
previous point.	
Photos: Detection area: 450 Site: 450	Mic orientation: (4)
Form Field  Small Wood Lot  Field	Farm Field Farm Field Field



Site Name:	35 H				Project Name :	102 K	sev inc
Biologists:	E. Mer	ull	_			Date:	7/1/202
Detector: (circle one)	50			Detector Status:	QN:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector location	n/orientation cha	ange? If so, how?:	No		· ·		
If detector has moved, bee	en tampered with	n, knocked over, o	r changed orientat	on then take photo	os before picking u	p.	
Weather conditions	1		*Weather data (sou	rce: NOAA) must be Nij		d below prior to pick	кир.
		1	2	] з	4	5	6
	Date	6/27/21	6/28/21	6/29/21	6/30/21		
	Start time	2045	2045	2045	2045		
	End time	0624	0624	I .			
•		Do any of	the following cond	itions apply to the	first 5 hours of san	npling? (Y/N)	.
Temp. bel	ow 10°C(50°F) ?	No	No	No	No		
>9m/	h wind speeds?	No	No	No	No		
>30 min	of precip./fog?	No	1/2	No	No		
			*1f YI	S to any of the cond	itions, resample the	night.	
Was the n	night successful?	775	Trs	775	Y75		
Data download	110	·		·			
Card ID:			-		Card ID:		
Card ID:	406		-		Log file Present?		



# Site 35 Location A





Site Name: 35 B	Project Name	2021 Riverbend
Biologists: E. Merrill,	A. Grorbel, M. Zollar	Date: 06/27/2021
Location Information:		, ,
state: Michigan	county: Sanilac	Datum/Format: NAD 83/D.D
Latitude: 43.18133°	Longitude: <u>-82.72872°</u>	UTC: <u>-4</u>
Site Description: Shooting al	long tree row/next	to Creck
Habitat being sampled Riparian Field	l Edge Open Field Bottomland Forest Uplar (circle one)	nd Forest Pond Other
Deployment Information:	-6	
Detector #: \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	ne #: Directional PVC present?	: <u>No</u>
Mic Height (m): 3 Mic Inclinat	cion: Mic Azimuth: _ 190°	_
Firmware: 2.3.1 Input G	req: 384kHz Min. Dur.: 1.5 ms iter: On Max Dur.: none iain: 0 of 12 db Trig Freq: 16kHz  (circle one)  Tel due to the remove	Trig. Window 3 sec  Max Length: 5 Sec
Ornoekt.		
Property.		
Photos: Detection area:	Site: Mic orientation: M	
8	Shall Wood District Cheek	Srown Rd.



Site Name:	35B				Project Name :	2-21 R	10 er Jene
Biologists:	E.Mo	Iluv		<u> </u>		Date:	7/1/21
Detector: (circle one)	18			Detector Status:	N:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector location	n/orientation ch	ange? if so, how?:	N-	_		_	
If detector has moved, bee	n tampered wit	h, knocked over, o	r changed orientat	ion then take phot	os before picking u	р.	
Weather conditions			*Weather data (sou		checked and entered	l below prior to pick	up.
-		1	2	3	4	5	6
	Date	Lo/27/21	6/28/21	6/29/21	6/30/21		
	Start time	2045	2045	2045	2045		
	End time	0607	0624	0625	0625		
•		Do any of	the following cond	itions apply to the	first 5 hours of sam	pling? (Y/N)	
Temp. beld	pw 10°C(50°F) ?	No	No	No	No		
>9m/	h wind speeds?	No	No	No	No		
>30 min	of precip./fog?	No	No	No	No	==1	
			*if YE	S to any of the cond	itions, resample the	night.	
Was the n	ight successful?	1/15	YES	115	725		
Data download					•		
Card ID:	22				Card ID:		
Log file Present?	Yw	5	-		Log file Present?		



Site 35 Location B





Site Name: 36 A	Project Name: _	2021	Riverbend
Biologists: E. Merrill, R. Fitzpatrick		С	Date: 7/14/21
Location Information:			
State: Michigan County:_	Sanilac	Datum/For	mat: <u>NAD 83/D.D</u>
Latitude: 43./6 888 Longitude	-082.72576	l	JTC: <u>-</u> 4
Site Description: Shading along	forested le	and	soybean
- held	, 		
Habitat being sampled: Riparian rield Edge open Field  Deployment Information:	Bottomland Forest Upland I	Forest Pond	Other
Detector #: 7] Microphone #: 49	Directional PVC present?: _	no	
Mic Height (m): 3 Mic Inclination:	Mic Azimuth:O		
User Profile/Settings:     Samp. Freq:     384kHz       WA SM4BAT FS     SMM-U2     HP-Filter:     On       Firmware:     2.3.1     Input Gain:     0 or (2)db       Comments:	Min. Dur.: 1.5 ms Max Dur.: none Trig Freq: 16kHz	Trig. L Trig. Wind Max Len	dow 3 sec
Photos: Detection area: (x ) Site: (X)	Mic orientation: (X)		
fonded P	3 Pean	S	^ \



Site Name:	36	A		-	Project Name :	2021 R	verbend
Biologists:	E. Merc	III, R.Fitz	patrick			Date:	7/18/21
Detector: (circle one)	71		•	Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector location	n/orientation ch	ange? If so, how?:	No				
If detector has moved, bee	en tampered wit	h, knocked over, o	r changed orientat	ion then take phot	os before picking u	р.	
Weather conditions	ı		*Weather data (sou	•	checked and entered	l below prior to picku	ip.
-		1	2	3	4	5	6
	Date	7/14/21	7/15/21	7/16/21	7/17/21		
	Start time	2039	2038	2038	2037		
	End time	0000	0636	0637	0638		
	1	l	the following cond	litions apply to the	first 5 hours of sam	ipling? (Y/N)	
Temp. belo	ow 10°C(50°F) ?	N	N	N	N		
>9m/	h wind speeds?	N	N	N	N		
>30 min	of precip./fog?	N	N	N	N		
-	-		*If YE	S to any of the cond	itions, resample the r	night.	
Was the ni	ight successful?	Y	У	ly	y		
Data download		·		1	1		
Card ID:	29		•		Card ID:		
Log file Present?	YES				Log file Present?		



**Site 36 Location A** 





Site Name;	36	B		Proje	ect Name:	2021 Rivert	end
Biologists.	E.Merrill	, R. Fitzpa	trick			Date:	1/14/21
Location Information:							
State:	Michigan		County: _	Sarilac		Datum/Format: NA	D 83/D.D
	. •	10	Longitude:	082.7274	2	UTC: <u>-4</u>	
Site Description:	Shooty	can fiel	d	eline convi	eding	forested	[ofs.
Habitat being	sampled: Ripa	rian Eield Edge		Bottomland Fores	t Upland Fo	rest Pond Othe	r
Deployment Information  Detector #:		Microphone #:	75	Directional PVC	present?:	no	
Mic Height (m):	<u>3</u> ,	lic Inclination: _	0	Mic Azimuth:	1		
User Profile/Settings:  WA SM4BAT FS Firmware:  Comments:		Samp. Freq: HP-Filter: Input Gain:	384kHz On O or 12 db (circle one)	Min. Dur.: Max Dur.: Trig Freq:	none	Trig. Level Trig. Window Max Length:	12db 3 sec 5 Sec
Photos: Detection area:	(x)	Site:	(x)	Mic orientation:	(x)		
	Contract of the second of the	3	of Say	Joean for	211	1 N	ROCK



Site Name:36	B		_	Project Name :	2021 R	iverbend
Biologists: E. Mecci	11, R. Fitz	patrick			Date	7/18/
Detector: 44		_	Detector Status	s: ON:Armed	ON:Triggered	OFF: Dea
Reason for OFF:		100				
Did detector location/orientation cha	ange? If so, how?	No.				
tector has moved, been tampered with	n, knocked over,	or changed orienta	tion then take pho	otos before picking u	p.	
ther conditions		*Weather data (so		e checked and entered	d below prior to pic	kup.
	1	2	3	light 4	5	6
Date	7/14/21	7/15/21	7/16/21	7/17/21	11	
Start time	2039	2038		2037		
End time	0635	0636	0637	0638		
	Do any of	the following cond	litions apply to the	first 5 hours of sam	pling? (Y/N)	
Temp. below 10°C(50°F) ?	N	N	N	N		
>9m/h wind speeds?	N	N	N	N		
>30 min of precip./fog?	N	N	N	N		
		*If YE	S to any of the con	ditions, resample the r	night.	
Was the night successful?	<u> </u>	У	y	V		
download		/	,	1		
Card ID: 45 Log file Present? YCS		-		Card ID:		
Log file Present?		_		Log file Present?_		



Site 36 Location B





Site Name: 37 A	Project Name: 2021 Riverbend
Biologists: A. Goebel, E. Merrill,	
Location information:	
State: Michigan cou	inty: Sanilac Datum/Format: NAD 83/D.D
Latitude: 43. 16470 Longit	ude: -82.79249° UTC: -4
Site Description: Planted Pine fores	it with large pond and great
foraging areas surrounding	1.
Habitat being sampled: Riparian Field Edge Open I	Field Bottomland Forest Upland Forest Pond Other (circle one)
Deployment Information:	
Detector #: <u>63</u> Microphone #: <u>44</u>	Directional PVC present?: No
Mic Height (m): 3 Mic Inclination: 0	Mic Azimuth: 19°
WA SM4BAT FS     SMM-U2     HP-Filter:     On Input Gain:     0 or(12 or Input Gain:       Firmware:     Comments:	Max Dur.: none Trig. Window 3 sec  Trig Freq: 16kHz Max Length: 5 Sec
Photos:  Detection area: (X) Site: (X)	Mic orientation: (X )
Field	7
Planted Pine	A Contract  A Cont



Site Name: 37	4		_	Project Name :	2021	Riverbei				
Biologists:	1-cu11				Date	7/1/21				
Detector: 63	<u> </u>	_	Detector Status:	ON:Armed	ON:Triggered	OFF: Dead				
Reason for OFF:										
Did detector location/orientation	Did detector location/orientation change? If so, how?:									
If detector has moved, been tampered v	ith, knocked over, o	or changed oriental	tion then take phot	os before picking u	p.					
Marakan Dat.										
Weather conditions	1	*Weather data (sou	urce: NOAA) must be Ni	checked and entered ght	d below prior to pic	cup.				
	1	2	3	4	5	6				
Dat	6/25/21	4/26/21	6/27/21	6/28/21	6/29/21	6/30/21				
Start tim	e <u>-</u>		2045	2045	2045	2045				
End tim		_	0624	0624	0625	0625				
	1	the following cond	litions apply to the	first 5 hours of sam	pling? (Y/N)					
Temp. below 10°C(50°F)	No	No	No	No	No	No				
>9m/h wind speeds	, No	No	No	N.	N-	N.				
>30 min of precip./fog	Yes	Y-65	No	No	No	No				
		*If YE	S to any of the condi	tions, resample the r	night.					
Was the night successful	No	No	475	175	YTS	Y75				
Data download										
Card ID: 50		_		Card ID:						
Log file Present?	5	-		Log file Present?						



# **Site 37 Location A**





Site Name: 37 B		Project Name:	2021 Riverbend
Biologists: A. Goel	sel, E. Merrill, M	Zollars	Date: 06   25   202
Location Information:			
State: Michie	gan Count	v: Sanilac	Datum/Format: NAD 83/D.D
Latitude: 43.164	47 Longitud	e: -82.79200°	UTC: <u>-4</u>
Site Description: Grassy	field empedo	led in the middle	of Pine wood lot
Habitat being sampled: Ri	parian Field Edge Open Fie	Bottomland Forest Upland F	Forest Pond Other
Detector #: 72	Microphone #: 80	Directional PVC present?:	No
Mic Height (m): 3	Mic Inclination:	Mic Azimuth: 192°	
User Profile/Settings:	Samp. Freq: 384kHz	Min. Dur.: 1.5 ms	Trig. Level 12db
WA SM4BAT F5 SMM-U2	HP-Filter: On	Max Dur.: none	Trig. Window 3 sec
Firmware: 2.3.1	Input Gain: 0 or 12 db	Trig Freq: 16kHz	Max Length: 5 Sec
Comments:	,		
Photos:			
Detection area: (X)	Site: (X)	Mic orientation: (X)	
	grassy Field		N
_	Field		1
		marry Planted	
		Area Pine Lot	
7	Planted Pine	Area Wood AB	7
	2.4	teth /	
3	110	A TIE	}
	Lot to know	n Sign open	
NI .	Lot ( Rid	grand	
	61 en/ //	(.)	
	1 5 0 /3	6 6,	
	1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Rantedwood	
Un Eastern	11-11	Time Lot	



Site Name:	370	<u> </u>		_	Project Name :	2021 P	verbend	
Biologists:	E.M	evill				Date:	7/1/21	
Detector: (circle one)	72		-	Detector Status	ON:Armed	ON:Triggered	OFF: Dead	
Reason for OFF:								
Did detector location/orientation change? If so, how?:								
If detector has moved, bee	n tampered wit	h, knocked over, o	r changed orientat	tion then take phot	os before picking u	p.		
Weather conditions			*Weather data (sou		checked and entere	d below prior to pick	к <b>и</b> р. <b> </b>	
-		1	2	3	4	5	6	
	Date	6/25/21	6/26/21	6/27/21	6/28/21	6/29/21	6/30/21	
	Start time			2045	2045	2045	2045	
_	End time		· State of the sta	0C24	3000	9625	0625	
		Do any of	the following cond	itions apply to the	first 5 hours of sam	pling? (Y/N)		
Temp. belo	rw 10°C(50°F) ?	No	No	No	No	No	No	
>9m/l	n wind speeds?	No	Na	No	No	No	N.	
>30 min	of precip./fog?	Y75	Y7-5	No	No	No	No	
_			*If YE	S to any of the cond	tions, resample the i	night.		
Was the ni	ght successful?	Na	No	1/25	Yrs	YTS	773	
Data download					•	•	Ψ	
Card ID: _	52				Card ID:			
Log file Present?_	Y-ES				Log file Present?			



**Site 37 Location B** 





Site Name:		A	Project Name:	2021 Riverbend
Biologists:	6. Merrill	, R. Fitzput	rick	Date: 7/18/21
Location Information:		,		,
	Michigan		ity: Sanilac	Datum/Format: NAD 83/D.D
	43.1834		de: -082.77411	UTC: <u>-4</u>
Site Description:	edge of	ag. field	and forested	lot
	sampled: Riparian	Field Edge Open Fi	eid Bottomland Forest Upland {circle one}	Forest Pond Other
Deployment Information  Detector #:		rophone #: 56	Directional PVC present?:	NA
		Inclination:		
User Profile/Settings: WA SM4BAT F5 Firmware: Comments:	SMM-U2	amp. Freq: 384kHz HP-Filter: On Input Gain: 0 or 12 di (circle one)	Max Dur.: none b Trig Freq: 16kHz	Trig. Level 12db Trig. Window 3 sec Max Length: 5 Sec
<u>Photos:</u> Detection area:	(x)	Site: (X)	Mic orientation: ( x)	
ac;	iveld (		forest	ed let



Site Name:	<u>38                                    </u>	A		_	Project Name :	2021	Riverbero
Biologists:	E. Mer	cill, C.Fit.	zpatrick .			Date:	7/22/20
Detector:(circle ane)	48			Detector Status:	QN:Armed	N:Triggered	OFF: Dead
Reason for OFF:							
Did detector location/o	orientation ch	ange? If so, how?:	No				
If detector has moved, been	tampered wit	h, knocked over, o	r changed orienta	tion then take phot	os before picking u	р.	
Weather conditions	1		*Weather data (so	urce: NOAA) must be Nî	checked and entered	d below prior to pick	up. 
_		1	2	3	4	5	6
	Date	7/18/21	7/19/21	7/20/21	7/21/21		
	Start time	2036	2036	2035	2034		
	End time	0639	0640	0641	Œ42		
		Do any of	the following cond	ditions apply to the	first 5 hours of sam	pling? (Y/N)	
Temp. below	10°C(50°F) ?	N	$\wedge$	$\sim$	$ \mathcal{N} $		ŀ
>9m/h v	wind speeds?	N	$\sim$	N	N		
>30 min of	precip./fog?	N	$\sim$	$\sim$	$\sim$		
_			*If YI	ES to any of the cond	itions, resample the	right.	
Was the nigh	t successful?	<u> </u>	Y	У	Y		
Data download		/	ł	,	(		
Card ID:	23				Card ID:		
Log file Present?	Yes				Log file Present?		



**Site 38 Location A** 





Site Name: 38 B	Project Name: 2021 Riversend
Biologists: E. Merrill, R. Fitzpatrick	Date: 7/18/21
Location Information:	,
State: Michigan County:	Sanilac Datum/Format: NAD 83/D.D
Latitude: 43./8 283 Longitude:	082.77446 UTC: -4
Site Description: eder of at. fuld	and forested lot with ATV
Site Description: edge of af. fuld trail vinning along fuld ar	id enforme Woods
Habitat being sampled: Riparian Field Edge Open Field (	Bottomland Forest Upland Forest Pond Other
Detector #: 9 Microphone #: \( \frac{2}{2} \)	Disastinas I NVS proceeds.
	Directional PVC present?:
Mic Height (m): 3 Mic Inclination: 0	Mic Azímuth: 20
User Profile/Settings: Samp. Freq: 384kHz	Min. Dur.: 1.5 ms Trig. Level 12db
WA SM4BAT F5 SMM-U2 HP-Filter: On	Max Dur.: none Trig. Window 3 sec
Firmware: 2.3.1 Input Gain: 0 or 12 db (circle one)	Trig Freq: 16kHz Max Length: 5 Sec
Comments:	
Photos:	
Detection area: (X) Site: (X)	Mic orientation: (X)
ponefied)	
T A	
N 17	forested 1.t
of field	Casted
at I	+000
2 1 2/	
A	
\ \	
\ \	



Site Name:	<u> </u>	<u>B</u>			Project Name:	<u> 2021  </u>	Kiverbead
Biologists:	E.Mer.	c:11, R.F.	tzpatrick			Date:	7/22/202
Detector:(circle one)	9			Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector location/o	orientation ch	ange? If so, how?:	No				
if detector has moved, been	tampered wit	h, knocked over, o	r changed orientat	ion then take phot	tos before picking u	ip.	
Weather conditions		l	*Weather data (sou	-	checked and entere	d below prior to pick	cup.
_		1	2	3	4	5	6
	Date	7/18/21	7/19/21	7/20/21	7/21/21		
	Start time	2036	2036	2035	2034		
	End time	0639	0640	0641	9642		L
_		Do any of	the following cond	litions apply to the	first 5 hours of san	npling? (Y/N)	
Temp. below	/ 10°C(50°F) ?	N	N	$\Delta \lambda$	1//		
>9m/h	wind speeds?	N	$\sim$		N		
>30 min of	f precip./fog?	N	N	N	N		
_			*If YI	S to any of the cond	ditions, resample the	night.	
Was the nigh	nt successful?	<u> </u>	<u> </u>	У	L Y		
Data download		/	1		/		
Card ID:	28		_		Card ID:		
Log file Present?	YES				Log file Present?		



Site 38 Location B





	Site Name: 39 A	Project Name: 2	021 Riverbend
	Biologists: A. Goebel, E. Merrill, M	Zollars	Date: 06 25/2021
<u>Locat</u>	ion Information:		,
	State: Michigan County:	Sanilac	Datum/Format: NAD 83/D.D
	Latitude: 43. 17094 Longitude:		UTC: <u>-4</u>
	Site Description: Shooting down tree	cow in farm	~ field
	Habitat being sampled: Riparian Field Edge Open Field	Bottomiand Forest Upland Fo	prest Pond Other
Deplo	pyment Information:  Detector #: 65 Microphone #: 82	Directional PVC present?:	No
	Mic Height (m): 3 Mic Inclination:	Mic Azimuth: 82	
User	Profile/Settings:  WA 5M4BAT FS SMM-U2 HP-Filter: On Input Gain: O or (12 db)  Comments:	Min. Dur.: 1.5 ms Max Dur.: none Trig Freq: 15kHz	Trig. Level 12db Trig. Window 3 sec  Max Length: 5 Sec
Photo	Detection area: (X) Site: (X)	Mic orientation: (X)	
	E Wellman Line	Rd.	
7	E Wellman Line		2
Suggestie re		Farm	
1209	Farmeld	Δ	_>
{	Tree Row	3	
	Δ		



	39 A			,	Project Name :	2021 1	<u> Zverben</u>
Biologists:	E. M	onll				Date:	7/1/21
Detector: (circle one)	65			Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector locatio	n/orientation ch	ange? If so, how?:	No				
If detector has moved, bea	en tampered wit	h, knocked over, o	r changed orientat	on then take phot	os before picking u	p.	
Weather conditions			*Weather data (sou		checked and entere	d below prior to pick	tup.
		11	2	3	4	5	6
	Date	6/25/21	6/26/21	6/27/21	6/28/21	6/29/21	6/30/21
	Start time			2045	2045	2645	2045
	End time			0624	0624	0625	0625
•	-	Do any of	the following cond	itions apply to the	first 5 hours of san	npling? (Y/N)	
Temp. bel	ow 10°C(50°F) ?	No	'No	No	No	No	No
>9m/	h wind speeds?	No	No	No	N.	No	No
>30 min	of precip./fog?	Y-75	Y 75	No	No	No	No
			*If YE	S to any of the cond	itions, resample the	night.	
Was the n	ight successful?	No	No	YZIS	YTS	YES	175
Data download						(	
•	56				Card ID:		
Log file Present?	405				Log file Present?		



# Site 39 Location A





Biologists: A	Goebel E. H	Lerrill, M.Z	ollars	Date: C	6 25 20
ocation Information:				_	
State: N	Michigan	County: Sc	anilac	Datum/Format: N	AD 83/D.D
Latitude:	13.17072°	Longitude: — 8	2.77573°	UTC:4	
Site Description:	Shooting C	sown tree	row in fa	rm field	1
Habitat being s	ampled: Riparian Field	Edge Open Field B	ottomland Forest Uplar	nd Forest Pond Oth	er
eployment Information:		===			
_	8 Microphon		Directional PVC present?		
Mic Height (m): _	5 Mic Inclinat	tion: Ø	Mic Azimuth: 284	-	
wa SM4BAT FS Firmware: 2	SMM-U2 HP-Fi	req: 384kHz  ter: On    sain: 0 or (12 db)    (circle one)	Min. Dur.: 1.5 ms Max Dur.: none Trig Freq: 16kHz	Trig. Level Trig. Window Max tength:	12db 3 sec 5 Sec
Comments:					
_		Site: (x) M	ic orientation: (X)		
hotos:					
hotos: Detection area:	E. V	Site: (x) M Vellman Li	ne Rd.	eld	24
hotos: Detection area:	E. V	Site: (x) M Vellman Li		eld	24
hotos: Detection area:	E. V	Site: (x) M Vellman Li	ne Rd.	eld	24
hotos: Detection area:	E. V	Site: (x) M Vellman Li	ne Rd.	eld	24



Site Name:	39P	)		_	Project Name :	2021 7	ZiverSen
Biologists:	EM	and					7/1/2
Detector: (circle one)	08			Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector location	n/orientation ch	ange? If so, how?:	No				
If detector has moved, bee	n tampered wit	h, knocked over, o	r changed orientat	ion then take phot	os before picking L	p.	
Weather conditions			*Weather data (sou	irce: NOAA) must be Nij	checked and entere	d below prior to pick	cup.
		1	2	3	4	5	6
	Date	6/25/21	6/26/21	6/27/21	6/28/21	6/29/21	6/30/21
	Start time			2045	2045	2045	2045
_	End time		_	0624	0624	0625	0625
		Do any of	the following cond	itions apply to the	first 5 hours of san	pling? (Y/N)	
Temp. belo	w 10°C(50°F) ?	No	No	No	$N_o$	No	No
>9m/i	wind speeds?	No	No	No	No	No	No
>30 min	of precip./fog?	Yous	725	No	No	No	Na
			*If YE	S to any of the condi	tions, resample the	night.	
Was the ni	ght successful?	No	No	4-00	YES	TES	Y70
Data download	4				,		
Card ID:	54				Card ID:		
Log file Present?_	YTS				Log file Present?		



## **Site 39 Location B**





Site Name:	40 A			Project Name: _	2021 River	bend
Biologists:	A. Goebel, E. M.	errill, M	1.Zollan		Date: C	x6/25/20
Location Information:						
State:	Michigan	County:	Sanila	С	Datum/Format: N	AD 83/D.D
Latitude:	43.17259°	Longitude:	-82.767	01°	UTC:4	
Site Description:	Shooting along	tight	tree	row in	soybean f	ield
	sampled: Riparian Field Edge		Bottomland (circle one)	Forest Upland	Forest Pond Oth	er
Deployment Information  Detector #:		20	Directions	I PVC present?:	Na	
Mic Height (m):				ith: 4°	100	
User Profile/Settings:	Samp. Freq:	384kHz	Min. D	ur.: 1.5 ms	Trig. Level	12db #
WA SM4BAT FS	SMM-U2 HP-Filter:	On	Max D	ur.: none	Trig. Window Max Length:	3 sec 5 Sec
Firmware:	2.3.1 Input Gain:	(circle one)	Trig Fr	eq: 10kHz	IVIAX LEIIBLII.	3 360
Comments:						
Photos: Detection area:	(x) Site:	(x)	Micorientati	Α.		
11					4	
	Organica Charles	So	ybean	Field		Tree Row Pand
		Fo	reste d	AB Area		



Site Name:	<u>A</u>				Project Name :	2021	Piverbe
Biologists:	$\cdot N$	Jan 1					7/1/24
Detector: 20				Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector location/orienta	tion ch	ange? if so, how?:	No				
If detector has moved, been tampe	red wit	h, knocked over, o	r changed orientat	ion then take phot	os before picking u	p.	
Weather conditions		I	*Weather data (sou		checked and entered	d below prior to pick	cup.
		1	2	3	4	5	6
	Date	6/25/21	6/25/21	6/27/21	6/28/21	6/29/21	6/30/21
Sta	rt time		, <u></u>	2045	2045	2045	2045
En	d time		<u> </u>	0624	0624	0625	0625
		Do any of	the following cond		first 5 hours of san	npling? (Y/N)	
Temp. below 10°C(	50°F) ?	No	N-	No	No	No	Na
>9m/h wind sj	peeds?	No	No	No	$N_{\circ}$	No	No
>30 min of precip	o./fog?	105	1/25	Nh	No	No	No
			*If YE	S to any of the cond	itions, resample the	night.	
Was the night succ	essful?	No	N-	You	425	YTS	725
Data download							
Card ID:	+				Card ID:		
Log file Present?	15				Log file Present?		



## **Site 40 Location A**





Site Name: 40 B		Project Name:	2021 River	bend
Biologists: A. Goebel	E. Merrill, M	1. Zollars	Date: O	6/25/20
Location Information:				
State: Michigan	County:	Sanilac	Datum/Format: N/	AD 83/D.D
Latitude: 43. 17249°	Longitude:	82.76914	UTC: _4	
Site Description: Shooting	down Field	edge in Soyb-	ean Field.	
Habitat being sampled: Riparian (Fig.		Bottomland Forest Upland	Forest Pond Othe	er
Deployment Information:				
Detector #: 47 Microph	one #: 85	Directional PVC present?: _	NO	
Mic Height (m): 3 Mic Inclin	nation:	Mic Azimuth: 45°		
User Profile/Settings:	. Freq: 384kHz	Min. Dur.: 1.5 ms	Trig. Level	12db
WA SM4BAT FS SMM-U2 HP-	-Filter: On	Max Dur.: none	Trig. Window	3 sec
Firmware: 2.3.1 Input	t Gain: 0 or 2 db (circle one)	Trig Freq: 16kHz	Max Length:	5 Sec
Comments:				
Photos: Detection area: (x)	Site: (x)	Mic orientation: (X)		
E	Wellman L	ine Rd.		
R.				Pand
Karok Ch	Sayb	ean Field		
PA STATE OF THE ST				Row
				Tree
		$\xrightarrow{\mathcal{B}_{\Delta}}$		A
	Forested	Area		



Site Name: 40			_	Project Name :	2021 F	giver ben
Biologists:	anill				Date	7/1/21
Detector: (circle one)		_	Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:						
Did detector location/orientation of	Did detector location/orientation change? If so, how?:					
If detector has moved, been tampered wi	th, knocked over, o	r changed orientat	ion then take phot	os before picking u	ıp.	
Weather conditions	1	*Weather data (sou		checked and entere	d below prior to pic	kup.
	1	2	3	4	5	6
Date	6/25/20	21 6/26/21	6/27/21	6/28/21	6/29/21	6/30/21
Start time			2045	2045	2045	2045
End time			0624	0624	0625	0625
	Do any of	the following cond	itions apply to the	first 5 hours of san	opling? (Y/N)	
Temp. below 10°C(50°F) ?	No	Na	No	No	No	Na
>9m/h wind speeds?	No	No	No	No	No	No
>30 min of precip./fog?	Yas	25%	No	No	No	No
		*If YE	S to any of the cond	itions, resample the	night.	
Was the night successful?	No	NLO	475	YES	TS	75
Data download  Card ID:			•	Card ID:		
Log file Present?	<u> </u>			Log file Present?	·	



## **Site 40 Location B**





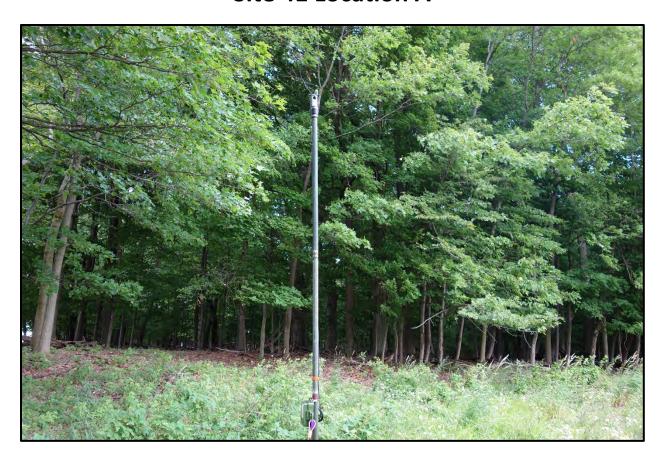
Site Name: 41 A	Project Name: 2021 Riverbend
Biologists: E. Murrill, A. Goebel,	M. Zollars Date: 00/27/2021
Location Information:	
State: Michigan County:	Sanilac Datum/Format: NAD 83/D.D
Latitude: 43.17049 Longitude:	-82.78925° UTC: -4
Site Description: Shooting along for Corn Field	rested wood lot next to
Habitat being sampled: Riparian Field Edge Open Field	Bottomland Forest Upland Forest Pond Other
Deployment Information:	inde die
Detector #: 48 Microphone #: 46	Directional PVC present?: No
Mic Height (m): 3 Mic Inclination: Ø	Mic Azimuth:
User Profile/Settings:     Samp. Freq:     384kHz       WA SM4BAT FS     SMM-U2     HP-Filter:     On       Firmware:     2.3.1     Input Gain:     0 or 12 db       Comments:     Comments:     Comments:	Min. Dur.: 1.5 ms Trig. Level 12db  Max Dur.: none Trig. Window 3 sec  Trig Freq: 16kHz Max Length: 5 Sec
Photos: Detection area: 10 Site: 19  E. Wellman Lin	Mic orientation: 149
N N	千
Corn F	Field
Mood	
LOT 1 P	
A A B	



Site Name: 4			_	Project Name :	2021	Guer Gen
Biologists: ± M	avil				Date	7/1/21
Detector: 48		•	Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:						
Did detector location/orientation cl	nange? If so, how?:	Ne				
If detector has moved, been tampered wi	th, knocked over, o	r changed orientat	ion then take phot	os before picking u	p	
Weather conditions	I	*Weather data (sou	irce: NOAA) must be Nij	checked and entered	l below prior to pict	kup.
	1	2	3	4	5	6
Date	6/27/21	6/28/21	6/29/21	6/30/21		
Start time	2045	2045	2045	2045		
End time	0624	0624	0625	0625		
	Do any of	the following cond	itions apply to the		pling? (Y/N)	
Temp. below 10°C(50°F) ?	No	No	No	No		
>9m/h wind speeds?	No	No	No	No		
>30 min of precip./fog?	No	No	No	No		
		*If YE	S to any of the condi	tions, resample the r	night.	
Was the night successful?	Yes	YTS	YTS	Y-TS		
Data download		·				
Card ID: 27				Card ID:		
Log file Present?				Log file Present?_		



# Site 41 Location A





Site Name:		Project Name: 2021 Riverbend
Biologists:	1. Goebel, E. Mewill, M.Z	ollars Date: 06 27 2
Location Information:		1
State: 1	Tichigan county: Sa	Datum/Format: NAD 83/D.D
	3.17049 Longitude: -83	
Site Description: S	hooting along forester	d edge next to corn
field	3	U
Habitat being sa  Deployment Information:  Detector #:	mpled: Riparian Field Edge Open Field Bott (circle on	e)
Mic Height (m):		rectional PVC present?: No
User Profile/Settings:  WA SM4BAT FS S Firmware: 2.3	Samp. Freq: 384kHz MM-U2 HP-Filter: On	Min. Dur.:         1.5 ms         Trig. Level         12db           Max Dur.:         none         Trig. Window         3 sec           Trig Freq:         16kHz         Max Length:         5 Sec
Photos:  Detection area:	1/4 Site: (A) Mic o	prientation: (b)
	E. Wellman Lin	e Rd
Tivee Row		24
wood Lot	Corn Fie	( 0 )



Site Name:	41 B	<del></del>		_	Project Name :	2021	Ziver Jen
Biologists:	E.M	EVIL					e: 7/1/21
Detector: (circle one)	56		-	Detector Status:	ON:Armed	ON:Triggered	77
Reason for OFF:							
Did detector location	n/orientation ch	ange? If so, how?:	No				
If detector has moved, bee	en tampered wit	h, knocked over, o	r changed orientat	ion then take phot	os before picking u	p.	
Weather conditions			*Weather data (sou	irce: NOAA) must be Nij	checked and entered	d below prior to p	ickup.
_		1	2	3	4	5	6
	Date	6/27/21	6/28/21	6/27/21	6/30/21		
	Start time	2045	2045	2046	2045		
_	End time.	0624	0624	0625	0625		
		Do any of	the following cond	itions apply to the	first 5 hours of sam	noling? (Y/N)	
Temp. beid	ow 10°C(50°F) ?	No	No	No	No		
>9m/	h wind speeds?	No	70	No.	No		
>30 min	of precip./fog?	No	N 2	No	No		
-			*If YE	S to any of the cond	tions, resample the	night.	
Was the ni	ght successful?	175	fcs	YES	Y25		
Data download				•			
POST ADMINISTRA	12						
Card ID: _	10				Card ID:		
Log file Present?	Y25				Log file Present?		



**Site 41 Location B** 





Site Name: 42 A	Project Name: 2021 Riverbend
Biologists: E. Mescill, R. Fitzpatrick	Date: 7/16/21
Location Information:	7.7=1
State: Michigan County: Sar	Datum/Format: NAD 83/D.D
Latitude: 43. 22135 Longitude: 082	8/937 UTC: -4
Site Description: edge of goybam fed	d and dramage ditch forest
Habitat being sampled: Riparian Field Edge Open Field Botto	emland Forest Upland Forest Pond Other
Deployment Information:	
Detector #: 16 Microphone #: 79 Dir	ectional PVC present?:
Mic Height (m): 3 Mic Inclination: 0 Mi	c Azimuth: 172
User Profile/Settings: Samp. Freq: 384kHz	Min. Dur.: 1.5 ms Trig. Level 12db
WA SM4BAT FS SMM-U2 HP-Filter: On	Max Dur.: none Trig. Window 3 sec
Firmware: 2.3.1 Input Gain: 0 o 12db (circle one)	Trig Freq: 16kHz Max Length: 5 Sec
Comments:	
Photos: Detection area: (x) Site: (x) Mic or	rientation: (x)
	nay 1
Corrected City	
/A // Cis	yseans
6 A 50	7
7\ (	
(1)	



Site Name:		_ A			Project Name :	2021 K	iverbend
Biologists:	E. Merri	11, R.Fitz	patrick			Date:	1 /
Detector: (circle one)	16		-	Detector Status:	QN:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector location	n/orientation ch	ange? If so, how?:	No				
If detector has moved, bee	en tampered with	h, knocked aver, o	r changed orientat	ion then take phot	os before picking u	р.	
Weather conditions	ł		*Weather data (sou	,	checked and entered	d below prior to pick	kup.
-		1	2	3	4	5	6
	Date	7/16/21	7/17/21	7/18/21	7/19/21		_
	Start time	2038	2038	2037	2036		
_	End time	9637	9638	9639	0640		
		Do any of	the following cond	itions apply to the	first 5 hours of san	opling? (Y/N)	1
Temp. beld	ow 10°C(50°F) ?	Ν	N	N	N		
>9m/	h wind speeds?	N	N	N	N		
>30 min	of precip./fog?	Ν	N	N	$\sim$		
			*If YE	S to any of the cond	itions, resample the	night.	
Was the n	ight successful?	<u> </u>	1	y	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		
Data download		,	1	/	,		
Card ID:	145				Card ID:		
Log file Present?	Yes				Log file Present?		



Site 42 Location A





Site Name: 42	В		Project Name:	2021 Rivert	pend
Biologists: E.M	escill, R. Fitzp	atrick		Date:	7/16/21
Location Information:					, ,
State: Mick	igan	County:	Socilar	Datum/Format: N	NAD 83/D.D
Latitude: 43	.22348	Longitude:	-082.81952	UTC:	4
Site Description:	ooting ed	er of	forested lot	/corner =	f
forcested lot	/ drawna	se di	tch/edge of	hax fiel	d
		5	, 0		
Habitat being sampled	Riparian Field Edge		Bottomland Forest Upland F	orest Pond Oth	ner
Deployment Information:			Total Control of the		
Detector #: 35	Microphone #:	70	Directional PVC present?:	no	
Mic Height (m): 3	Mic Inclination:	0	Mic Azimuth: //		
User Profile/Settings:	Samp. Freq:	30464	Min Down 15 mm	<b>*</b>	40.11
WA SM4BAT FS SMM-U		384kHz On	Min. Dur.: 1.5 ms Max Dur.: none	Trig. Level _ Trig. Window	12db 3 sec
Firmware: 2.3.1	_ Input Gain: _	0 or 12 db	Trig Freq: 16kHz	Max Length:	5 Sec
Comments:		(circle one)			
Photos: Detection area: (X)	Site:	(X) (	Mic orientation: (X)		
			1		
		300			
forest	ed	VATOR NO.	hay		
ketch site with detector location;	label streams, roads,	and other leatu	ires.		

Site Name:	42	B			Project Name :	2021 K	liver bend
Biologists:(	E. Merc	II. R. Fit	eputrick			Date:	7/20/202
Detector:(circle one)	35		•	Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector location/	orientation cha	ange? If so, how?:	No				
detector has moved, been	tampered with	n, knocked over, or	changed orientat	ion then take phot	os before picking u	p.	
eather conditions	I		*Weather data (sou		checked and entered	below prior to pick	cup.
_		1	2	3	4	5	6
	Date	7/16/21	7/17/21	7/18/21	7/19/21		
	Start time	2038		2037			
	End time	0637	0638	000	0640		
	ı	Do any of	the following cond	itions apply to the	first 5 hours of sam	ipling? (Y/N)	, )
Temp. belov	v 10°C(50°F) ?	N	N	N	$\sim$		
>9m/h	wind speeds?	N	N	N	$\wedge$		
>30 min o	f precip./fog?	N	N	N	$\sim$		
_			*If YE	5 to any of the cond	litions, resample the	night.	
Was the nig	ht successful?	_ <b>y</b>	1	у			
ta download		1	1	/	1		
Card ID:	146				Card ID:		
Log file Present?	YES				Log file Present?		
	*						



Site 42 Location B





Site Name: 43	Α	Project Name:	2021 Riverbend
Biologists: E. Merrill	R. Fitzpatrick		Date: 7/17/2
Location Information:			
State: Michiga	County	: Sanilac	Datum/Format: NAD 83/D.D
Latitude: 43.23	536 Longitude	-082.79603	UTC: -4
Site Description: edge a	of rooded lot a	and age Grad	
Habitat being sampled: Ripa	rian Field Edge Open Field	d Bottomland Forest Upland Fo	prest Pond Other
Deployment Information:			
Detector #: 59	Microphone #: 59	Directional PVC present?:	no
Mic Height (m): 3	Mic Inclination:	Mic Azimuth: 260	
User Profile/Settings:	Samp. Freq: 384kHz	Min. Dur.: 1.5 ms	Trig. Level 12db
WA SM4BAT FS SMM-U2 Firmware: 2.3.1	HP-Filter: On Input Gain: 0 or (12)db	Max Dur.: none Trig Freq: 16kHz	Trig. Window 3 sec  Max Length: 5 Sec
	(circle one)		Wax Length. 3 dec
Comments:			
Photos: Detection area: (X)	Site: (X)	Mic orientation: (X)	
		<b>†</b>	7(
		FIELD	PR
	AG.	FIELL	ES TR
	~ .		14(3
	wooded		,
	101		



Site Name: _	43 1	<u>9-</u>			Project Name :	2021	Kiverteenel
Biologists:	E. Meri	cill, R. Fit	zpatrick			Date:	7/21/25
Detector:	54			Detector Status	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF: _							
Did detector location	orientation ch	ange? If so, how?:	No				
tector has moved, bee				ion then take pho	tos before picking u	p.	
ther conditions		l	*Weather data (sou		e checked and entered	l below prior to pic	cup.
_		1	2	3	ight 4	5	6
	Date	7/17/21	7/18/21	7/19/21	7/20/21		
	Start time	2038	2037	2036	1 1		
	End time	0638	0639	06 40	0641		
_		Do any of	the following cond	litions apply to the	first 5 hours of sam	pling? (Y/N)	
Temp. belo	w 10°C(50°F) ?	N	N	N	$\sim$		
>9m/t	n wind speeds?	N	N	N	$\sim$		
>30 min	of precip./fog?	Ν	N	N	$\wedge$		
_			*If YE	ES to any of the con	ditions, resample the	night.	
Was the ni	ght successful?		Y	<u> </u>	Y		
<u>clownload</u>		1	,				
Card ID:	51		-		Card ID:		
Log file Present?	4-25	•			Log file Present?		



Site 43 Location A





Site Name:	43	B		Project Name:	2021 Riverbend
Biologists:	E. Men	ill, R. Fitzp	atrick		Date: 7/17/21
Location Information:					- / -
State:	Michigo	Λ	County:	Sanilac	Datum/Format: NAD 83/D.D
Latitude: _	43.	23528	Longitude:	-682.79729	UTC: _4
Site Description:	edec	of 47.	field	and worded	(0+
		parian Pield Edge		Bottomland Forest Upland ( circle one)	Forest Pond Other
Deployment Information  Detector #:	8	Microphone #: _	85	Directional PVC present?:	no
Mic Height (m):	3_	Mic Inclination:	0	Mic Azimuth: 276	
User Profile/Settings: WA SM4BAT FS Firmware: 2		Samp. Freq: HP-Filter: Input Gain:	384kHz On 0 or (12)db (circle one)	Min. Dur.: 1.5 ms Max Dur.: none Trig Freq: 16kHz	Trig. Level 12db Trig. Window 3 sec Max Length: 5 5ec
Photos: Detection area:	(X)	Site:	(x)	Mic orientation: (x)	
C C		)	5 Suld	in the state of th	)
A		Maa.	dedlo	+ 73	P



Site Name: <u>43</u>	<u></u>		-	Project Name :	4061	Riverberd
Biologists: E. Mec	rill, R. Fitz	epatrick			Date	7/21/21
Detector:			Detector Status	ON:Armed	N:Triggered	OFF: Dead
Reason for OFF:						
Did detector location/orientation ch	nange? If so, how?:	No				
detector has moved, been tampered wi	th, knocked over, o	r changed orientat	tion then take phot	tos before picking u	p	
Veather conditions	1	*Weather data (sou		checked and entered	l below prior to pi	ckup.
	1	2	3	ght 4	5	6
Date	7/17/21	7/18/21	7/19/21	7/20/21		
Start time	2038	2037	2036	2035		
End time	0638	0639	0640	0641		
	Do any of	the following cond	litions apply to the	first 5 hours of sam	pling? (Y/N)	1
Temp. below 10°C(50°F) ?	N	N	N	//		
>9m/h wind speeds?	N	N	N	$  \wedge \rangle$		
>30 min of precip./fog?	N	N	N	$\wedge$		
	· · · · · · · · · · · · · · · · · · ·	*uf YE	ES to any of the cond	litions, resample the	night	<del></del>
Was the night successful?	<u> </u>	1	Ly	<u> </u>		
ata download	/	1	(	•		
Card ID: 104		_		Card ID:		
Log file Present?		_		Log file Present?		



Site 43 Location B





Site Name:	44	A rescill, R.F		Project Name:	2021 Riverbend
Biologists:	E.N	restill, R.F.	itzpatri	·dc	Date: 7/18/2/
Location Information:			·		,
State:	Mich	مانوهم	County: _	Sanilac	Datum/Format: NAD 83/D.D
Latitude:	43.1	18679	Longitude: _	-082. 76907	UTC: <u>-4</u>
Site Description:	odre	of ar. 1	Gold .	and wooded	lot with trade
runne	+MEUS	h. Near	open	ng to homes	tead trans
		Riparian Field Edge	Open Field	Bottomland Forest Upland (circle one)	
Deployment Information			7/4		00
		Microphone #: _	,		110
Mic Height (m):	3_	Mic Inclination:	0	Mic Azimuth: 190	
User Profile/Settings: WA SM4BAT FS Firmware:		Samp. Freq: HP-Filter: Input Gain:	On	Min. Dur.: 1.5 ms Max Dur.: none Trig Freq: 16kHz	Trig. Level 12db Trig. Window 3 sec  Max Length: 5 Sec
Photos:  Detection area:	(x)	Site:	(x)	Mic orientation: $(X)$	
04	ماه			Garage ,	vooded Fot



Site Name: 44	A		_	Project Name :	2021	Liverberd
Biologists: E. Merri	Il. R. Fitz	atrick			Date	-1 1
	40	-	Detector Status	: ON:Armed	N:Triggered	OFF: Dead
Reason for OFF:						
Did detector location/orientation ch						
If detector has moved, been tampered with	h, knocked over, c	or changed oriental	tion then take pho	tos before picking up	o.	<del></del>
Weather conditions		*Weather data (so		e checked and entered	below prior to pic	kup.
	1	2	3	4	5	6
Date	7/18/21	7/19/21	7/20/21	7/21/21		
Start time	2036	2036	2035	2034		
End time	0439	0640	0641	0641		
	Do any of	the following cond	litions apply to the	first 5 hours of sam	pling? (Y/N)	
Temp. below 10°C(50°F) ?	N	$\sim$	$\mathcal{N}$	$\perp N$		
>9m/h wind speeds?	N	N	N	'W		
>30 min of precip./fog?	N	N	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	$\mathcal{N}$		
		*If Y	ES to any of the cond	litions, resample the n	ight.	
Was the night successful?	У	<u> </u>	<u> </u>	Y		
Data download	1	1	1			<del></del>
Card ID: 34				Card ID:		
Log file Present?				Log file Present?		



**Site 44 Location A** 





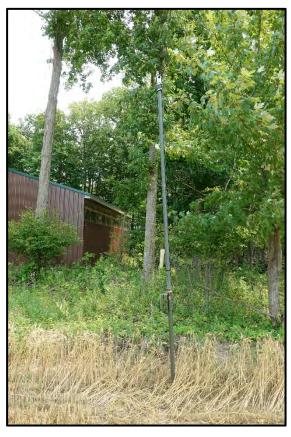
Site Name: 44 B	Project Name: 2021 Riverbend
Site Name: 94 B Biologists: E. Merrill, R. Fitzpatr	ick Date: 7/18/21
Location Information:	17.7.
	ty: Sanilac Datum/Format: NAD 83/D.D
Latitude: 43.18693 Longitud	fe: <u>-082.76908</u> UTC: <u>-4</u>
Site Description: On tage of field	and mooded lot by homeston
Trails removed through	and mooded Let by homestand opening boat
Habitat being sampled: Riparian Field Edge Open Fie	
Deployment Information:  Detector #: 32 Microphone #: 46	Directional DVC research?
Mic Height (m): 3 Mic Inclination: 0	Mic Azimuth: 2
User Profile/Settings:     Samp. Freq:     384kHz       WA SM4BAT FS SMM-U2 Firmware:     2.3.1 Input Gain:     0 or 12 db (circle one)       Comments:     0 or 12 db (circle one)	Max Dur.: none Trig. Window 3 sec.
Photos:  Detection area: (X) Site: (X)	Mic orientation: (X)
N The Cold	tgarast 10t



Site Name:	B		-	Project Name :	2021	Riverbend
Biologists: E. Mer	cill, R.Fitz	e patrick			Date	7/22/20
	52			ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:						
Did detector location/orientation ch	nange? If so, how?:	No				
f detector has moved, been tampered wi	th, knocked over, o	r changed orientat	ion then take phot	os before picking u	р.	
<u>Weather conditions</u>	1	*Weather data (sou		checked and entered	d below prior to pi	ckup.
	1	2	3	4	5	6
Date	7/18/21	7/19/21	7/20/21	7/21/21		
Start time	2036	2036	2035	2034		
End time	0639	06400	De 41	0641		
	Do any of	the following cond	litions apply to the	first 5 hours of san	opling? (Y/N)	
Temp. below 10°C(50°F) ?	N	$\wedge$	N	$\mathcal{N}$		
>9m/h wind speeds?	N	N	$N_{i}$	\ \( \lambda \)		
>30 min of precip./fog?	N	$\sim$	N	N		
		*If Y	ES to any of the cond	itions, resample the	night.	
Was the night successful?	V	<u> </u>	Y	<u> </u>		
Data download	/	r		•		
Card ID: 21		-		Card ID:		
Log file Present?				Log file Present?		



Site 44 Location B





Site Name: 45	A	Project Name:	2021 Riverbend
Biologists: E. Mer	rill, R. Fitzpatrick		Date: 7/18/21
Location Information:			, ,
State: Michig		v: Sanilac	Datum/Format: NAD 83/D.D
Latitude: 43.79		e: -082.76817	UTC: _4
Site Description:	of sweet be	set field and f	arst
Habitat being sampled: R	iparia Field Edge Open Fie	ld Bottomland Forest Upland For	prest Pond Other
Deployment Information:			
Detector #: 56	Microphone #: 76	Directional PVC present?:	NO
Mic Height (m):3	Mic Inclination:	Mic Azimuth:	
User Profile/Settings:	Samp. Freq: 384kHz	Min. Dur.: 1.5 ms	Trig. Level 12db
WA SM4BAT FS SMM-U2 Firmware: 2.3.1	HP-Filter: On Input Gain: 0 or 12 db	Max Dur.: none Trig Freq: 16kHz	Trig. Window 3 sec Max Length: 5 Sec
	(circle one)		Wide Cengui.
Comments:			
Photos: Detection area: (X)	Site: (X)	Mic orientation: (x)	
			1
smeelt	Y	, ,	
Seet		Nooded	
Sweet	/F	B Nooded	
La	^	101	
		$\mathcal{H}$	



Site Name: 45	A		_	Project Name :	2021	Riverbence
Biologists: E. Merc	III, R.F.	tapatrick			Date	7/22/20
_	6	-	Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:						
Did detector location/orientation ch	ange? If so, how?	No				
If detector has moved, been tampered wit	h, knocked over, o	or changed orienta	tion then take phot	os before picking L	ıp.	
Weather conditions		*Weather data (so	urce: NOAA) must be	checked and entere	d below prior to pic	ckup.
	1	2	3	4	5	6
Date	7/18/21	7/19/21	7/20/21	7/21/21		
Start time	2036	2036	2039	2034		
End time	0639	0640	2641	0641		
·	Do any of	the following cond	ditions apply to the	first S hours of san	npling? (Y/N)	
Temp. below 10°C(50°F) ?	N	N		N		
>9m/h wind speeds?	N	N	N	N		
>30 min of precip./fog?	N	N	M	N		
,		*if Y	ES to any of the cond	itions, resample the	night.	
Was the night successful?	V	l y	1	\ \ \		
Data download	/		1	7		<del></del>
Card ID: 33		-		Card ID:		
Log file Present?	· •	-		Log file Present?		



**Site 45 Location A** 





Site Name:	E.Mercill, R.	B	Project Name	2021	2 iverbend
Biologists:	E. Mercill, R.	Fitzpatric	С		7/19/21
Location Information:		•			, ,
State:	Michigan	County:	Sanilac	Datum/Forma	t: NAD 83/D.D
Latitude:	43.19184	Longitude:	-082.76826	<u> </u>	D: <u>-4</u>
Site Description:	eder of gwee	Socot fide	and week	ded lot	where
Black Cre	do estars	vooded Lo			
Habitat being	sampled: Riparian Field		Bottomland Forest Upla	nd Forest Pond	Other
Deployment Information		ď۵			
Detector #:	Microphone	± #:8 <i>O</i>	Directional PVC present	?:	
Mic Height (m):	Mic Inclinati	on:	Mic Azimuth: 5	_	
User Profile/Settings: WA SM4BAT FS Firmware: Comments:	SMM-U2 HP-Filt	eq: 384kHz der: On ain: 0 or 12)db (circie one)	Min. Dur.: 1.5 ms Max Dur.: none Trig Freq: 16kHz	Trig. Levo Trig. Windoo Max Length	w 3 sec
<u>Photos:</u> Detection area:	(x) s	ite: <b>½</b> ) <i>N</i>	Aic orientation: (X)		
Gwest Guld		BLACK	CREX	woodad	12



Site Name:		<u> </u>		_	Project Name :	2021	Riverbend
Biologists:	E.Mera	ill, R.Fitz	epatrick			Date:	7/22/202
Detector: (circle one)		3	<i>.</i> -	Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector location	n/orientation ch	ange? If so, how?:	No				
If detector has moved, bee	n tampered wit	h, knocked over, o	or changed oriental	tion then take phot	os before picking u	p.	
Weather conditions		1	*Weather data (so		checked and entered	i below prior to picki	лр. 
_		11	2	3	4 ]	5	6
	Date	7/10/21	7/19/21	7/20/21	7/21/21		
	Start time	2036	2036	2035	2034		
-	End time	0639	0640	0641	0641		
			the following cond	litions apply to the	first 5 hours of sam	ıpling? (Y/N) I	
Temp. belo	w 10°C(50°F) ?	N	$\sim$	$\Delta \Delta$	N		
>9m/I	wind speeds?	N	N	N	$\mathcal{N}$		
>30 min	of precip./fog?	N	N	N	$\mathcal{N}$		
_			*!f Yi	ES to any of the cond	itions, resample the r	night.	
Was the ni	ght successful?	<u> </u>	<u> </u>	Y			
Data download		/	,	·			
Card ID: _	136	<u> </u>	-		Card ID:		
Log file Present? _	Yes		-		Log file Present?		



Site 45 Location B





Site Name:		A		_	Project Name:	2021 River	bond
Biologists:	E.M	esrill, R.F	itzpati	rick		Date: 1	1
Location Information:						_	41 8/ 33
		18456 of ac				Datum/Format: 1	4
Habitat being  Deployment Information  Detector #:	<u>n:</u>	Riparian Field Edg	2 -	(circle one)	Forest Upland	Forest Pond Oth	ner
Mic Height (m): <u>User Profile/Settings:</u>	_3_	Mic Inclination:		•	th: 276		
WA SM4BAT FS		Samp. Freq: HP-Filter:	On	Min. Du Max Du		Trig. Level Trig. Window	12db 3 sec
Firmware:	2.3.1	Input Gain:	0 or (12 ab	Trig Fre	eq: 16kHz	Max Length:	5 5ec
Comments:	·		(chile one)		<del></del>		
Photos: Detection area:	(x)	Site:	(x)	Mic orientation	on: (X)		
		AG. FIELD					Forestel



Site Name: _	46	A			Project Name :	2021 8	iverbend
Biologists: _	E. Merci	II. C. Eitz	patrick			Date:	7/22/202
Detector:	10.00	17		Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector location			<u>·</u>				
If detector has moved, bee	n tampered wit	h, knocked over, o	r changed orientat	ion then take phot	os before picking u	p.	
Weather conditions			*Weather data (sou		checked and entered	d below prior to pic	kup.
_		1	2	3_	4	5	6
	Date	7/18/21	7/19/21	7/20/21	7/21/21		
	Start time	2037	2036	2035	2034		
	End time	0639	0640	0641	0642		
_		Do any of	the following cond	itions apply to the	first 5 hours of san	pling? (Y/N)	,
Temp. belo	ow 10°C(50°F) ?	N	N				
>9m/l	h wind speeds?	N	$\sim$				
>30 min	of precip./fog?	N	$\sim$				
_			+If YE	S to any of the cond	itions, resample the	night.	
Was the rai	ght successful?		<u> </u>				
Data download		/	ı				
Card ID:	215		_		Card ID:		
Log file Present?	YTS		-		Log file Present?		



**Site 46 Location A** 





Site Name:			Project N	ame: 202	1 Riverbend
Biologists: E.	Merrill, R. F	itzpatr	rick		Date: 7/18/21
Location Information:					
State: Mi	chigan	County:	Sonibe	Datur	m/Format: NAD 83/D.D
Latitude: <u>43</u>	1,18392	Longitude:	-082.79764	<u></u>	UTC: <u>-4</u>
Site Description:			eld and		ol lat
Habitat being sample	ed: Riparian Field Edg	e Open Field	Bottomland Forest (circle one)	Jpland Forest	Pond Other
Deployment Information:					
Detector #: 26	Microphone #:	52	Directional PVC pres	ent?: <u>/\C</u>	<u> </u>
Mic Height (m): 3	Mic Inclination:	0	Mic Azimuth:	<u>`</u>	
User Profile/Settings:  WA SM4BAT FS SMM- Firmware: 2.3.1  Comments:			Min. Dur.: 1.S Max Dur.: no Trig Freq: 16k	ne Trig	Trig. Level 12db g. Window 3 sec ax Length: 5 Sec
Photos: Detection area: (X)	5ite:	(X )	Mic orientation: (x	:)	
AG. FIELD	, , ,		A	old to	ested lot



Site Name: _	46	В		_	Project Name :	2021 8	iverbend
Biologists:	E. Merri	IL R.Fitz	patrick				H22/202
Detector:	2		-	Detector Status:	QN:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector location	orientation ch	ange? If so, how?:	No				
If detector has moved, beer	n tampered with	h, knocked over, c	r changed orientat	tion then take phot	os before picking u	р.	
Weather conditions	I		*Weather data (sou		checked and entered	d below prior to pick	<b>υ</b> ρ.
_		1	2	3	4	5	6
	Date	7/18/21	7/19/21	7/20/21	7/21/21		
	Start time	2037	2036	2035	2034		
_	End time	9639	0640	0641	0642		
		Do any of	the following cond	litions apply to the	first 5 hours of san	npling? (Y/N)	
Temp. belo	w 10°C(50°F) ?	N	$\sim$	N	N		
>9m/h	wind speeds?	N	$\sim$	N	Λ1		
>30 min	of precip./fog?	N	$\sim$	N	N		
			*If Y	ES to any of the cond	litions, resample the	night.	
Was the ni	ght successful?	y	<u> </u>	4	<b>y</b>		
Data downioad		1		(	/		
Card ID: _	49		_		Card ID:		
Log file Present? _	Yos		_		Log file Present?		



Site 46 Location B





Site Name:	47	rill, R. Fit		í	Project Name:	2021 Rivert	pend
Biologists:	E. Me	rill, R. Fit	zpatrick				7/57/21
Location Information:							,
State:	Michig	an 9/9/	County:	Sanilac		Datum/Format: N	AD 83/D.D
						. —	
Site Description:	+dee	of corn	freld o	ind no	oded V		
Habitat being	sampled: Rij	parian Field Edge		Bottomland Fe	orest Upland Fo	rest Pond Othe	er
Deployment Information  Detector #:		Microphone #: _	44	Directional	PVC present?:	<u>no</u>	
Mic Height (m):	_3	Mic Inclination:		Mic Azimut	h: <u>/82</u>		
<u>User Profile/Settings:</u> WA SM4BAT FS Firmware:		Samp. Freq: HP-Filter: Input Gain:	384kHz On 0 or 12)db (circle one)	Max Du	1.5 ms r.: none q: 16kHz	Trig. Level Trig. Window Max Length:	12db 3 sec 5 Sec
Photos: Detection area:	(x)	Site:	(x)	Mic orientatio	n: (x)		
				† c	orn fiz	eld	
		(					



Site Name: 9/	A		-	Project Name :	2021 R	iverbuil				
Biologists: <u>E. Ma</u>	esrill, R. Fis	tepatrick	·		Date: _	7/21/2				
Detector: 47		-		N;Armed	ON:Triggered	OFF: Dead				
Reason for OFF:										
Did detector location/orientation change? If so, how?:										
f detector has moved, been tampered v			tion then take phot	os before picking u	ip.					
<u>Neather conditions</u>	<u>conditions</u> *Weather data (source: NQAA) must be checked and entered below prior to pickup.  Night									
	1	2	3	4	5	6				
Da	te 7/17/21	7/18/21	7/19/21	7/20/21						
Start tin	1e 2037	2036	2036							
End tir	ne 0638	9638	06	0635						
	Do any of	the following cond	litions apply to the	first 5 hours of san	npling? (Y/N)					
Temp. below 10°C(50°F	15 N	N	$\Lambda$	$\sim$						
>9m/h wind speed	s? N	N	$\sim$	$\Lambda$						
>30 min of precip./fo	B? N	N_	N	$\sim$						
		*If YI	ES to any of the cond	itions, resample the	night.					
Was the night successfu	17	<u> </u>	<u>Y</u>	<u> </u>						
Data download	1	I		,						
Card ID: 153	<u> </u>	_		Card ID:						
Log file Present?	?	4		Log file Present?						



**Site 47 Location A** 





# **SM4 Detector Deployment Data Sheet**

Site Name:	47	В		í	Project Name:	2021 R	i verbend
Biologists:	E. Me	will, L.Fitz	ematrick				7/17/21
Location Information:		,	•				
State:	Michig	an 19414	County:	Sanilac		Datum/Format	t: NAD 83/D.D
Latitude:	43.	19414	Longitude:	-082.7	3399	UTC	C: <u>-4</u>
Site Description:	chec	of com	- Field	and m	ooded 1	let	
Habitat being	sampled: Ri	parian Field Edge		Bottomland Fo	prest Upland	Forest Pond (	Other
Deployment Information			2.5				
Detector #:	65	Microphone #: _	22_	Directional (	PVC present?:_	no	
Mic Height (m):	3	Mic Inclination:	0	Mic Azimuth	: 6		
User Profile/Settings:  WA SM4BAT FS Firmware:  Comments:	2.3.1	Samp. Freq: HP-Filter: Input Gain:	On O or 12 db (circle one)	Max Dur	1.5 ms none 1: 16kHz	Trig. Leve Trig. Windov Max Length	v 3 sec
Photos: Detection area:	(x)	Site:	(x)	Mic orientation	n: (x)		
	15	Gold	A L L DOINH		Cova	n IJ	
	Mosc	led for				1	

Sketch site with detector location; label streams, roads, and other features.



Site Name:	Site Name: 4 / B					7051 B	iverbend
Biologists:	Meci	ill, R.Eit	reputrick			Date	7/21/21
Detector:(circle one)	65			Detector Status:	ON:Armed	ON:Triggered	OFF: Dead
Reason for OFF:							
Did detector location/o	orientation cha	ange? If so, how?:	No				
If detector has moved, been	tampered with	n, knocked over, o	r changed orientat	ion then take phot	os before picking L	ıp.	
Weather conditions	ı		"Weather data (sou	rce: NOAA) must be Ni	checked and entere	d below prior to pic	kup.
_		1	2	3	44	5	6
	Date	7/17/21	7/18/21	7/19/21	7/29/21		
	Start time	2037	2036	2036	2035		
_	End time	06 38	0638	0639			
		Do any of	the following cond	itions apply to the	first 5 hours of sar	npling? (Y/N)	1
Temp. below	10°C(50°F) ?	N	N	N	N		
>9m/h 1	wind speeds?	N	N	N	_N_		
>30 min of	precip./fog?	N	N	N	N_		
			*If YE	S to any of the cond	itions, resample the	night.	T
Was the nigh	nt successful?	Y	<u> </u>	L Y	Y		
Data download		1	1	(			
Card ID:	154		-		Card ID:		
Log file Present?	Yes				Log file Present?		



# **Site 47 Location B**





# **SM4** Detector Deployment Data Sheet

48	A		Proje	ect Name: _	2021 Rive	rbend
E. Merri	1. R.Fin	tzpatrick				1 -1
		'			7	
Michigan		County: _	Sanilac		Datum/Format: NA	D 83/D.D
43.2181	0	Longitude:	-082.71	143	UTC: -4	
oder .	f w	soded.	lot and	con	r field	
sampled: Riparia	Field Edge			t Upland	Forest Pond Othe	r
<u>60                                    </u>	rophone #: _	42	Directional PVC	present?:_	No	
<u>3</u> Mic	Inclination:	0	Mic Azimuth:	88		
	Samp, Freg:	384kHz	Min. Dur.:	1.S ms	Trig. Level	12db
SMM-U2	HP-Filter:	On	Max Dur.:	none	Trig. Window	3 sec 5 Sec
2.3.1	mput Gam	(circle one)	ing ried	TOKHZ	iviax tengtii.	3 360
( <sub>X</sub> )	Site:	(X)	Mic orientation:	( X)		
45		Corn	field			
1 3			A-7			
		wood	ed ot	1		
	Michigan  43.2181  sampled: Ripariar  50 Mic  SMM-U2  2.3.1	Michigan  43.218/0  Sampled: Riparian Field Edge  Bit 60 Microphone #:  3 Mic inclination:  Samp. Freq: HP-Filter: Input Gain:	Michigan County:  43.218/0 Longitude:  Sampled: Riparian Field Edge Open Field  Microphone #:  Michigan County:  43.218/0 Longitude:  Sampled: Riparian Field Edge Open Field  Microphone #:  Sampled: Sampled: 384kHz  HP-Filter: On On On 12)db  (circle one)  (x) Site: (x)	Michigan County: Sanilac  43.218/0 Longitude: -082.7/  21c of wooded of and  sampled: Riparian Field Edge Open Field Bottomland Fores (circle one)  Boom Microphone #: 42 Directional PVC  3 Mic Inclination: O Mic Azimuth:  SAMM-U2 HP-Filter: On Max Dur.: Input Gain: 0 or 12 db (circle one)  (x) Site: (x) Mic orientation:	Michigan  County: Sanilac  43.218/0  Longitude: -082.71/43  Sampled: Riparian Field Edge Open Field Bottomland Forest Upland (circle one)  Bit of Microphone #: 42  Michigan  County: Sanilac  Open Field Bottomland Forest Upland (circle one)  Directional PVC present?:  Mic Azimuth: 88  SMM-U2  SMM-U2  HP-Filter: On Max Dur.: none Trig Freq: 16kHz  (x) Site: (x) Mic orientation: (x)  Corn Field  Corn Field  Michigan  County: Sanilac  Directional PVC  Michigan  Michigan  Corn  Michigan  Corn  Michigan  Corn  Michigan  Corn  Michigan  Corn  Michigan  Michigan  Corn  Michigan  Michigan	Michigan  County: Sanilac  Michigan  County: Sanilac  Michigan  County: Sanilac  Datum/Format: NA  43.218/0  Longitude: -082.71/43  UTC: 4  Longitude: -082.71/43  Longitude: -082.71/43  Longitude: -082.71/43  UTC: 4  Longitude: -082.71/43  UTC: 4

Sketch site with detector location; label streams, roads, and other features.



Site Name: 48	A		_	Project Name :	2021	Riverbend			
Biologists: <u>E. Mest</u>	ill, R. Fil	z put (:cK				7/21/202			
Detector: 50		-	Detector Status	: ON:Armed	ON:Triggered	OFF: Dead			
Reason for OFF:						<u></u>			
Did detector location/orientation change? If so, how?:									
If detector has moved, been tampered wi	th, knocked over, o	r changed orientat	tion then take pho	tos before picking u	p.				
Weather conditions		*Weather data (sou		e checked and entered	d below prior to pic	kup.			
	1	2	3	4	5	6			
Date	7/17/21	7/18/21	7/19/21	7/20/21					
Start time	2037	2037	2036	20 35					
End time	0637	0638	0639	9640					
	Do any of	the following cond	litions apply to the	first 5 hours of sam	pling? (Y/N)				
Temp. below 10°C(50°F) ?	N	N	Ν	N					
>9m/h wind speeds?	N	N	N	N					
>30 min of precip./fog?	N	N	N	$\wedge$					
		*If YE	S to any of the cond	litions, resample the r	night.				
Was the night successful?	У	V	Y	$\sqrt{}$					
Data download	I	1	,						
Card ID: 156				' Card ID:					
Log file Present?				Log file Present?					



Site 48 Location A





# SM4 Detector Deployment Data Sheet

Site Name:	48 B Merrill, R.Fitz,		Project Name	2021 Riverberd
Biologists:	Merrill, R.Fitz,	patrick		Date: 7/17/2/
Location Information:				
State:	1 ichigan	County:	Sanibe	Datum/Format: NAD 83/D.D
Latitude: し	13.21636	Longitude:	082.71203	UTC: -4
Site Description:	dee of wood	ted lot	and covn	Freld
Habitat being sam	pled: Riparian Field Edge		Bottomland Forest Uplan	nd Forest Pond Other
Deployment Information:		(2.1.4.		
Detector #: / 8	Microphone #:	71	Directional PVC present	:NO
Mic Height (m):	3 Mic Inclination:	0	Mic Azimuth: 267	
User Profile/Settings:  WA SM4BAT FS SM Firmware: 2.3  Comments:		On	Min. Dur.: 1.5 ms Max Dur.: none Trig Freq: 16kHz	Trig. Level 12db Trig. Window 3 sec Max Length: 5 Sec
Photos: Detection area:	(X) Site:	(X) N	fic orientation: $(_{ m X})$	
C	an feld		(A)	A ded lot

Sketch site with detector location; label streams, roads, and other features.



Site Name: 48	В		Project Name: 2021 Riverbend						
Biologists: E. Merr	:11, R.F.	tzpatrick				07/21/202			
Detector: /8		-	Detector Status:	ON:Armed	ON:Triggered	OFF: Dead			
Reason for OFF:									
Did detector location/orientation change? If so, how?:									
If detector has moved, been tampered wit	h, knocked over, o	r changed orientat	tion then take phot	tos before picking u	ıp.				
Weather conditions		*Weather data (sou		checked and entere	d below prior to picku	up.			
	1	2	3	4	5	6			
Date	7/17/21	7/18/21	7/19/21	7/20/21					
Start time	2037	2036	20 36	2035					
End time	0637	0638	0639	0640					
	Do any of	the following cond	litions apply to the	first 5 hours of san	npling? (Y/N)				
Temp. below 10°C(50°F)?	N	N	$\mathbb{N}$	$\wedge$					
>9m/h wind speeds?	N	N	N	$\wedge$					
>30 min of precip./fog?	N	N	N	$\sim$					
	•	*If YE	S to any of the cond	itions, resample the	night.				
Was the night successful?		<u> </u>	LY						
Data download	i	1	ſ						
Card ID: 5	>			Card ID:					
Log file Present?				Log file Present?					



Site 48 Location B





# **SM4 Detector Deployment Data Sheet**

Site Name: 49	7 A		Proje	ect Name:	2021 Rivert	rend
Biologists: E. Me	errill, R. Fitzpa	trick			Date:	
Location Information:						1 1
State: M; ch;		County: _	Sanilac		Datum/Format: N	AD 83/D.D
Latitude: 43.	21045	Longitude: _	-082.77	933	UTC:4	
Site Description: Bhoo-	The along +	reelme	adjace	nt to	frestal	lot,
Habitat being sampled:	Riparia Field Edge	Open Field	Bottomland Forest	t Upland Fo	rest Pond Oth	er
Deployment Information:	1	10				
Detector #: //	Microphone #:	19	Directional PVC	present?:	no	
Mic Height (m):	Mic Inclination:	0	Mic Azimuth:	180		
User Profile/Settings:	Samp. Freq:	384kHz	Min. Dur.:	1.5 ms	Trig. Level	12db
WA SM4BAT FS SMM-U2 Firmware: 2.3.1	2 HP-Filter:	On 0 or (12) db	Max Dur.: Trig Freq:	none	Trig. Window Max Length:	3 sec 5 Sec
		(circle one)	mg ried	TOKITZ	IVIAX LEIIBLII.	3 360
Comments:						
Photos: Detection area: (X)	Site:	(x)	Mic orientation:	(x)		72.00
			-1_		frest	
				A) (	1	
				1 Jen	3 1	
		011		7.7	J [V	
	a	s, ful		(r)		
				e		
Mr.				11		
				1		
10				15		4 4
						1111
				) /		
M. Taranta and A. Caranta and A. Car				//		

Sketch site with detector location; label streams, roads, and other features.



Site Name:	49	A		_	Project Name :	2021	Riverberd			
Biologists:	E. Mer	cill, R.F.	tzpatrick	·			7/22/202			
Detector: (circle one)			-		: ON:Armed	ON:Triggered	OFF: Dead			
Reason for OFF:						<u> </u>				
Did detector location/orientation change? If so, how?:										
If detector has moved, bee	If detector has moved, been tampered with, knocked over, or changed orientation then take photos before picking up.									
Weather conditions	1		*Weather data (sou		checked and entered	l below prior to pi	ckup.			
-		1	2	3	4	5	6			
	Date	7/18/21	7/19/21	7/20/21	7/21/21					
	Start time	2037	2036	2035	2034					
_	End time	0639	0640	9641	0641					
		Do any of	the following cond	litions apply to the	first 5 hours of sam	pling? (Y/N)				
Temp. belo	ow 10°C(50°F) ?	_N	N	Ν	$\Delta$					
>9m/	h wind speeds?	N	N	N	N	_				
>30 min	of precip./fog?	N	N N	N	N					
-			*If YE	S to any of the cond	litions, resample the r	ilght.				
Was the ni	ght successful?	У	<u> </u>	<u> </u>	У					
Data download	_	1		•	'					
Card ID: _ Log file Present? _	203	3			Card ID:					
Log file Present?	Y05		-		Log file Present?					



Site 49 Location A





# SM4 Detector Deployment Data Sheet

Site Name:	49	B_		f	Project Name: _	2021	River k	penal
Biologists:	E. Merc	: 11 , R. Fitz	patrick			-	Date:	_ / /
Location Information:		,						, • .
Latitude:	43.2	209/6	Longitude	-082	77919		ormat: <u>NA</u> UTC: <u>-4</u>	
Site Description:	exce	of treel	lne a	nd as	Reld,	5he	ating	+on m
Habitat being s	sampled: Rip	parian Field Edge		Bottomland Fo	prest Upland I	Forest Poi	nd Othe	r
Deployment information  Detector #: _  Mic Height (m): _	44	Microphone #:_	75		PVC present?: _ n: <u>190</u>			
User Profile/Settings:  WA SM4BAT FS Firmware: 2  Comments:		Samp. Freq: HP-Filter: Input Gain:	On		1.5 ms :: none q: 16kHz	Trig. W	. Level /indow .ength:	12db 3 sec 5 Sec
Photos: Detection area:	(x)	Site:	(x)	Mic orientation	n: (X)			
T-	whe	The state of the s	)				7	
	azh	eld EN		DRALZAGE	con	hel	d	

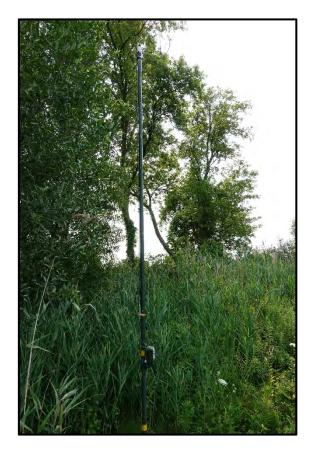
Sketch site with detector location; label streams, roads, and other features.



Site Name:	<u> </u>	-	<del>_</del>	Project Name :	2021	Riverbend			
Biologists: E.Mer	rill, R.F.	tzpatrick			Date	7/22/202			
Detector: 44	<u></u>	-	Detector Status:	ON:Armed	ON:Triggered	OFF: Dead			
Reason for OFF:									
Did detector location/orientation change? If so, how?:									
If detector has moved, been tampered wi	th, knocked over, c	r changed orienta	tion then take phot	tos before picking u	p.				
Weather conditions	1	*Weather data (so	•	checked and entered	d below prior to pic	:kup.			
	1	2	3	4	5	6			
Date	7/18/21	7/19/21	7/20/21	7/21/21					
Start time	2037	2036	2030	2034					
End time	000	0640	0641	0641					
	1	the following cond	ditions apply to the	first 5 hours of sam	pling? (Y/N)	1			
Temp. below 10°C(S0°F) ?	<u> </u>	N	N	$\Delta$					
>9m/h wind speeds?	N	N	N	Δı					
>30 min of precip./fog?	N	L N	N	\					
		*If Y	ES to any of the cond	itions, resample the	night.				
Was the night successful?	· Ly	<u> </u>	<u> </u>						
<u>Data download</u>	/	1	ı						
Card ID: 38				Card 1D:					
Log file Present?	<u>,                                     </u>	-		Log file Present?					



Site 49 Location B





Appendix D: Echolocation Call Review – Janet Tyburec

# Janet Debelak Tyburec

**Bat Survey Solutions, LLC** 

Cell/Text: (520) 404-7406

jtyburec@batsurveysolutions.com

7 September 2021

# Echolocation Call Review

Myotis septentrionalis and M. sodalis AutoID Classifications
Results of Manual Vetting

An acoustic survey for bats was conducted in June/July 2021 in Michigan using Wildlife Acoustics full-spectrum bat detectors. The results of this survey included five (5) recordings at one site identified with an MLE for probable presence for the federally endangered Indiana myotis (Myotis sodalis) by the Wildlife Acoustics bat call classification program Kaleidoscope Pro. This software additionally identified four (4) recordings from two additional sites as probable for occurrence of the federally threatened northern long-eared myotis (M. septentrionalis). I have manually reviewed these nine (9) recordings and have determined none of them had any archetypical species characteristics for either of these species, nor for any Myotis species in general. No mitigation for either the federally endangered Indiana myotis or the federally threatened northern long-eared myotis is warranted from analysis of this acoustic survey.

My manual review was conducted by viewing and playing the recordings using both the SonoBat and Kaleidoscope software programs. This revealed that eight (8) of the recordings were in fact either commuting, approach- or inspection-phase call sequences from *Lasiurus borealis* (eastern red bat). The one (1) remaining recording was a typical clutter- or edge-habitat echolocation call from *Eptesicus fuscus* (big brown bat). My file-level Manual Identification (ID) results for these nine (9) recordings appear in Table 1, and includes certain AutoID metrics generated by the KaleidoscopePRO (version 5.4.3) classification algorithm. Spectrographs for each recording, accompanied by a short narrative describing the reasons for over-ruling the computer-generated ID, appear in Figures 1-9. My review is based upon thirty years of experience recording bat echolocation, including work with all *Myotis* species in the eastern U.S. Please see the attached vitae for a summary of my qualifications to provide this type of opinion.

Table 1. File-level Results of KaleidoscopePRO AutoID and Manual Vetting

FILES WITH A MYOTIS SEPTENTRIONALIS, NORTHERN LONG-EARED MYOTIS, AUTOID										
FILENAME	AUTO ID	PULSES	MATCH	RATIO	MANUAL ID	COMMENTS				
S4U11109_20210630_035558	MYOSEP	5	3	0.6	LASBOR	approach-phase call type				
S4U11101_20210630_040230	MYOSEP	4	2	0.5	LASBOR+LASBOR	two bats in file; approach-phase call type; low match ratio				
S4U10922_20210717_025858	MYOSEP	4	2	0.5	LASBOR	approach-phase call type; low match ratio				
S4U10922_20210718_232623	MYOSEP	5	2	0.4	EPTFUS	typical clutter- or edge-type search phase; diffuse echo; low match ratio				

FILES WITH A MYOTIS SODALI	s, Indiana	MYOTIS, A	ЛитоID			
FILENAME	AUTO ID	PULSES	MATCH	RATIO	MANUAL ID	COMMENTS
S4U11087_20210719_211610	MYOSOD	10	1	0.1	LASBOR	approach-phase call type; very low match ratio
S4U11087_20210719_213045	MYOSOD	11	2	0.182	LASBOR	archetypical search-phase; very low match ratio
S4U11087_20210719_213335	MYOSOD	8	1	0.125	LASBOR	archetypical search-phase; very low match ratio
S4U11087_20210719_213407	MYOSOD	8	3	0.375	LASBOR	archetypical search-phase; very low match ratio
S4U11087_20210719_214509	MYOSOD	11	1	0.091	LASBOR+LowF	two bats in file; approach-phase call type; very low match ratio

NOTES: AutoID decisions generated by KaleidoscopePRO (v5.4.3); Pulses indicate the number of echolocation call pulses in the recording that contributed to the AutoID decision; MATCH indicates how many of the pulses in the recording that "matched" the AutoID decision; RATIO indicates the ratio of pulses matching the AutoID decision (in general, a match ratio greater than or equal to 0.66 and for at least 8 "matching" pulses is considered to be a "confident" AutoID decision; match ratios less than that are equivalent to a "flip of a coin" between other AutoID decisions at the pulse level); COMMENTS include reasons for rejecting the AutoID decision

#### AUTOID'D MYOTIS SEPTENTRIONALIS, NORTHERN LONG-EARED MYOTIS (MYOSEP) RECORDINGS

Figure 1. Lasiurus borealis (LASBOR, eastern red bat), approach-phase call sequence.

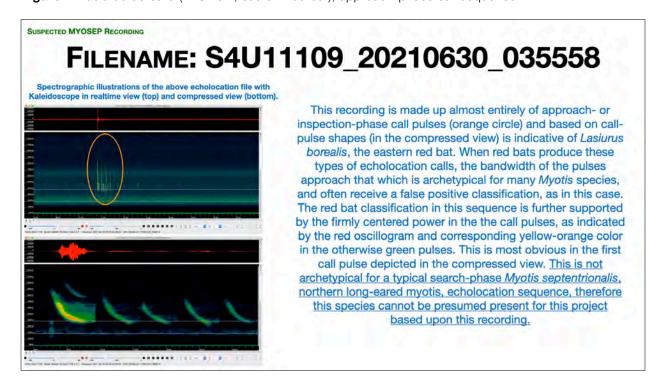


Figure 2. Two Lasiurus borealis (LASBOR, eastern red bat), approach-phase call sequences.

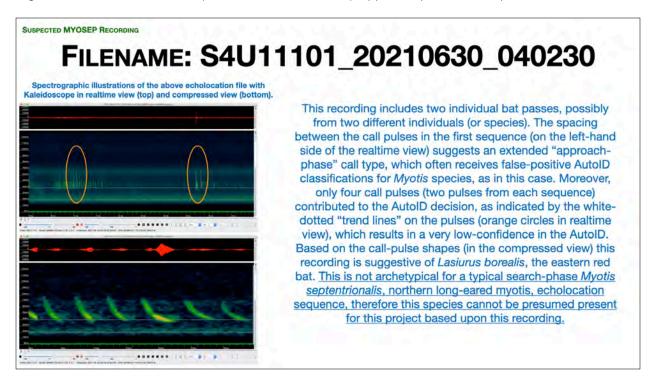


Figure 3. Lasiurus borealis (LASBOR, eastern red bat), approach-phase call sequence.

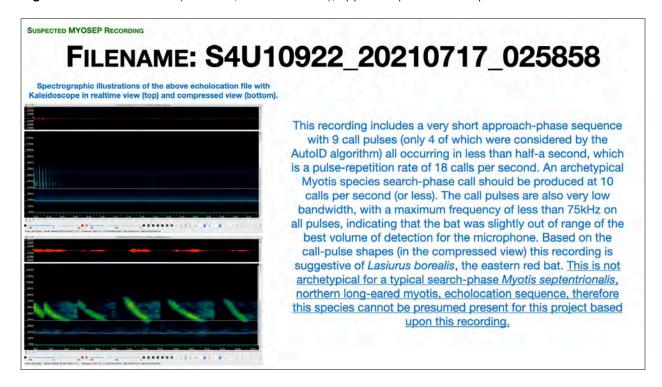
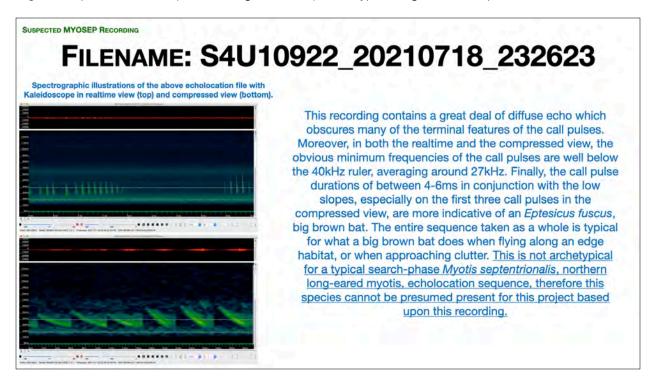


Figure 4. Eptesicus fuscus (EPTFUS, big brown bat), archetypical edge/clutter sequence.



#### AUTOID'D MYOTIS SODALIS, INDIANA MYOTIS (MYOSOD) RECORDINGS

Figure 5. Lasiurus borealis (LASBOR, eastern red bat), approach-phase call sequence.

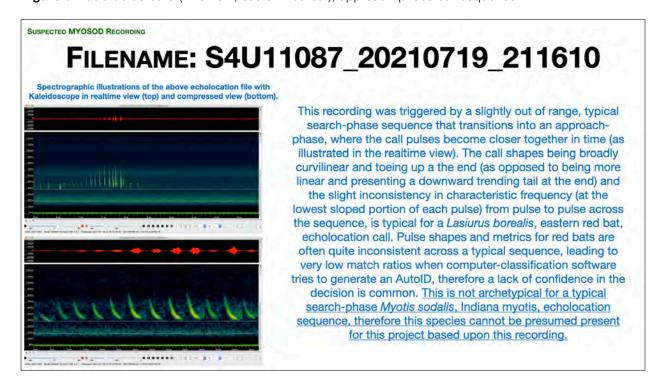


Figure 6. Lasiurus borealis (LASBOR, eastern red bat), archetypical search-phase call sequence.

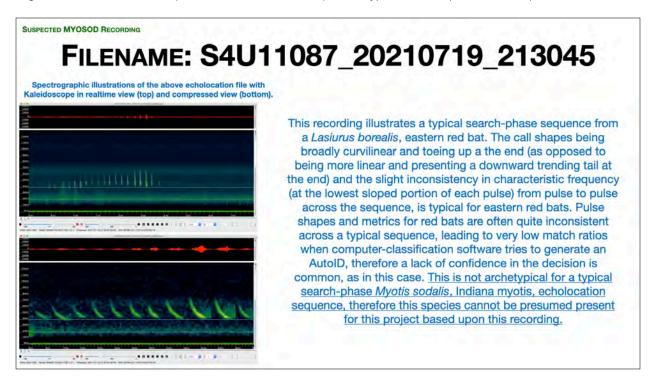


Figure 7. Lasiurus borealis (LASBOR, eastern red bat), archetypical search-phase call sequence.

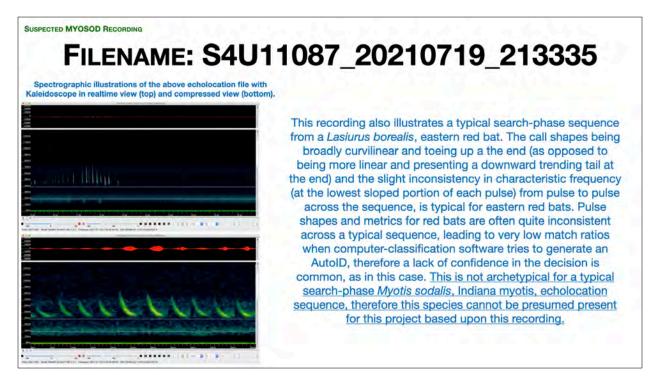


Figure 8. Lasiurus borealis (LASBOR, eastern red bat), archetypical search-phase call sequence.

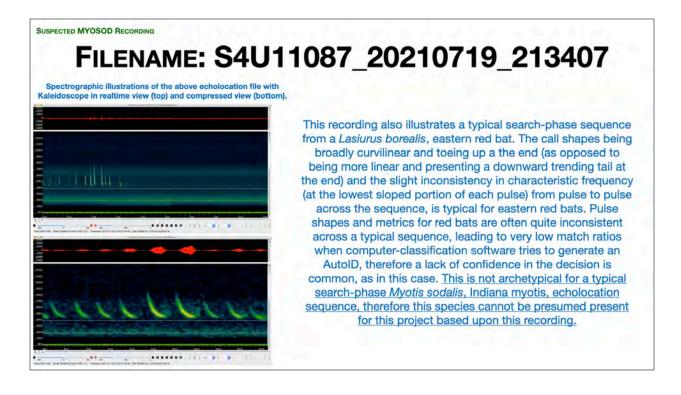
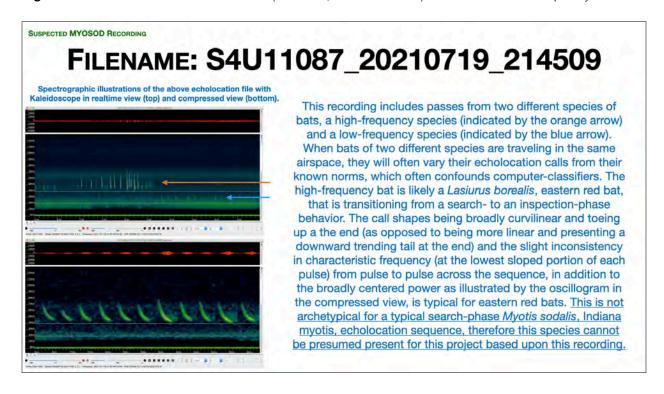


Figure 9. Two bats in file: Lasiurus borealis (LASBOR, eastern red bat) and unknown low-frequency bat.





# WETLAND DELINEATION REPORT RIVERBEND WIND PROJECT

Prepared for

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Atwell Project No. 21003645

# Submitted by Atwell, LLC

August 31, 2022

# **EXECUTIVE SUMMARY**

Atwell, LLC (Atwell) was contracted by Algonquin Power (Riverbend Wind), LLC to complete a wetland delineation and drainage review for the proposed Riverbend Wind Project (hereafter referred to as the "Environmental Study Area"). Riverbend Wind is proposing a wind energy facility within Sanilac County, located within the Lower Peninsula of Michigan. The Environmental Study Area spans approximately 44,523 acres, while the survey corridor used for field studies (hereafter referred to as the "Project Survey Corridor") is approximately 3,847 acres in size.

Atwell conducted a desktop review of aerial photographs, topographic maps, wetland inventory maps, floodplain maps, and county soil surveys for the Environmental Study Area. The desktop review was followed by on-site wetland delineations conducted on the following dates: December 6-9 and 13-17, 2021 and January 3-7, April 4-8 and 11-14, 2022. Atwell conducted on-site and desktop assessments within the areas targeted for development within the Environmental Study Area. The following summarizes Atwell's findings for the Environmental Study Area, which are intended to be taken in context with the complete report and should not be used as a separate document.

Existing land use within the Environmental Study Area consists of cultivated agricultural fields, farmsteads, pasture, fallow field, and rural residences within a network of agricultural drains and roadside ditches that are prevalent throughout the landscape. Forested areas, wetlands, and watercourses are also prevalent.

Atwell biologists delineated 70 wetlands and 196 watercourses within the Environmental Study Area. A wetland is considered regulated by Michigan Department of Environment, Great Lakes, and Energy (EGLE) if it is five acres in size or larger, and/or if it is connected to or located within 500 feet of a lake, pond, river, or stream. It is Atwell's professional opinion that 57 of the identified wetlands meet the requirements of Part 303, Wetlands Protection, of the Natural Resources and Environmental Protection Act, 1994 (NREPA), and should fall under the jurisdiction of EGLE. A Part 303 permit is required for temporary or permanent work within a regulated wetland (e.g. filling, dredging, construction, timber matting, etc.).

The 196 watercourses observed possess a defined bed, banks, and evidence of continued flow or continued occurrence of water. Therefore, these features are anticipated to be regulated by EGLE under Part 301, Inland Lakes and Streams, of the NREPA. A Part 301 permit is required for temporary or permanent work within a regulated watercourse (e.g. filling, dredging, construction, bridges, culverts, etc.).

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Additionally, Atwell conducted a desktop delineation for unsurveyed areas within the Project Survey Corridor and identified 27 wetlands and 45 watercourses. Field surveys will need to be conducted to confirm the location, composition, and regulation status.

Part 31, Water Resources Protection, of the NREPA regulates activities within the 100-year floodplain and floodway of a river, stream, or drain, and within the floodplain of any watercourse with an upstream drainage area of two square miles or larger. A Part 31 permit is required for construction within a regulated floodplain or floodway, including, but not limited to, installation of bridges and culverts. Atwell's review of the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs) for Sanilac County indicates there are no FEMA mapped 100-year floodplains within the Environmental Study Area. Based upon Atwell's desktop drainage review, state regulated floodplains may be associated with 10 watercourses.

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- **B** Wetland Determination Forms

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# **ACRONYMS AND ABBREVIATIONS**

Atwell Atwell, LLC

BFEs Base Flood Elevations

EGLE Michigan Department of Environment, Great Lakes, and Energy

FAC facultative

FACU facultative-upland FACW facultative-wetland

FEMA Federal Emergency Management Agency

FIRMs Flood Insurance Rate Maps

NRCS Natural Resources Conservation Service

NREPA Natural Resources and Environmental Protection Act, 1994 PA 451

NWI National Wetland Inventory

OBL obligate
OW open water

PEM palustrine emergent wetland
PSS palustrine scrub-shrub wetland
PFO palustrine forested wetland
USACE U.S. Army Corps of Engineers

USEPA U.S. Environmental Protection Agency

USFWS U.S. Fish and Wildlife Service

USGS U. S. Geological Service

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# 1 INTRODUCTION

Atwell, LLC (Atwell) was contracted by Algonquin Power (Riverbend Wind), LLC to complete a wetland delineation and desktop-level review for approximately 44,523 acres of the proposed Riverbend Wind Project (hereafter referred to as the "Environmental Study Area"). Riverbend Wind is proposing a wind energy facility within Sanilac County, located within the Lower Peninsula of Michigan. Refer to **Figure 1 – Site Location Map**.

Riverbend Wind proposes to build a wind energy facility that will involve the construction of various wind turbine locations and associated infrastructure including but not limited to permanent access roads, an underground electric collection line system, substation, temporary laydown yard, a temporary haul route, overhead transmission line, and a crane walk.

Atwell's evaluation of the Environmental Study Area focused on targeted areas for development to identify environmental features such as potentially regulated wetlands, watercourses, bodies of water and floodplains. The Environmental Study Area included areas identified through the desktop review as well as on-site identification.

In general, wetlands in Michigan fall under the jurisdiction of the Michigan Department of Environment, Great Lakes, and Energy (EGLE) by Part 303, Wetlands Protection, of the *Natural Resources and Environmental Protection Act, 1994 PA 451 (NREPA)* as amended, and/or the U.S. Army Corps of Engineers (USACE). Watercourses that meet the requirements of Part 301, Inland Lakes and Streams, of the NREPA, and floodplains that meet the requirements of Part 31, Water Resources Protection, of the NREPA, fall under the jurisdiction of the EGLE. USACE wetland participating authority is often associated with the Great Lakes and their connecting navigable waterways (e.g., Section 10 waters) and is authorized by Section 404 of the *Federal Water Pollution Control Act of 1972* (i.e. Clean Water Act). Although the EGLE administers Section 404 of the Clean Water Act, the U.S. Environmental Protection Agency (USEPA) maintains oversight of projects that surpass established criteria. When a project requires federal oversight, the EGLE forwards the permit application to federal agencies such as the USEPA, USACE, and the U.S. Fish and Wildlife Service (USFWS). EGLE does not typically issue permits for projects objected by the USEPA unless specific concerns are resolved.

This report summarizes the natural features found within the Environmental Study Area targeted for development of the proposed facility and associated permits or clearance that may be required prior to the commencement of project activities.

#### 2 SITE DESCRIPTION

The Environmental Study Area spans approximately 44,523 acres in Sanilac County, and is approximately 1.5 miles north of Yale, in the Lower Peninsula of Michigan. The land use within the Environmental Study Area consists primarily of cropland, along with some fallow fields, gravel and paved roads, roadside ditches, overhead distribution lines, and railroad tracks. The Environmental Study Area also contains scattered woodlots, wooded hedgerows, wetlands, and watercourses. Existing development within the Environmental Study Area is largely rural. The topography of the region and the Environmental Study Area is relatively flat to gently rolling, with elevations ranging between approximately 736 feet and 910 feet above sea level. Refer to **Figures 1 and 2**.

Specifically, the Environmental Study Area is located in:

#### **SANILAC COUNTY**

# **Speaker Township:**

Township 09 North, 14 East

Sections 1, 2, 4, 5, 7-10, 12-15, 18,

19, 23-26

# **Fremont Township:**

Township 09 North, 15 East

Sections 1, 2, 6, 7, 9-31, 33-36

#### 3 METHODS

Atwell completed a preliminary desktop review of existing background information for the Environmental Study Area. An extensive review of current and historical background documentation included aerial photographs, U. S. Geological Service (USGS) topographic maps, National Wetland Inventory (NWI) maps, county soil surveys, and Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRMs). This approach is effective for evaluating broader-scale wetland and watercourse systems and identifying potential natural resource constraints prior to on-site assessments to help with project design and reducing and eliminating impacts. The results of this desktop review were used to focus field efforts on regulated or protected natural resources that are likely to occur within the Environmental Study Area. Refer to Figures 1-7.

On-site surveys, including wetland delineations and watercourse documentations were then conducted to locate, verify, or ascertain the probability that protected natural resources were located within the Environmental Study Area. Atwell's knowledge of landscape characteristics, plant identification skills, and desktop review allowed for valid and effective wetland delineations.

#### 3.1 AERIAL PHOTOGRAPH REVIEW

Atwell utilized available Google Earth aerial imagery dated 1985 through 2019 to guide field efforts and outline land cover characteristics within the Environmental Study Area.

#### 3.2 USGS TOPOGRAPHIC REVIEW

The USGS 7.5-minute series Topographic Quadrangles for Brown City, Yale, and Roseburg were reviewed for overall topography, natural features, and additional characteristics of the Environmental Study Area. Refer to **Figure 1 - Site Location Map**.

#### 3.3 WETLAND INVENTORY MAP REVIEW

A review of the NWI maps for Sanilac County was conducted to determine the likely presence, location, size, and type of wetlands that may be located within the Environmental Study Area. The USFWS produces NWI maps through aerial photographic interpretation. Refer to **Figure 2 – Water Resources Map.** 

#### 3.4 COUNTY SOIL SURVEY MAP

The U. S. Department of Agriculture Natural Resources Conservation Service (NRCS) soil data for Sanilac County was reviewed to obtain an overall sense of the soil types likely to be observed within the Environmental Study Area. Refer to **Figure 3 - County Soil Survey Maps**.

#### 3.5 FLOODPLAIN MAP REVIEW

FEMA FIRMs are maps that show floodplain areas along rivers and their tributaries. The maps record the following data: 100-year floodplains (1% chance of annual flooding) and 500-year floodplains (0.2% annual chance of flooding), the base flood elevation, and the risk to premium areas developed across a floodplain. A review of the FEMA FIRMs for Sanilac County was conducted to determine the existence, location, and zone of any 100-year floodplain that may be located within the Environmental Study Area. Atwell also performed a preliminary desktop drainage review to determine if state regulated floodplains are present within the Project Area. Refer to Figure 4 – FEMA Floodplain Map and Figure 5 – Drainage Review Map.

# 3.6 ON-SITE LANDSCAPE ASSESSMENT

An on-site assessment of the Environmental Study Area was conducted to ascertain and verify landscape and land use characteristics. Atwell staff inspected the Environmental Study Area, noting primary and overall land use types, topography, and land cover types. These were compared with topographic map and aerial photographic reviews. Potential environmental challenges or regulatory requirements were noted, if encountered.

#### 3.7 ON-SITE WETLAND ASSESSMENT

Wetlands were identified and delineated utilizing methods prescribed by the USACE 1987 Wetland Delineation Manual and the Regional Supplement to the USACE Wetland Delineation Manual: Northcentral and Northeast Region (USACE 1987; USACE 2012). The delineation of any wetland depends on three basic, interrelated parameters. These parameters are: (1) the presence of hydrophytic vegetation (plants adapted to living in saturated soils), (2) hydric soils (distinctive soil types that develop under saturated conditions), and (3) wetland hydrology (the presence of water at or near the surface for a specific period of time). Wetland boundaries were recorded with a sub-meter GPS unit, which provides a spatial error of less than one meter.

#### 3.8 ON-SITE WATERCOURSE ASSESSMENT

EGLE regulated watercourses were identified and recorded based upon stream morphological characteristics, including (1) the presence of a defined bed, (2) the presence of defined banks, and (3) evidence of continued flow or continued occurrence of water.

#### 3.9 DESKTOP WETLAND AND WATERCOURSE ASSESSMENT

Atwell completed a desktop assessment of additional areas nearby for potential future inclusion in the Environmental Study Area. Google earth aerial interpretation, results of on-site wetland determinations, as well as Sanilac County soil data, NWI, and NHD maps were utilized to

determine whether wetlands and watercourses may be present. Refer to **Figure 7 – Wetland Location Map**.

# 4 RESULTS, FINDINGS, AND DISCUSSION

Atwell conducted on-site assessments of the Project Survey Corridor on the following dates: December 6-9 and 13-17, 2021 and January 3-7, April 4-8 and 11-14, 2022. Representative photographs depicting conditions at the time of the site visits are provided in the Photographic Log in **Appendix A**.

#### 4.1 OVERALL LANDSCAPE AND TOPOGRAPHY

The USGS 7.5-minute series Topographic Quadrangles for Brown City, Yale, and Roseburg, Michigan indicate that elevations within the Environmental Study Area range between approximately 736 feet and 910 feet above mean sea level. The topography of the Environmental Study Area is relatively flat to gently rolling. Land use within the Environmental Study Area consists primarily of cropland and a network of associated agricultural drains and roadside ditches. Existing development within the Environmental Study Area is largely rural residential. There are isolated patches of woodlots in the Environmental Study Area, along with a network of linear wetlands and watercourses. The Environmental Study Area includes numerous gravel and paved roadways that are spread relatively evenly across the entire Environmental Study Area, which allows for easy vehicle access. Railroad tracks are present in the Environmental Study Area as well as existing overhead transmission distribution lines. Nearby towns located outside of the Environmental Study Area include Yale to the south, Croswell to the northeast, and Brown City to the west. Refer to Figure 1 - Site Location Map.

The NRCS soil data for Sanilac County indicate that a number of different major soil series are present within the Environmental Study Area. The soils documented as hydric by the NRCS are depicted on the soil survey maps for Sanilac County. Hydric soils are conducive to the growth of hydrophytic (i.e., wetland) vegetation as a result of their tendency to be wet for extended periods of time (NRCS 2014). The presence of poorly drained and hydric soils suggest wetlands may be present within the Environmental Study Area. The composition of soils within the Environmental Study Area indicates that, historically, wetlands may have been abundant in the region. As a result of agricultural development, natural wetlands have become less prevalent over time. Refer to Figure 3 - County Soil Survey Map.

The on-site assessment revealed that the overall topography within the Environmental Study Area is largely an agricultural landscape with scattered rural residences, woodlots, wooded hedgerows, scrub/shrub areas, fallow herbaceous areas, wetlands, watercourses. Descriptions of each general land cover type within and adjacent to the Environmental Study Area are described below.

#### 4.2 AGRICULTURAL FIELDS/RURAL RESIDENCES

The Environmental Study Area consists primarily of agricultural land. During the on-site assessments agricultural lands consisted of planted and recently harvested fields including, but not limited to, corn (*Zea mays*), soybeans (*Glycine max*), wheat (*Triticum aestivum*), sugar beets (*Beta vulgaris*), and fescue (*Festuca spp.*). Agricultural drains, upland ditches, and hedgerows commonly border and separate individual fields. In addition, rural residences, farmsteads, and associated lawn areas are spread throughout the Environmental Study Area and are often located near roads on agricultural properties or on smaller lots adjacent to agricultural lands.

#### 4.3 OTHER UPLANDS

The upland areas within the Environmental Study Area are a mix of agricultural, fallow, and forested land. Upland areas also include actively maintained utility corridors, hedgerows, ditches, swales, and stream and field margins. Some of the more common herbaceous species in the upland areas such include Kentucky blue grass (*Poa pratensis*), yellow foxtail (*Setaria pumila*), penny-cress (*Thlaspi arvense*), garlic mustard (*Alliaria petiolata*), hairy bittercress (*Cardamine hirsuta*), spring draba (*Draba verna*), and black mustard (*Brassica nigra*). Common upland shrubs and brambles include autumn olive (*Elaeagnus umbellata*), common buckthorn (*Rhamnus cathartica*), gray dogwood (*Cornus racemosa*), and honeysuckle (*Lonicera spp.*). Common upland trees observed include white oak (*Quercus alba*), shagbark hickory (*Carya ovata*), black cherry (*Prunus serotina*), scotch pine (*Pinus sylvestris*), white pine (*Pinus strobus*), red maple (*Acer rubrum*), red pine (*Pinus resinosa*), and bur oak (*Quercus macrocarpa*).

# 4.4 WETLANDS, WATERCOURSES, AND FLOODPLAINS

A total of 70 wetlands and 196 watercourses were documented within the Project Survey Corridor. Of the 70 wetlands, 17 are considered entirely emergent, seven are considered emergent with scrub-shrub components, four are considered emergent with forested components, seven are considered entirely scrub-shrub, two are considered scrub-shrub with forested components, 25 are considered entirely forested, two are considered emergent with scrub-shrub and forested components, and six are considered open water. Of the documented wetlands, 57 features appear to meet the requirements of Part 303, Wetlands Protection, of the NREPA, 1994 PA 451, as amended, and are therefore anticipated to fall under the jurisdiction of EGLE. A wetland is considered regulated by EGLE under Part 303, Wetlands Protection, of the NREPA, as amended, if it is five acres in size or larger, and/or if it is connected to, or located within, 500 ft of a lake, pond, river, or stream. The State definition of a lake, pond, river, and stream is found in Parts 301 and 303 of PA 631 of Public Acts of 2018, amending NREPA, 1994 PA 451.

All 196 watercourses identified possess a defined bed, bank, and evidence of continued flow and/or continued occurrence of water and therefore meet the requirements of Part 301, Inland Lakes and Streams, of the NREPA, as amended. Refer to **Table 1 – Wetland, Watercourse, and Waterbody Summary Table**, **Figure 7 - Wetland Location Map**, and the Wetland Determination Forms in **Appendix B**.

## 4.4.1 EMERGENT WETLANDS

Palustrine emergent (PEM) wetlands were a common wetland type within the Project Survey Corridor due to the agricultural landscape, network of roads and ditches, and maintained conditions of the existing transmission corridor. Of the 70 wetlands, 17 were classified as entirely emergent (Wetlands BB5, C3, DD1, DD2, DD5, EE2, F3, F4, II3, T1-T3, T5, T8, & W1-W3), and an additional 13 wetlands contain emergent components (Wetlands BB2-BB4, F1, F2, F5, H1, L1, M1, P1, P3, T4 & T6). PEM wetlands were observed in various places such as active farm fields, pasture, fallow areas, and riparian areas. Common vegetation observed within the wetlands includes reed canary grass (*Phalaris arundinacea*; FACW), Indian hemp (*Apocynum cannabnum*; FAC), crested sedge (Carex cristatella; FACW), giant goldenrod (Solidago qigantea; FACW), dark green bulrush (Scirpus atrovirens; OBL), willowherb (Epilobium ciliatum; FACW), lakebank sedge (Carex lacustris; OBL), Canada bluejoint grass (Calamagrostis canadensis; OBL), and sensitive fern (Onoclea sensibilis; FACW). Common wetland hydrologic indicators observed within the emergent wetlands include surface water, surface saturation, high water table, sparsely vegetated concave surface, drainage patterns, algal mat, saturation visible on aerial imagery, stunted plants, geomorphic position, and FAC-Neutral test. Common hydric soil indicators observed include depleted below dark surface, depleted matrix, and redox dark surface.

For wetland specific vegetation and indicators, refer to the Wetland Determination Forms in **Appendix B**.

#### 4.4.2 SCRUB-SHRUB WETLANDS

Of the 70 wetlands delineated, seven wetlands were classified as entirely Palustrine scrub-shrub (PSS) (Wetlands DD3, DD7, EE1, HH2, HH4, P2 & T7), and an additional 11 wetlands contain scrub-shrub components (Wetlands B2, BB2-BB4, F1 F5, II2, M1, P1, T4 & T6). Scrub-shrub wetlands tend to have species compositions very similar to emergent wetlands, except with a higher density of shrubs and woody vegetation. Common vegetation observed within the wetlands includes sandbar willow (*Salix interior*; FACW), grey dogwood (FAC), buttonbush (*Cephalanthus occidentalis*; OBL), common buckthorn (FAC), and green ash saplings (*Fraxinus pennsylvanica*; FACW). Common wetland hydrologic indicators observed within the wetlands include surface water, surface saturation, water-stained leaves, geomorphic position, FAC-Neutral test, high

water table, and crayfish burrows. Common hydric soil indicators observed include depleted matrix, redox dark surface, and loamy mucky mineral.

For wetland specific vegetation and indicators, refer to the Wetland Determination Forms in **Appendix B**.

## 4.4.3 FORESTED WETLANDS

Of the 70 wetlands delineated, 25 wetlands were classified as entirely Palustrine forested (PFO) (Wetlands A1, A2, B1, C1, C2, C4, CC1, DD4, FF1, FF2, GG1, HH1, HH3, II4, J1-J3, K1, M2, N1, R1, R2, S1, U1 & Y1), and an additional eight wetlands contain forested components (Wetlands B2, BB4, F1, F2, H1, II2, L1 & P3). Palustrine forested wetlands tended to have species compositions very similar to the delineated PEM and PSS wetlands, except with a higher density of trees. The most commonly encountered woody species in PFO wetlands included green ash, cottonwood (*Populus deltoides*; FAC), box elder maple (*Acer negundo*; FAC), red maple (*Acer rubrum*; FAC), silver maple (*Acer saccharinum*; FACW), quaking aspen (*Populus tremuloides*; FACU), swamp white oak (*Quercus bicolor*; FACW), and pin oak (*Quercus palustris*; FACW). Common wetland hydrologic indicators observed within the wetlands include surface saturation, drainage patterns, water-stained leaves, geomorphic position, and FAC-Neutral test. Common hydric soil indicators observed include depleted matrix, redox dark surface, and redox depressions.

For wetland specific vegetation and indicators, refer to the Wetland Determination Forms in **Appendix B**.

# 4.4.4 OPEN WATER WETLANDS

Of the 70 delineated wetlands, six were classified as open water (OW) (Wetlands BB1, DD6, DD8, DD9, FF3 & II2). OW wetlands observed within the Project Survey Corridor had minimal vegetation and surface water totaling less than one acre. These wetlands often also had PEM and PSS fringe. Emergent vegetation that was observed included sensitive fern, broadleaf cattail (*Typha latifolia*; OBL), and reed canary grass. Scrub-shrub vegetation that was observed included sandbar willow, grey dogwood, musclewood (*Carpinus caroliniana*; FAC). Common wetland hydrologic indicators observed within the wetlands include surface water, surface saturation, high water table, geomorphic position, inundation visible on aerial imagery, FAC-Neutral test, waterstained leaves, moss trim lines, stunted or stressed plants, and sparsely vegetated concave surface. Common hydric soil indicators observed include depleted matrix, sandy mucky mineral, loamy mucky mineral, histosol, and 2 cm muck.

### 4.4.5 DESKTOP DELINEATED WETLANDS AND WATERCOURSES

At this time, field work has not been conducted within some portions of the Environmental Survey Area. These areas have been desktop delineated and will be revisited at a later date prior to EGLE submission. Within these additional areas, Atwell identified 27 wetlands and 45 watercourses. Field surveys will need to be conducted to confirm the location, composition, and regulation status.

# 4.4.6 WATERCOURSES, LAKES, AND PONDS

Watercourses were identified based upon stream morphological characteristics such as presence of a defined bed, banks, and evidence of continued flow or continued occurrence of water. The Project Survey Corridor contains 196 watercourses including crossings of the following named watercourses: Turner Drain, McIntyre & Willing Drain, William Doan Drain, Sheridan Drain, Lawson Drain, Downey Drain, Seymore Creek, Conroy & Ferriby Drain, Willey Drain, Lavell Drain, Black Creek Drain, Rector Drain, Sloat Drain, Potts Drain, Lord Drain, Cline and Kerr Drain, Cork Drain, Solan Drain, Macklem Drain, East Branch Speaker & Maple Drain, Rattray Drain, Wilson Drain, Spring Creek, Hunt Drain, Jackson Creek, Putney Drain, Sanilac and St. Clair Drain, Cole Drain, and 75 unnamed watercourses. The majority of these watercourses are roadside ditches and/or drains created or altered to expedite drainage for agriculture, and generally separate and border agricultural fields. Most of the features were intermittent in nature, 68 were considered perennial with constantly flowing water, and 15 were considered ephemeral. All 196 watercourses are likely regulated under Part 301, Inland Lakes and Streams, of the NREPA, as amended because they display a definitive bed and bank with a regular occurrence of flow. No lakes or ponds were observed within the Project Survey Corridor. Refer to the Table 1 -Wetland and Watercourse Summary Table and Figure 7 - Wetland Location Map for approximate watercourse locations.

#### 4.4.7 FLOODPLAINS

FEMA FIRMs for Sanilac County were reviewed to determine if portions of the Project Survey Corridor lie within mapped floodplains, floodways, or other flood prone areas. According to FEMA FIRM Panels #26151C0567B, #26151C0557B, #26151C0559B, #26151C0560B, #26151C0525B, #26151C0550B, #26151C0425B, and #26151C0570B, FEMA mapped 100-year floodplains were not mapped within the Project Survey Corridor.

A preliminary desktop drainage review was conducted to determine if watercourses with an upstream drainage area of greater than two square miles were present within the Environmental Study area; indicating the presence of a potentially state regulated floodplain. Based on Atwell's preliminary desktop drainage review, there are 10 watercourses with upstream drainage areas larger than two square miles within the Project Survey Corridor: Macklem Drain, East Branch

Speaker and Maple Valley Drain, Downey Drain, Sanilac and Saint Clair Drain, Potts Drain, Bradley Creek, Seymore Drain, Perry Drain, Willey Drain, and Black Creek.

Part 31, Water Resources Protection, of NREPA regulates activities within the 100-year floodplain and floodway of rivers, streams, drains, and watercourses that have upstream drainage areas of two square miles or larger. Temporary crossings of regulated floodplains are generally exempt from permitting if the floodplain will be restored to existing elevations; however, temporary watercourse crossings within a 100-year floodplain or floodway may require a permit from EGLE. Based upon the desktop and on-site assessments, Atwell anticipates that potential 100-year floodplains meeting the requirements of Part 31 of NREPA appear to be present within the Project Survey Corridor. Refer to Figure 4 – FEMA Floodplain Map and Figure 5 – Drainage Review Map for the locations of these features.

## 5 CONCLUSIONS

The Environmental Study Area is situated in an agricultural landscape dominated by cultivated fields, rural residences and farmsteads, and an associated network of agricultural drains and roadside ditches. Woodlots, hedgerows, pasture, wetlands, and fallow areas are also interspersed throughout the Environmental Study Area. Riverbend has carefully selected the proposed locations of turbines, associated access roads, and additional project infrastructure to avoid natural features to the greatest extent practicable. Atwell biologists delineated 70 wetlands and 196 watercourses within the Project Survey Corridor. It is Atwell's professional opinion that 57 of the field-identified wetlands meet the requirements of Part 303, Wetlands Protection, of the NREPA, and should fall under the jurisdiction of EGLE. A Part 303 permit is required for temporary or permanent work within a regulated wetland (e.g. filling, dredging, construction, timber matting, etc.).

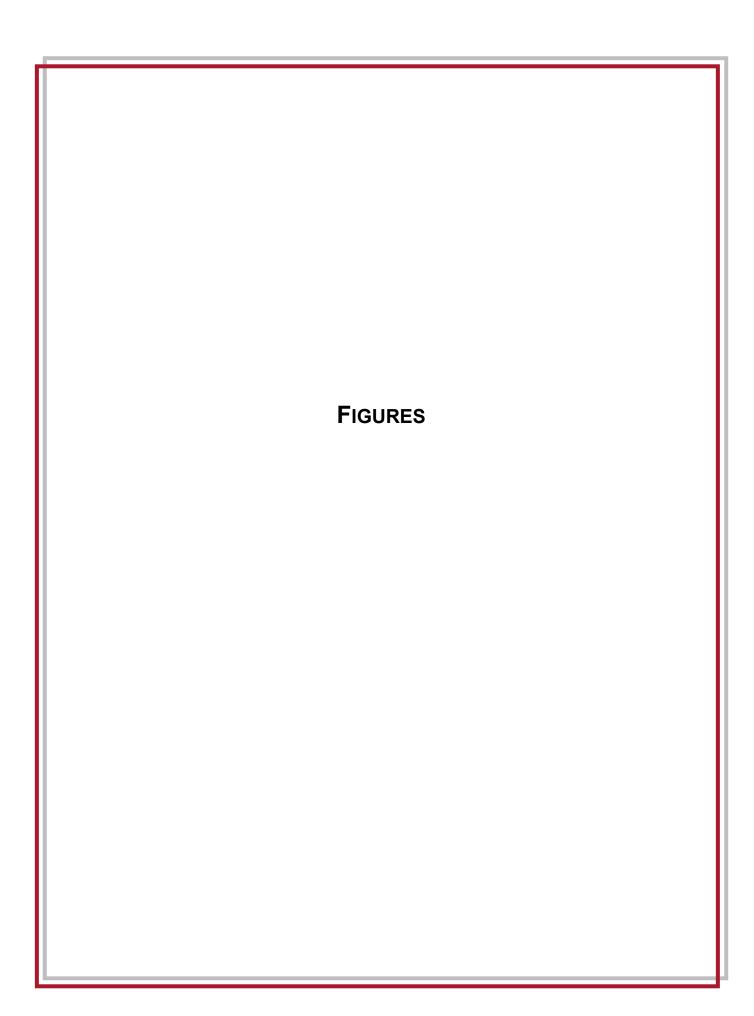
The 196 watercourses observed all possess a defined bed, banks, and evidence of continued flow or continued occurrence of water. Therefore, these features are anticipated to be regulated by EGLE under Part 301, Inland Lakes and Streams, of the NREPA. A Part 301 permit is required for temporary or permanent work within a regulated watercourse (e.g. filling, dredging, construction, bridges, culverts, etc.).

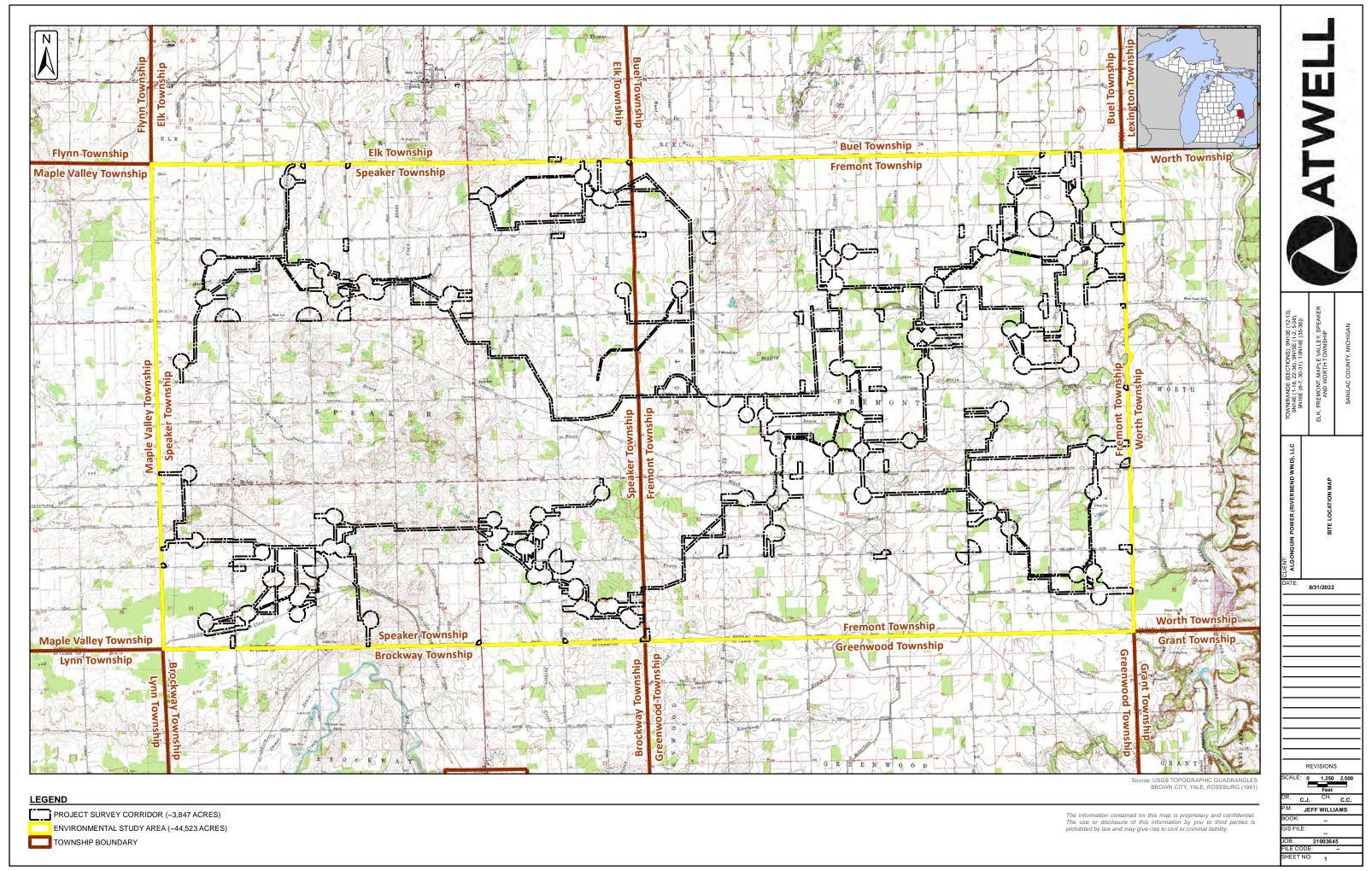
Additionally, Atwell conducted a desktop delineation for unsurveyed areas within the Environmental Survey Area and identified 27 wetlands and 45 watercourses. Field surveys will need to be conducted to confirm the location, composition, and regulation status.

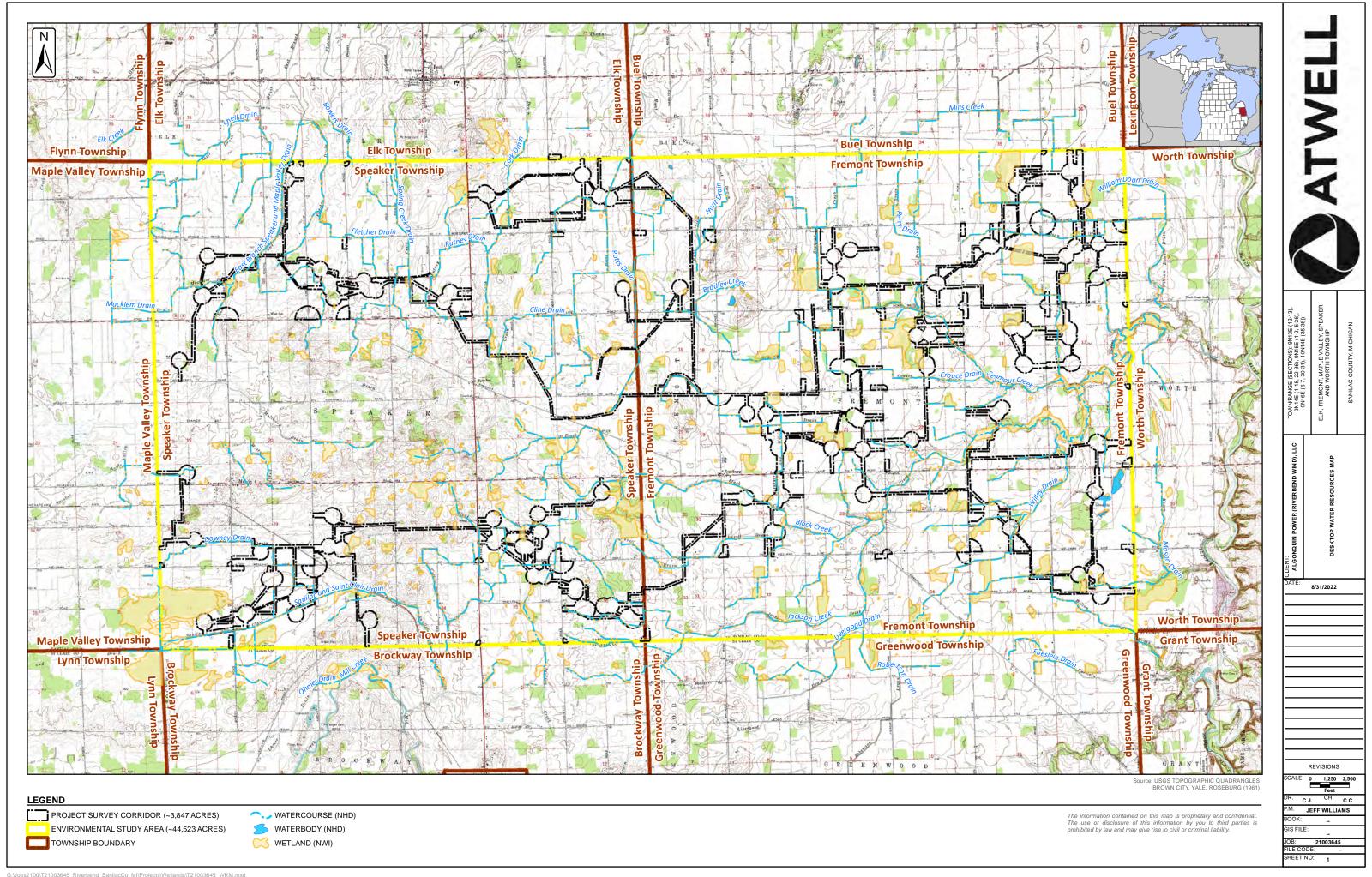
Part 31, Water Resources Protection, of the NREPA regulates activities within the 100-year floodplain and floodway of a river, stream, or drain, and within the floodplain of any watercourse with an upstream drainage area of two square miles or larger. A Part 31 permit from EGLE is required for construction within a regulated floodplain or floodway, including, but not limited to, installation of bridges and culverts. Atwell's review of the FEMA FIRMs for Sanilac County indicates there are no FEMA mapped 100-year floodplains within the Environmental Study Area. However, based upon Atwell's desktop drainage review, state regulated floodplains are likely present within the Environmental Study Area.

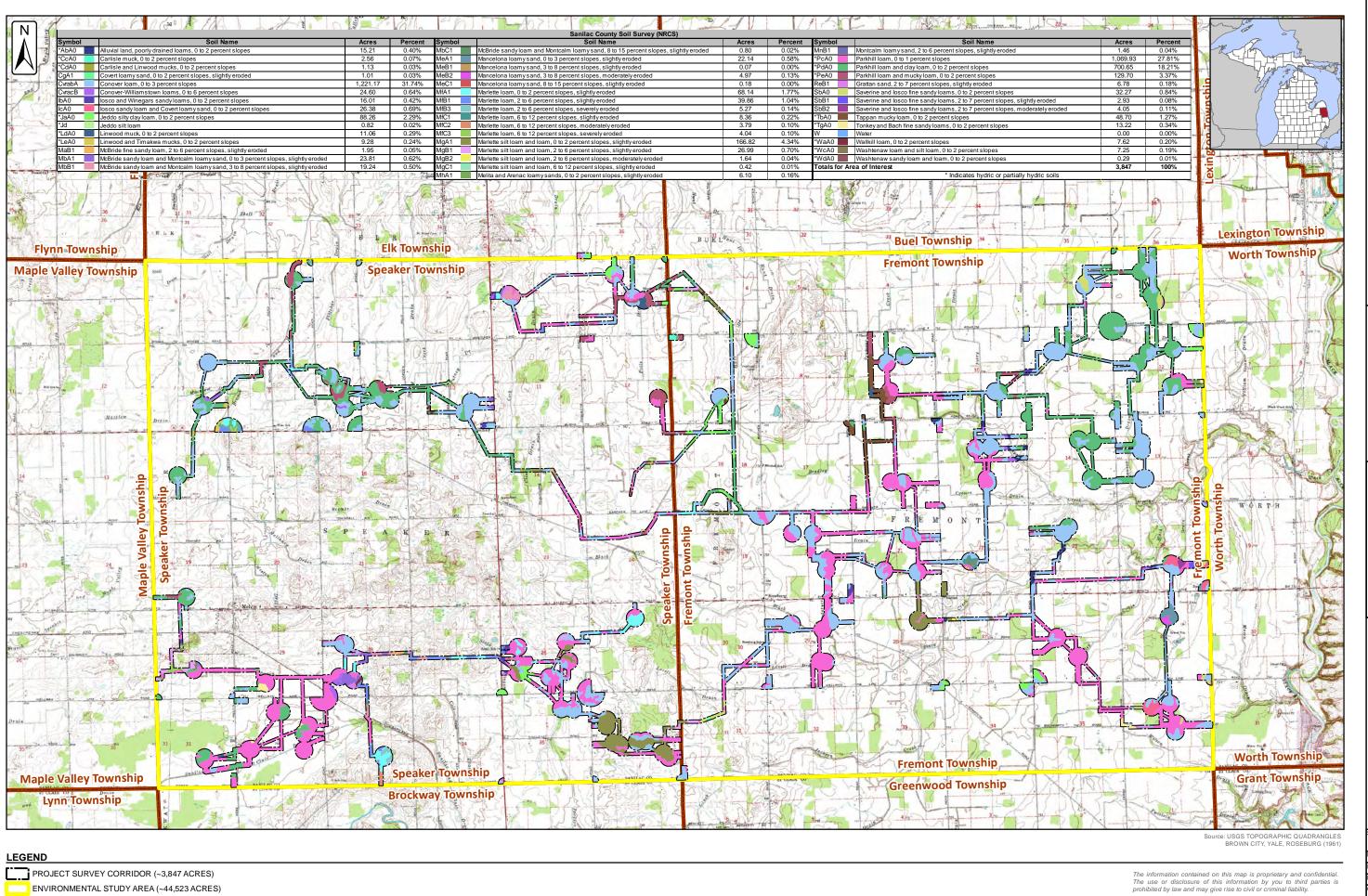
# **6 REFERENCES**

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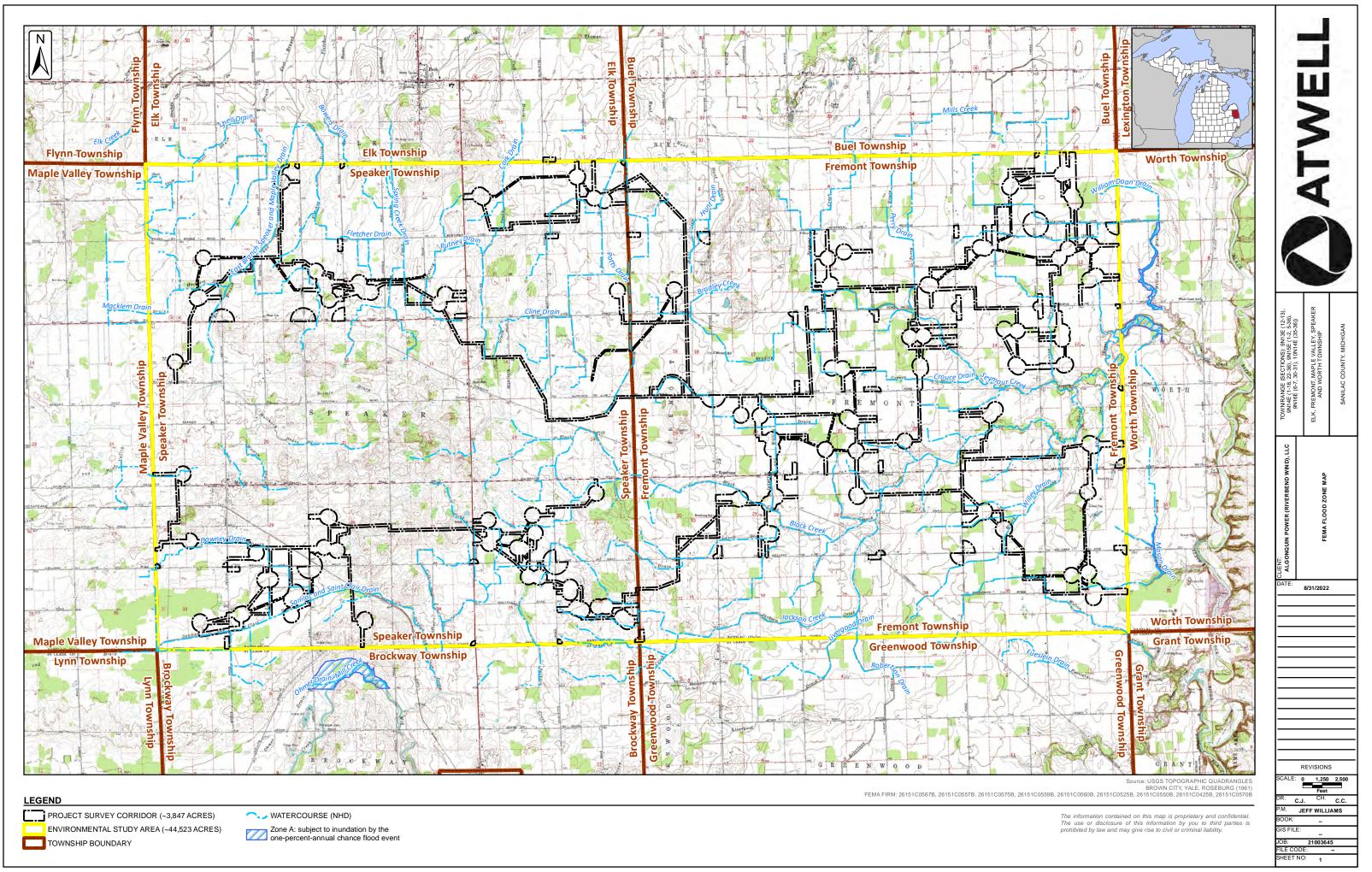


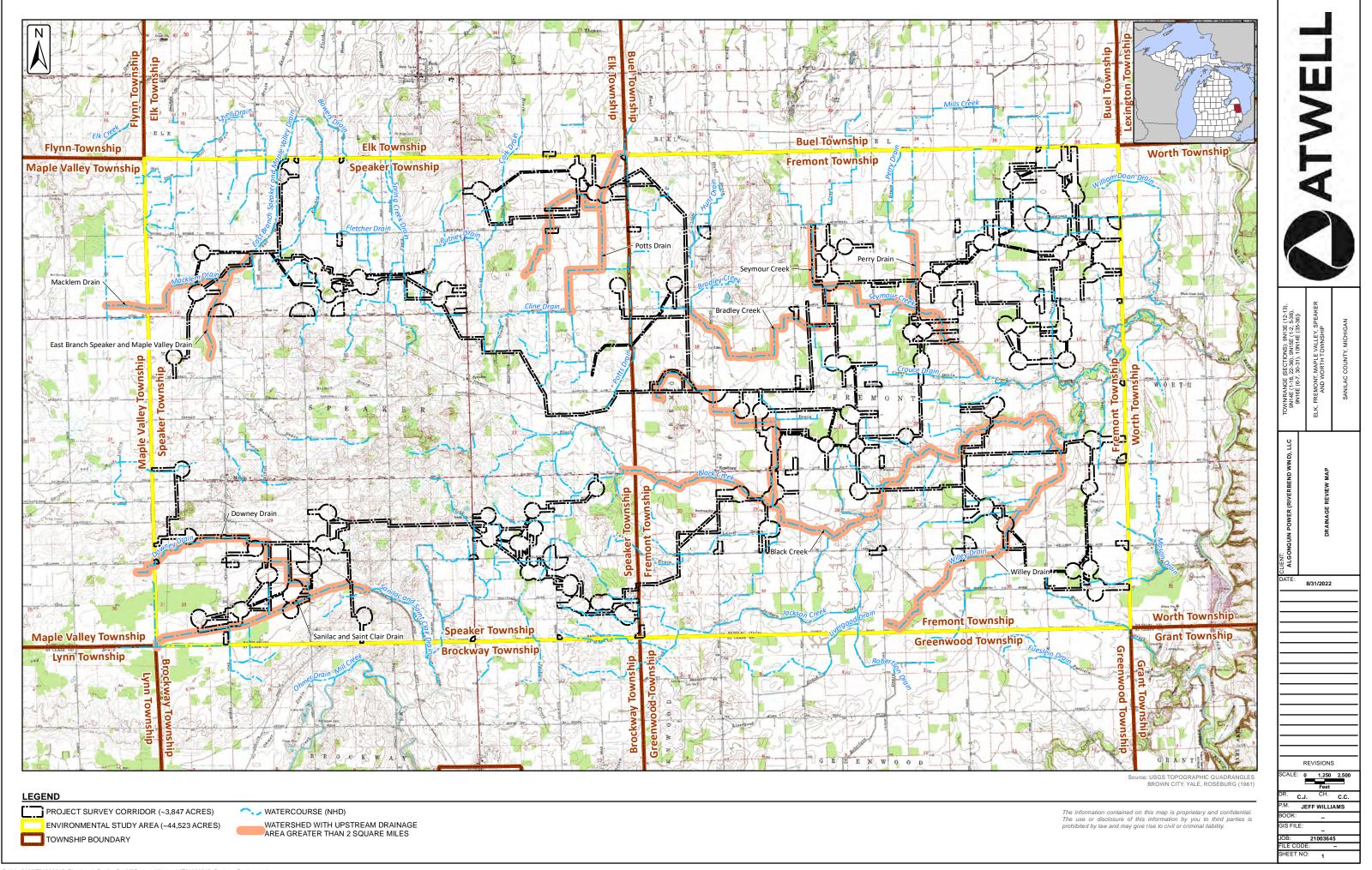
8/31/2022 REVISIONS c.J. CH. c.c. JEFF WILLIAMS 21003645

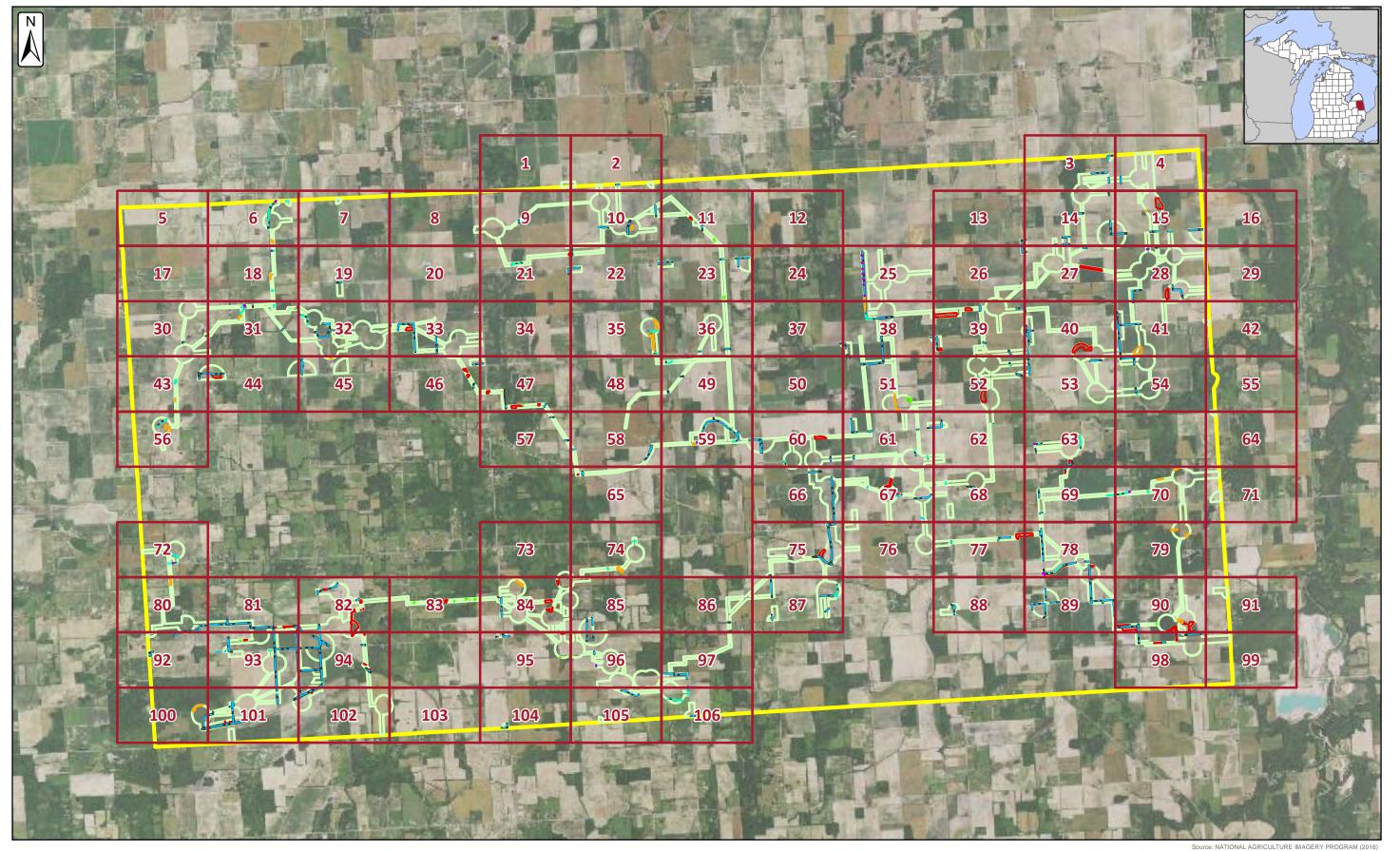
ENVIRONMENTAL STUDY AREA (~44,523 ACRES)

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TOWNSHIP BOUNDARY







# LEGEND

MAP INDEX

PROJECT SURVEY CORRIDOR (~3,847 ACRES)

ENVIRONMENTAL STUDY AREA (~44,523 ACRES)

→ WATERCOURSE (FIELD IDENTIFIED)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)

DESKTOP DELINEATED CULVERT

O DESKTOP DELINEATED WATERCOURSE

DESKTOP DELINEATED APPROXIMATE TOP OF BANK
DESKTOP DELINEATED WETLAND

Note: This illustration is an approximate depiction of the wetlands and watercourses that appear to be located on the subject property as delineated by Atwell on December 6-9 and 13-17, 2021 and January 3-7, April 4-8 and 11-14, 2022. The EGLE has the final authority on the extent of regulated wetlands, lakes, and streams in the state of Michigan.

The information contained on this map is proprietary and confidential. The use or disclosure of this information by you to third parties is prohibited by law and may give rise to civil or criminal liability.

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WETLAND DELINEATION MAP INDEX

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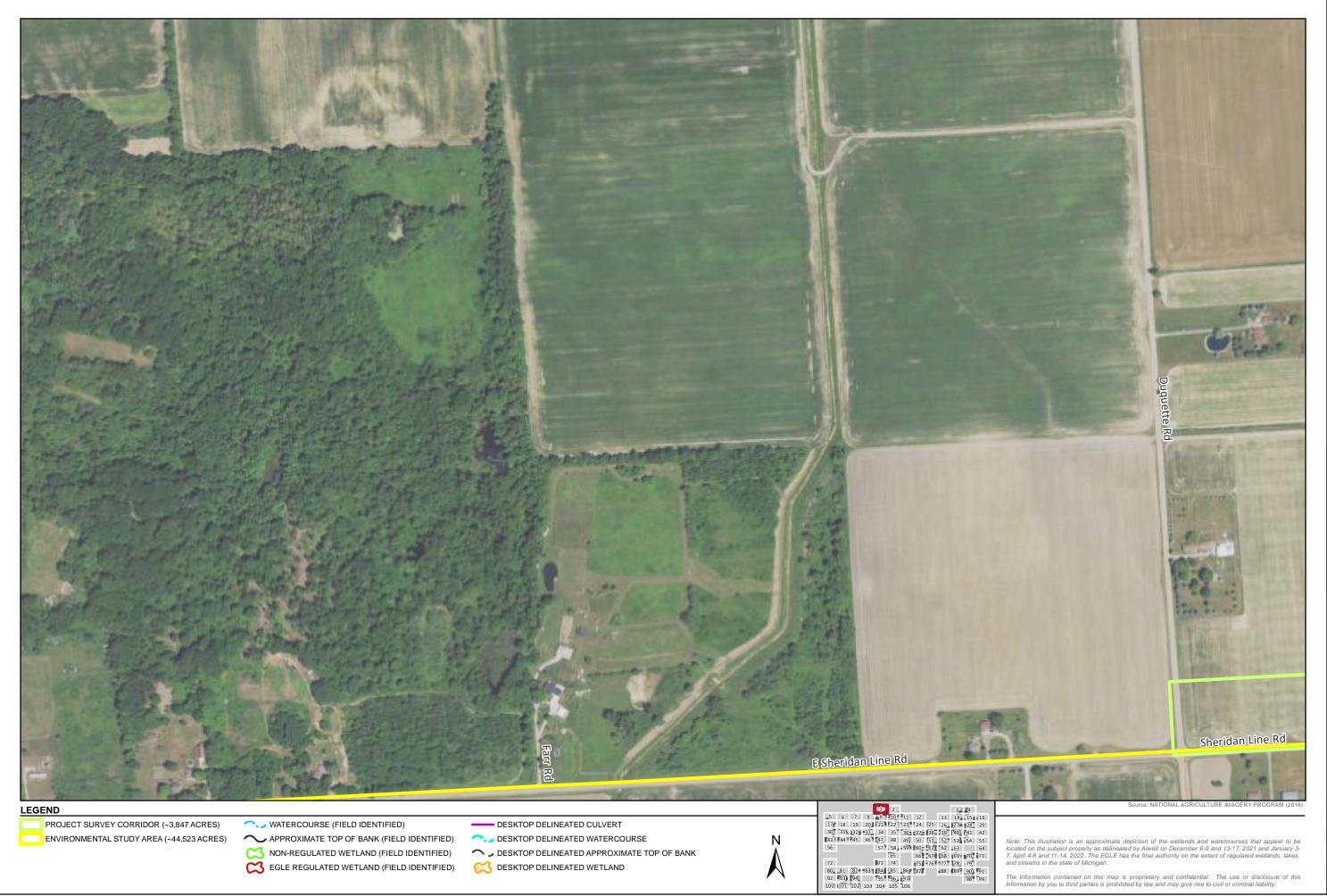
SHEET NO: INDEX MAP

C.J. CH. C.C. JEFF WILLIAMS

21003645

HEET NO: 1 OF 106

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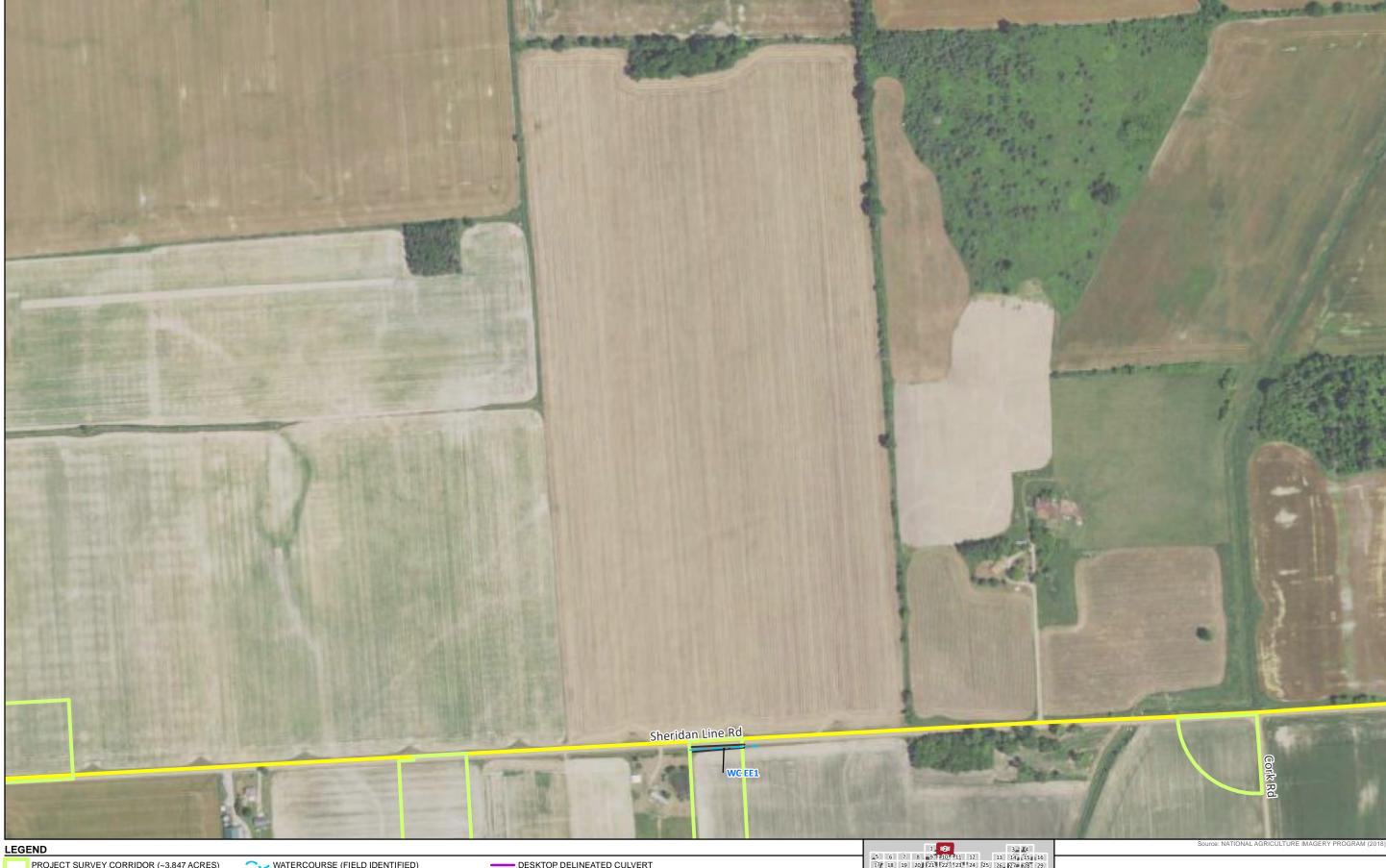
DESKTOP DELINEATED WETLAND

C.J. CH. C.C. JEFF WILLIAMS

21003645

HEET NO: 2 OF 106

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PROJECT SURVEY CORRIDOR (~3,847 ACRES) ENVIRONMENTAL STUDY AREA (~44,523 ACRES) ── WATERCOURSE (FIELD IDENTIFIED)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)

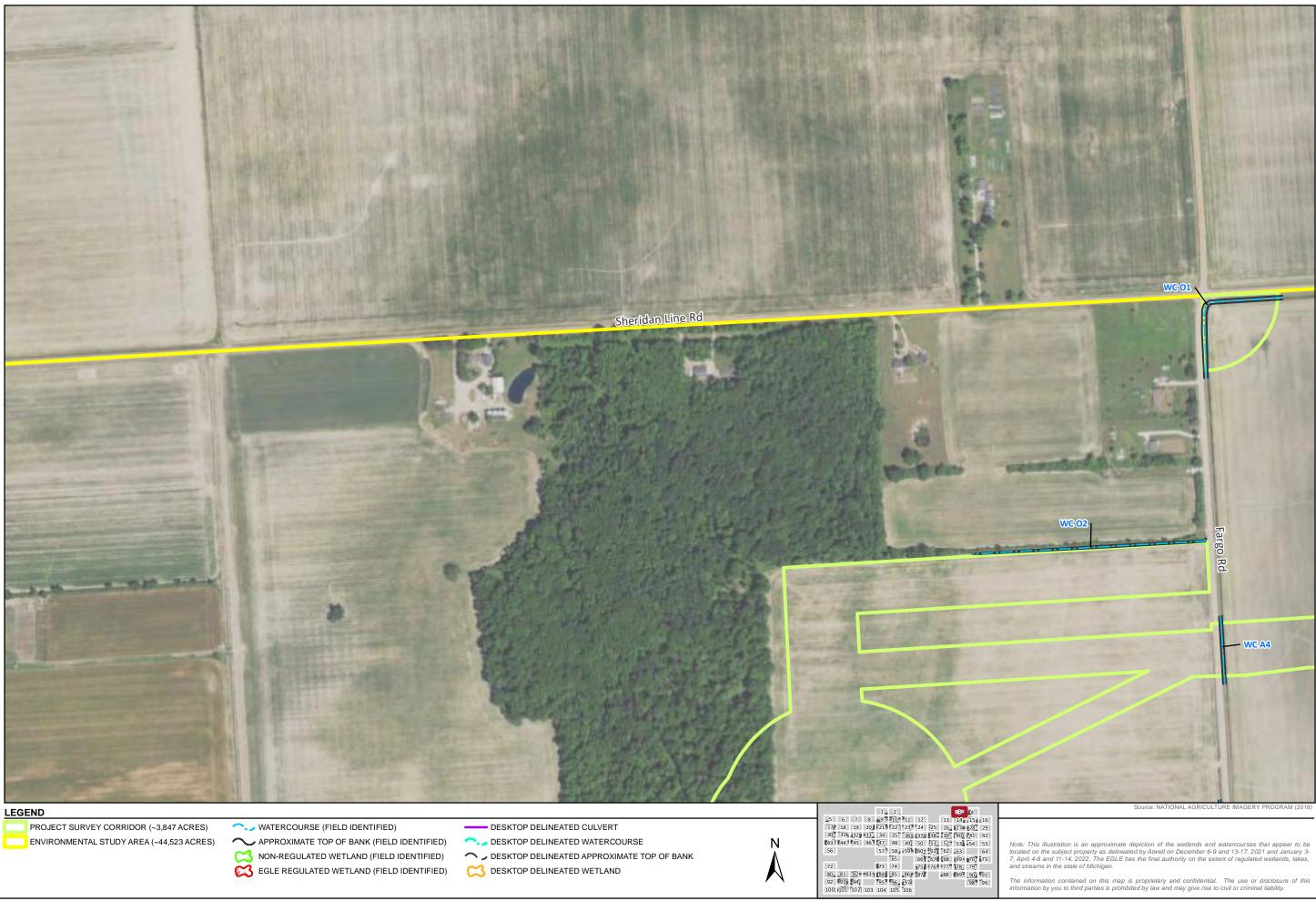
NON-REGULATED WETLAND (FIELD IDENTIFIED)

DESKTOP DELINEATED CULVERT

COURSE DESKTOP DELINEATED WATERCOURSE

MESKTOP DELINEATED WETLAND

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COURSE DESKTOP DELINEATED WATERCOURSE

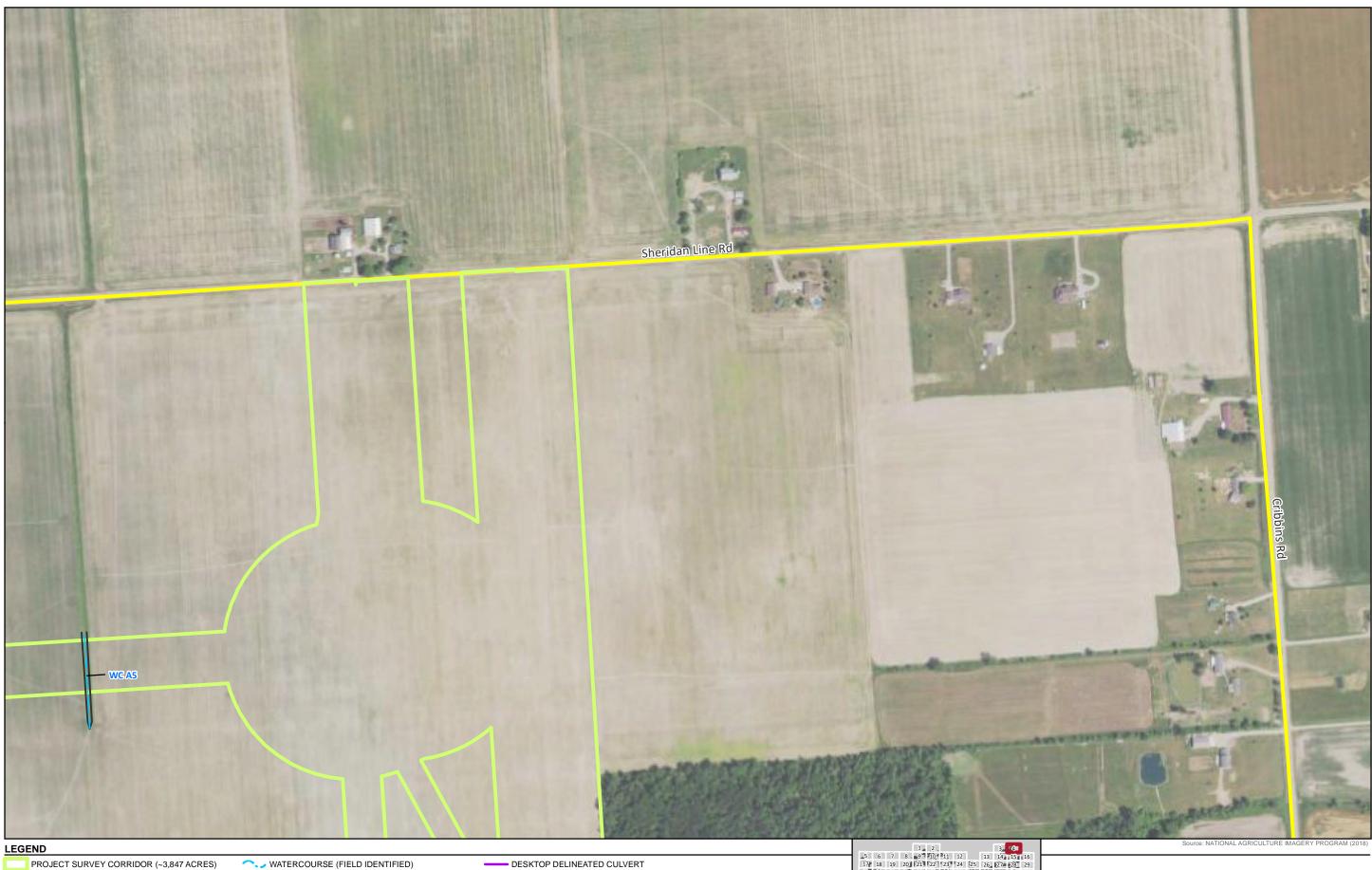
CC DESKTOP DELINEATED WETLAND

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ENVIRONMENTAL STUDY AREA (~44,523 ACRES)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED)



COURSE DESKTOP DELINEATED WATERCOURSE

CC DESKTOP DELINEATED WETLAND

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ENVIRONMENTAL STUDY AREA (~44,523 ACRES)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)

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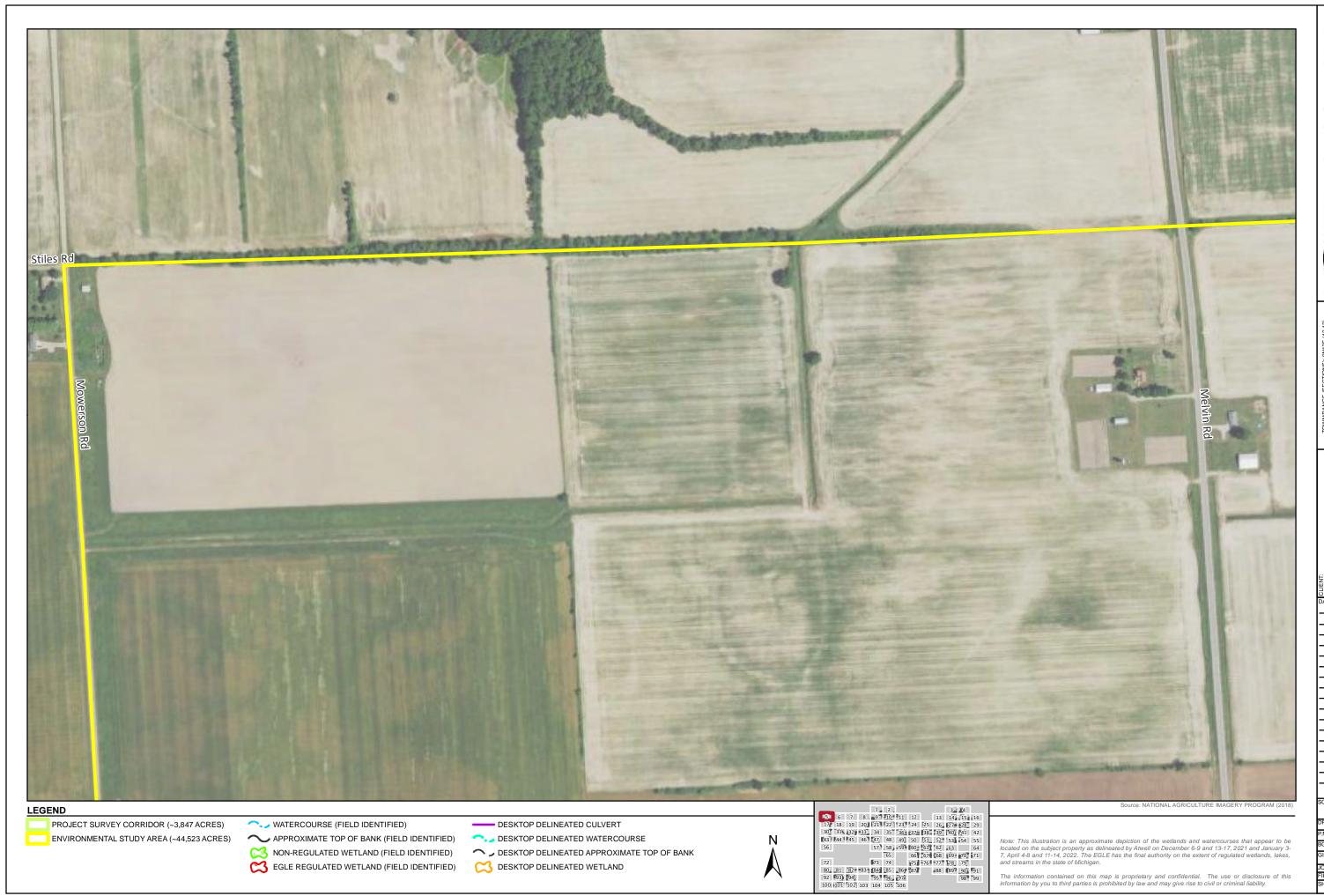
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HEET NO: 4 OF 106

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21003645 HEET NO: 5 OF 106

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EGLE REGULATED WETLAND (FIELD IDENTIFIED)

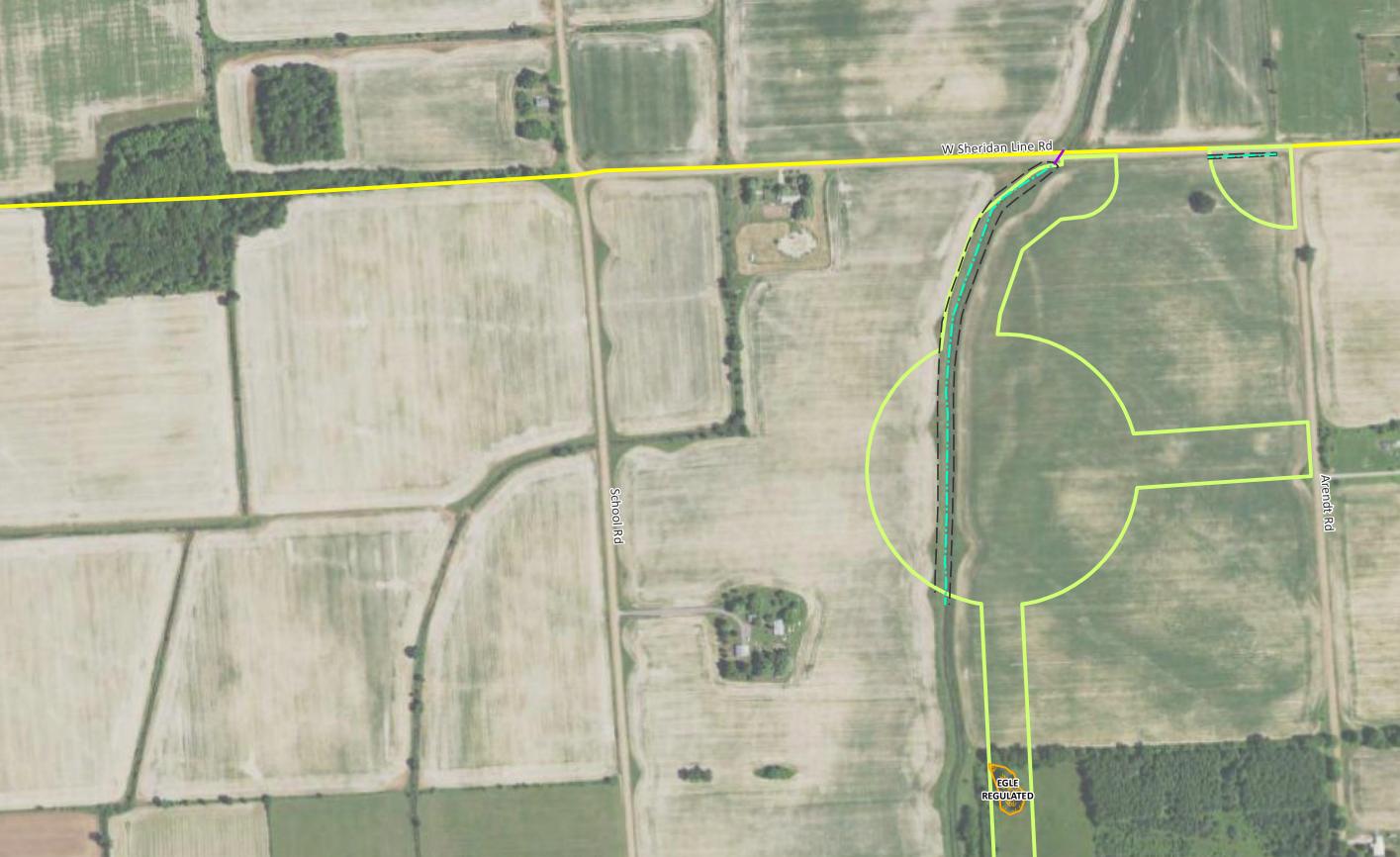
CC DESKTOP DELINEATED WETLAND

C.J. CH. C.C.

JEFF WILLIAMS

21003645 HEET NO: 6 OF 106

Note: This illustration is an approximate depiction of the wetlands and watercourses that appear to be located on the subject properly as delineated by Atwell on December 6-9 and 13-17, 2021 and January 3-7, April 4-8 and 11-14, 2022. The EGLE has the final authority on the extent of regulated wetlands, lakes, and streams in the state of Michigan. The information contained on this map is proprietary and confidential. The use or disclosure of this information by you to third parties is prohibited by law and may give rise to civil or criminal liability.



## LEGEND

PROJECT SURVEY CORRIDOR (~3,847 ACRES) ENVIRONMENTAL STUDY AREA (~44,523 ACRES) ── WATERCOURSE (FIELD IDENTIFIED)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED) NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)

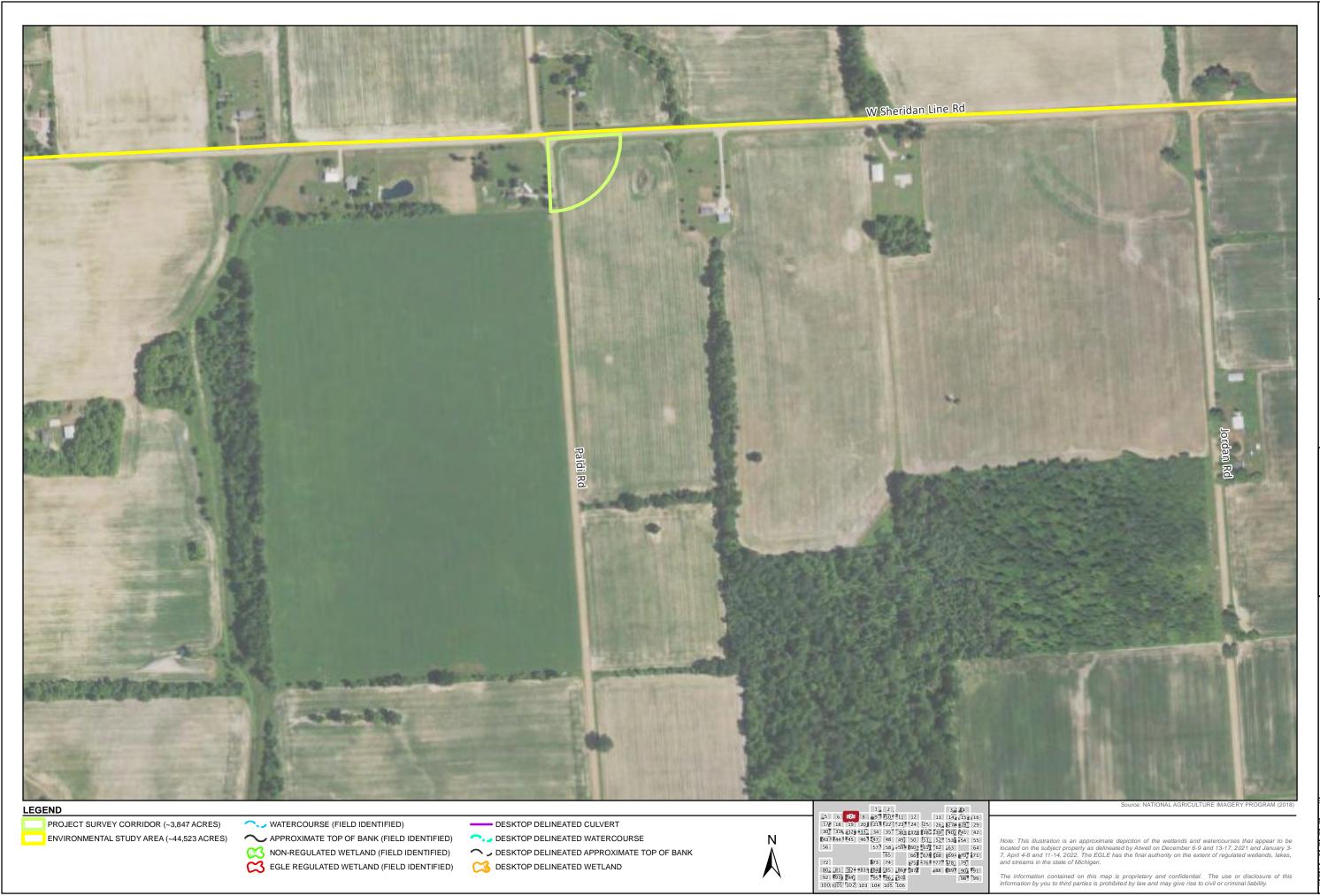
DESKTOP DELINEATED CULVERT DESKTOP DELINEATED WATERCOURSE

DESKTOP DELINEATED WETLAND

C.J. CH. C.C. JEFF WILLIAMS

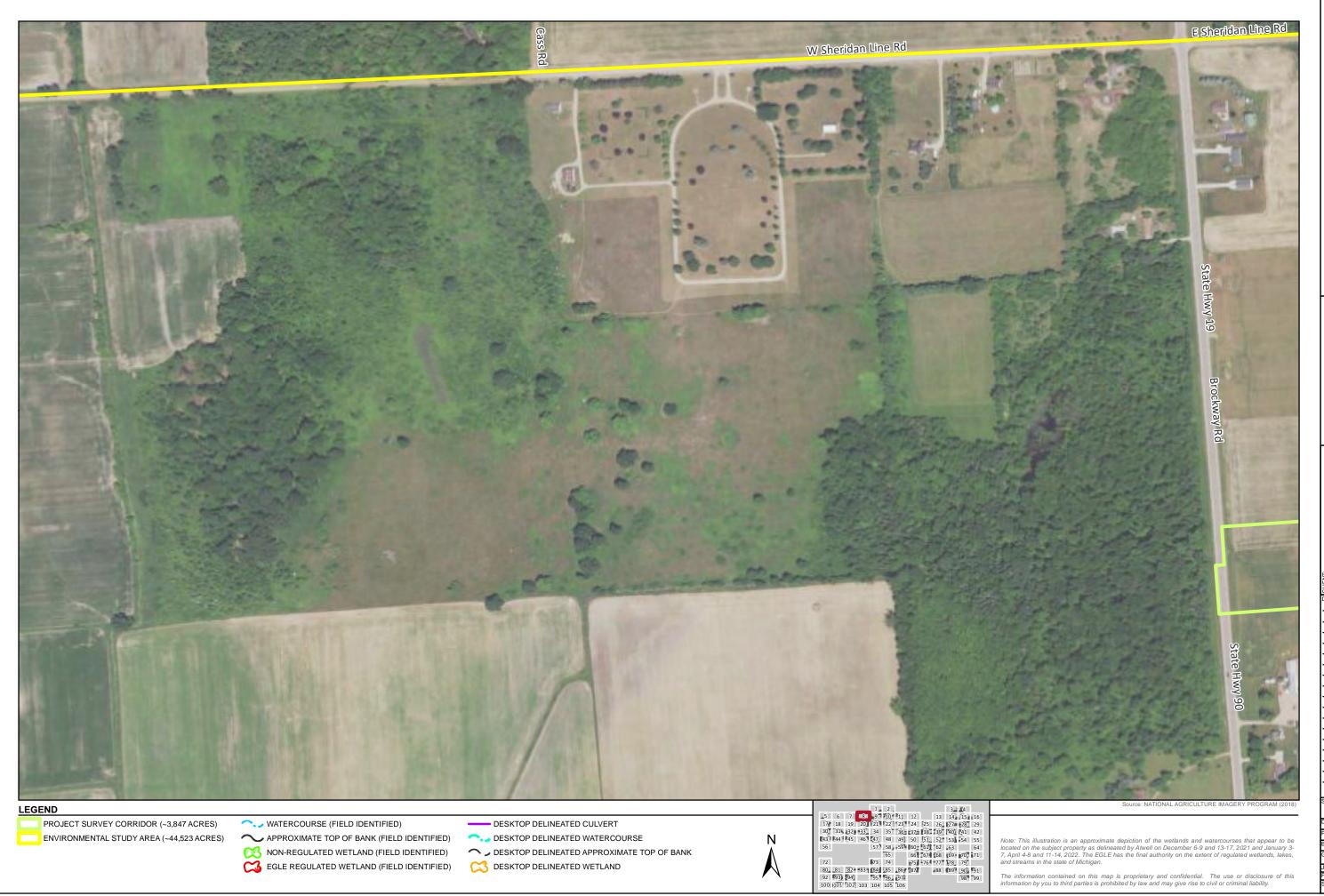
21003645 HEET NO: 7 OF 106

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CS DESKTOP DELINEATED WETLAND

NON-REGULATED WETLAND (FIELD IDENTIFIED)



→ DESKTOP DELINEATED APPROXIMATE TOP OF BANK

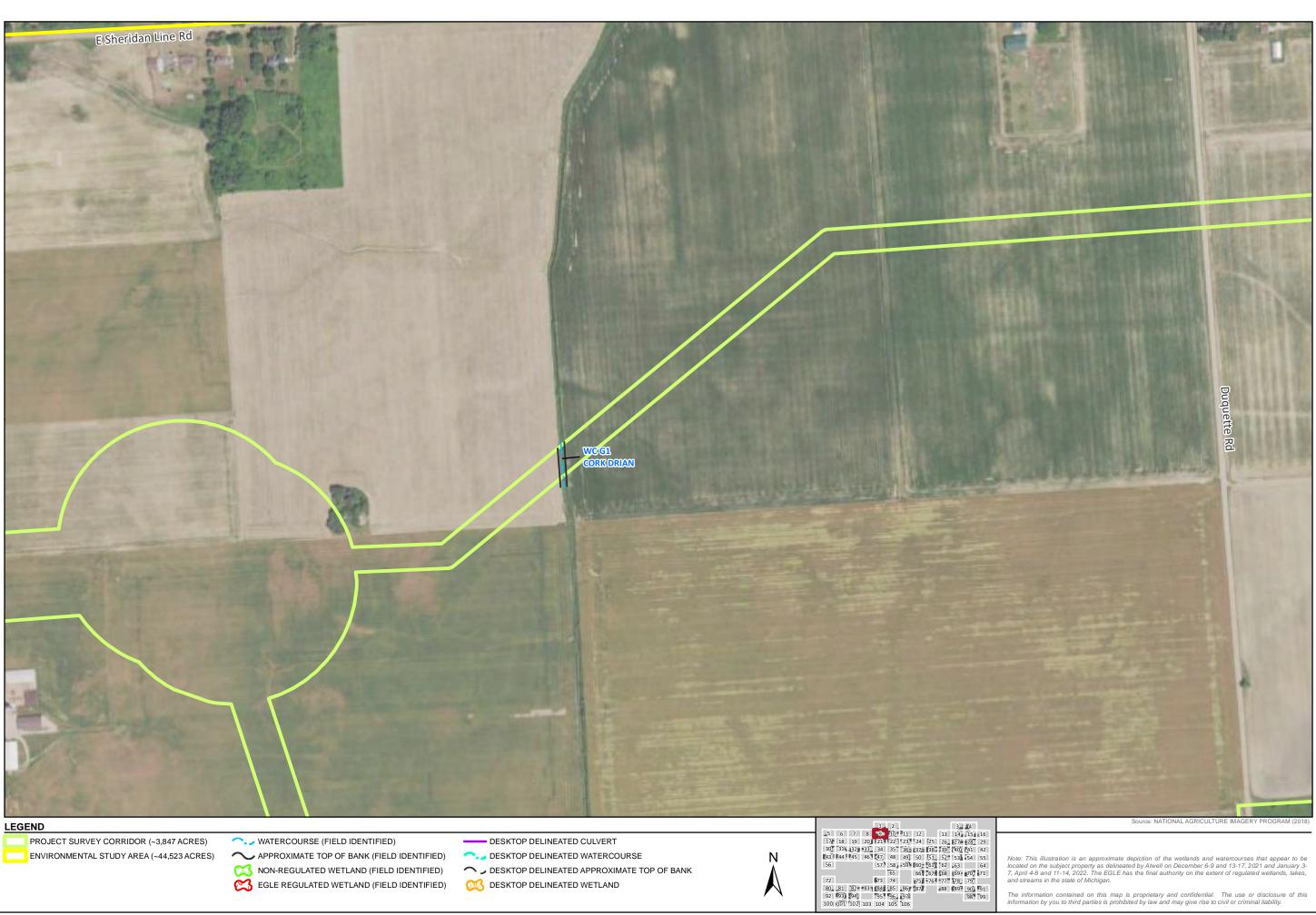
DESKTOP DELINEATED WETLAND

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NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)

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M DESKTOP DELINEATED WETLAND

8/31/2022

C.J. CH. C.C.

JEFF WILLIAMS

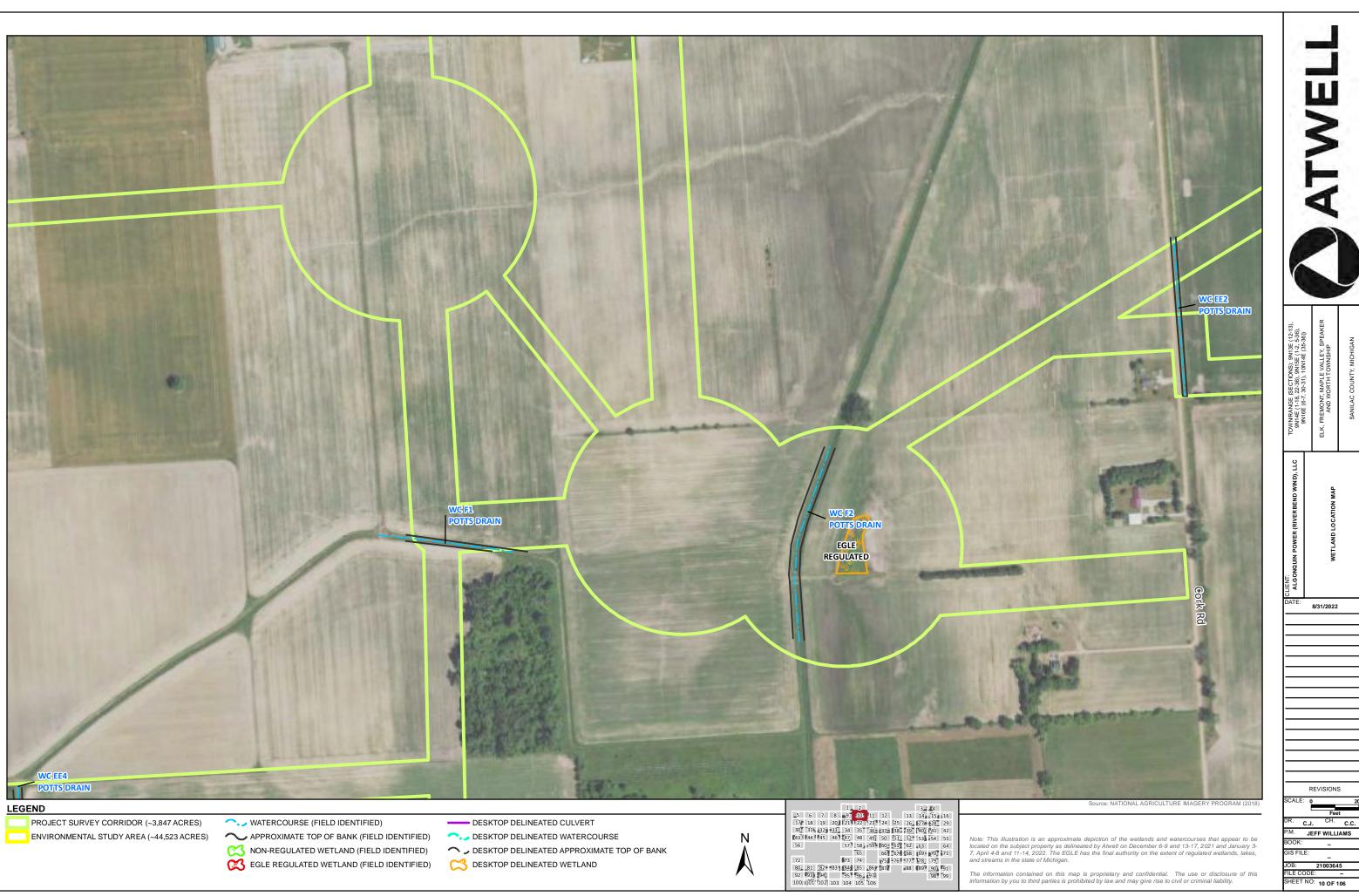
21003645

HEET NO: 9 OF 106

Note: This illustration is an approximate depiction of the wetlands and watercourses that appear to be located on the subject properly as delineated by Atwell on December 6-9 and 13-17, 2021 and January 3-7, April 4-8 and 11-14, 2022. The EGLE has the final authority on the extent of regulated wetlands, lakes, and streams in the state of Michigan.

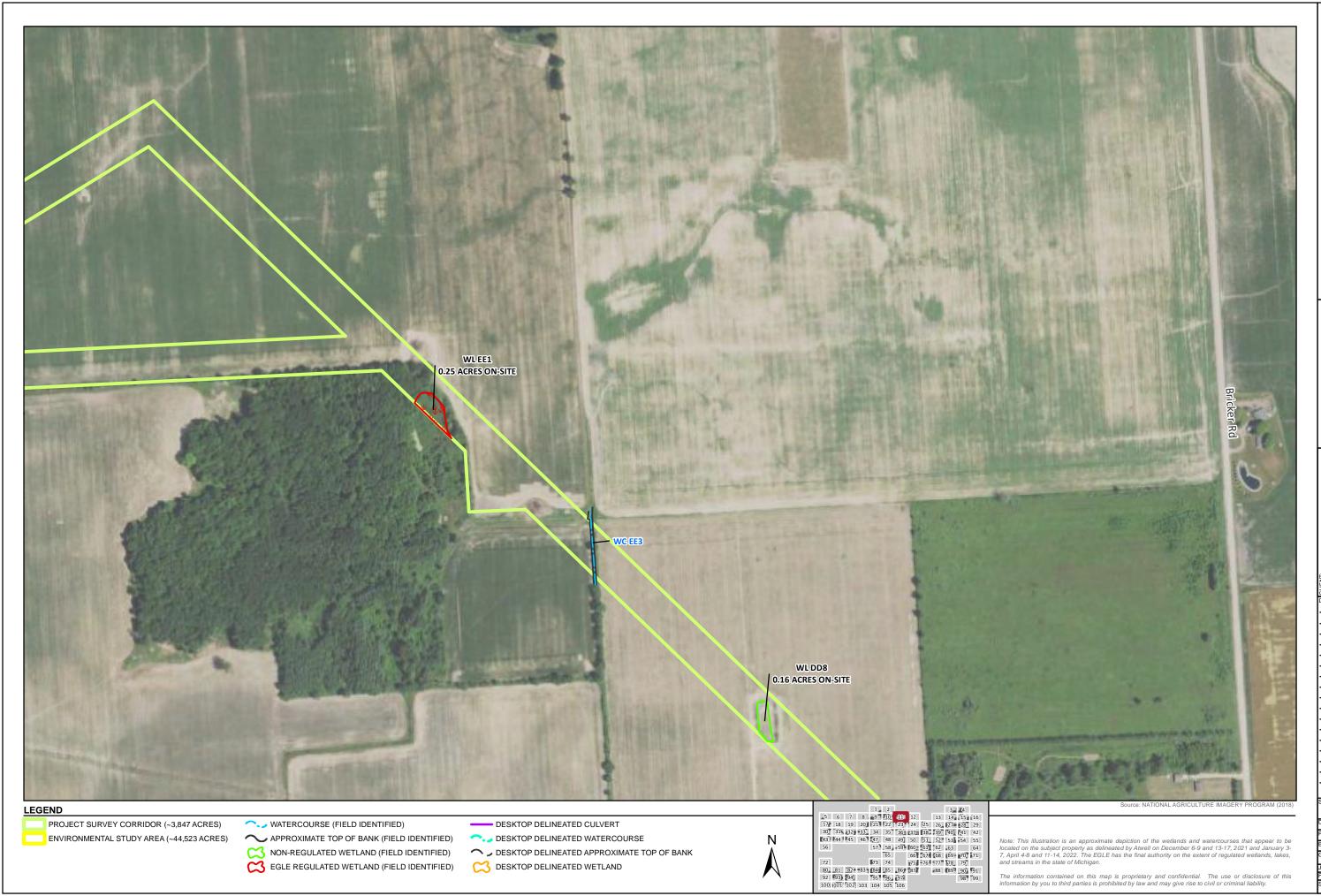
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NON-REGULATED WETLAND (FIELD IDENTIFIED)



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EGLE REGULATED WETLAND (FIELD IDENTIFIED)

CC DESKTOP DELINEATED WETLAND



C.J. CH. C.C. JEFF WILLIAMS

21003645

HEET NO: 12 OF 106

Note: This illustration is an approximate depiction of the wetlands and watercourses that appear to be located on the subject properly as delineated by Atwell on December 6-9 and 13-17, 2021 and January 3-7, April 4-8 and 11-14, 2022. The EGLE has the final authority on the extent of regulated wetlands, lakes, and streams in the state of Michigan.

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CC DESKTOP DELINEATED WETLAND

NON-REGULATED WETLAND (FIELD IDENTIFIED)



C.J. CH. C.C.

JEFF WILLIAMS

21003645 HEET NO: 13 OF 106

Note: This illustration is an approximate depiction of the wetlands and watercourses that appear to be located on the subject properly as delineated by Atwell on December 6-9 and 13-17, 2021 and January 3-7, April 4-8 and 11-14, 2022. The EGLE has the final authority on the extent of regulated wetlands, lakes, and streams in the state of Michigan. The information contained on this map is proprietary and confidential. The use or disclosure of this information by you to third parties is prohibited by law and may give rise to civil or criminal liability.



DESKTOP DELINEATED WETLAND

NON-REGULATED WETLAND (FIELD IDENTIFIED)

HEET NO: 14 OF 106



PROJECT SURVEY CORRIDOR (~3,847 ACRES) ENVIRONMENTAL STUDY AREA (~44,523 ACRES) ── WATERCOURSE (FIELD IDENTIFIED)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED) EGLE REGULATED WETLAND (FIELD IDENTIFIED) DESKTOP DELINEATED CULVERT

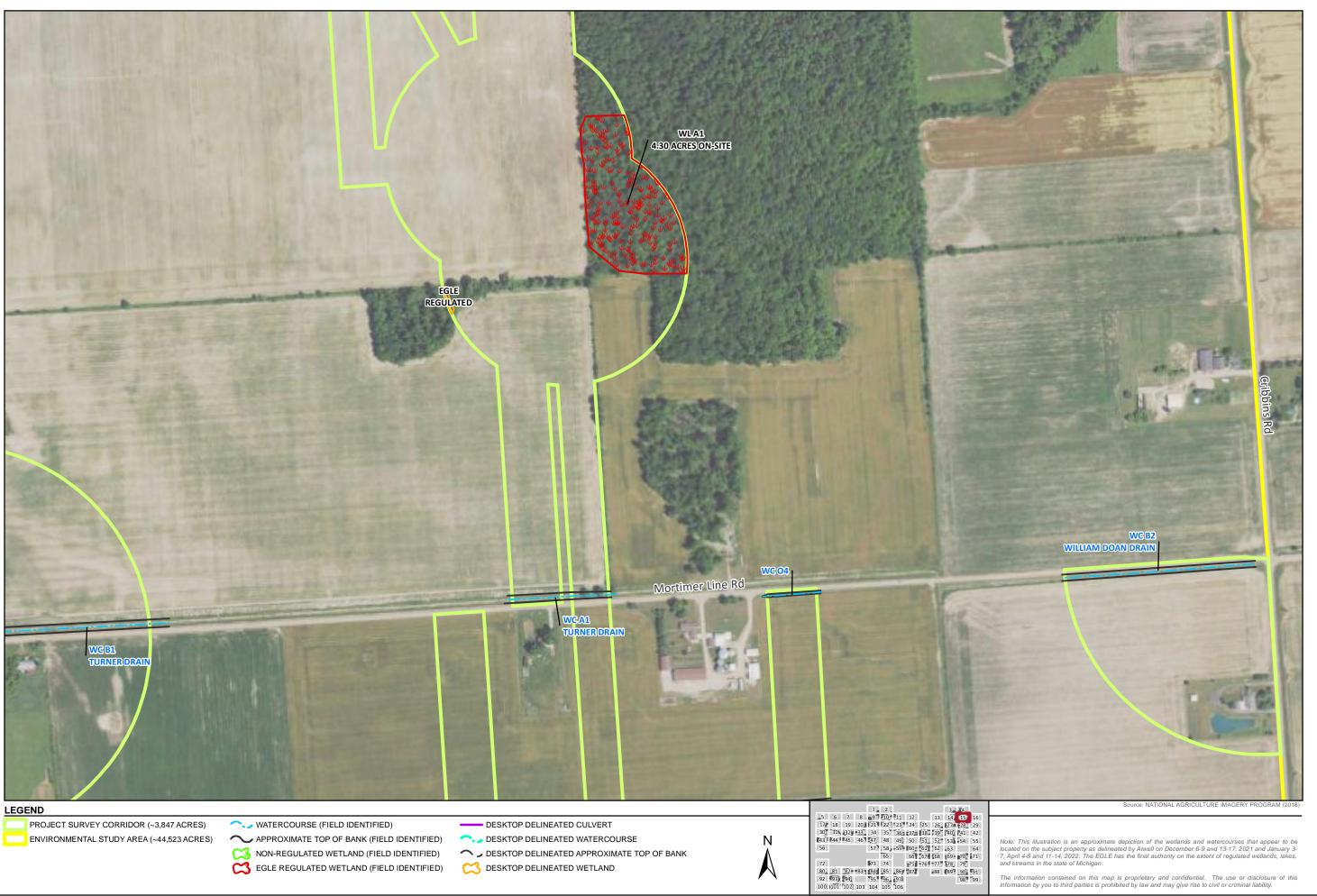
COURSE DESKTOP DELINEATED WATERCOURSE

DESKTOP DELINEATED WETLAND

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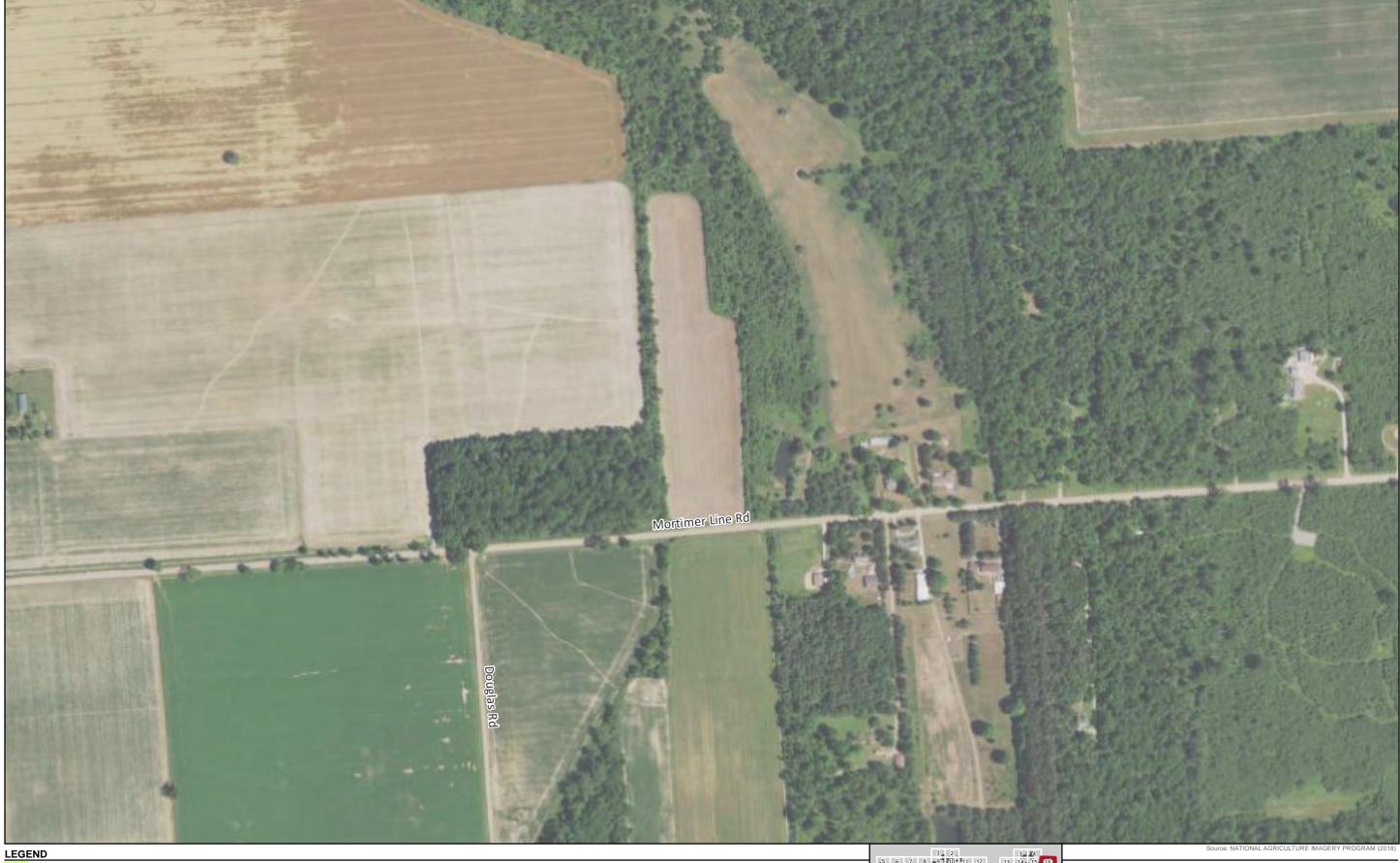
DESKTOP DELINEATED WETLAND

NON-REGULATED WETLAND (FIELD IDENTIFIED)

C.J. CH. C.C. JEFF WILLIAMS

21003645 SHEET NO: 16 OF 106

Note: This illustration is an approximate depiction of the wetlands and watercourses that appear to be located on the subject properly as delineated by Atwell on December 6-9 and 13-17, 2021 and January 3-7, April 4-8 and 11-14, 2022. The EGLE has the final authority on the extent of regulated wetlands, lakes, and streams in the state of Michigan. The information contained on this map is proprietary and confidential. The use or disclosure of this information by you to third parties is prohibited by law and may give rise to civil or criminal liability.



PROJECT SURVEY CORRIDOR (~3,847 ACRES)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED) EGLE REGULATED WETLAND (FIELD IDENTIFIED) DESKTOP DELINEATED CULVERT

 → DESKTOP DELINEATED WATERCOURSE → DESKTOP DELINEATED APPROXIMATE TOP OF BANK

DESKTOP DELINEATED WETLAND

21003645

HEET NO: 17 OF 106



PROJECT SURVEY CORRIDOR (~3,847 ACRES) ENVIRONMENTAL STUDY AREA (~44,523 ACRES) ─ WATERCOURSE (FIELD IDENTIFIED)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

Output

Desktop delineated watercourse

NON-REGULATED WETLAND (FIELD IDENTIFIED) EGLE REGULATED WETLAND (FIELD IDENTIFIED) DESKTOP DELINEATED CULVERT

DESKTOP DELINEATED WETLAND

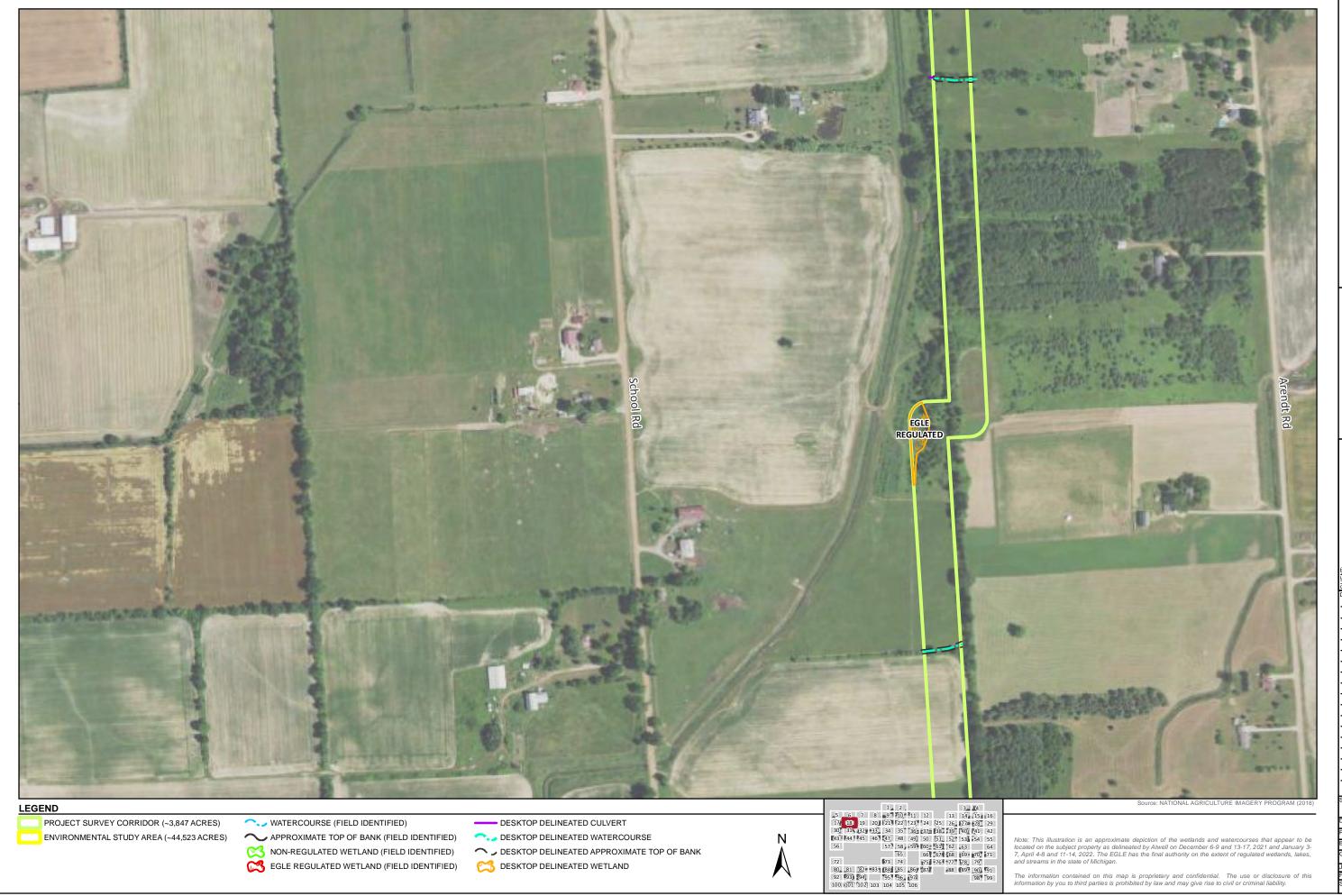
Note: This illustration is an approximate depiction of the wetlands and watercourses that appear to be located on the subject properly as delineated by Atwell on December 6-9 and 13-17, 2021 and January 3-7, April 4-8 and 11-14, 2022. The EGLE has the final authority on the extent of regulated wetlands, lakes, and streams in the state of Michigan.

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21003645 HEET NO: 18 OF 106

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EGLE REGULATED WETLAND (FIELD IDENTIFIED)

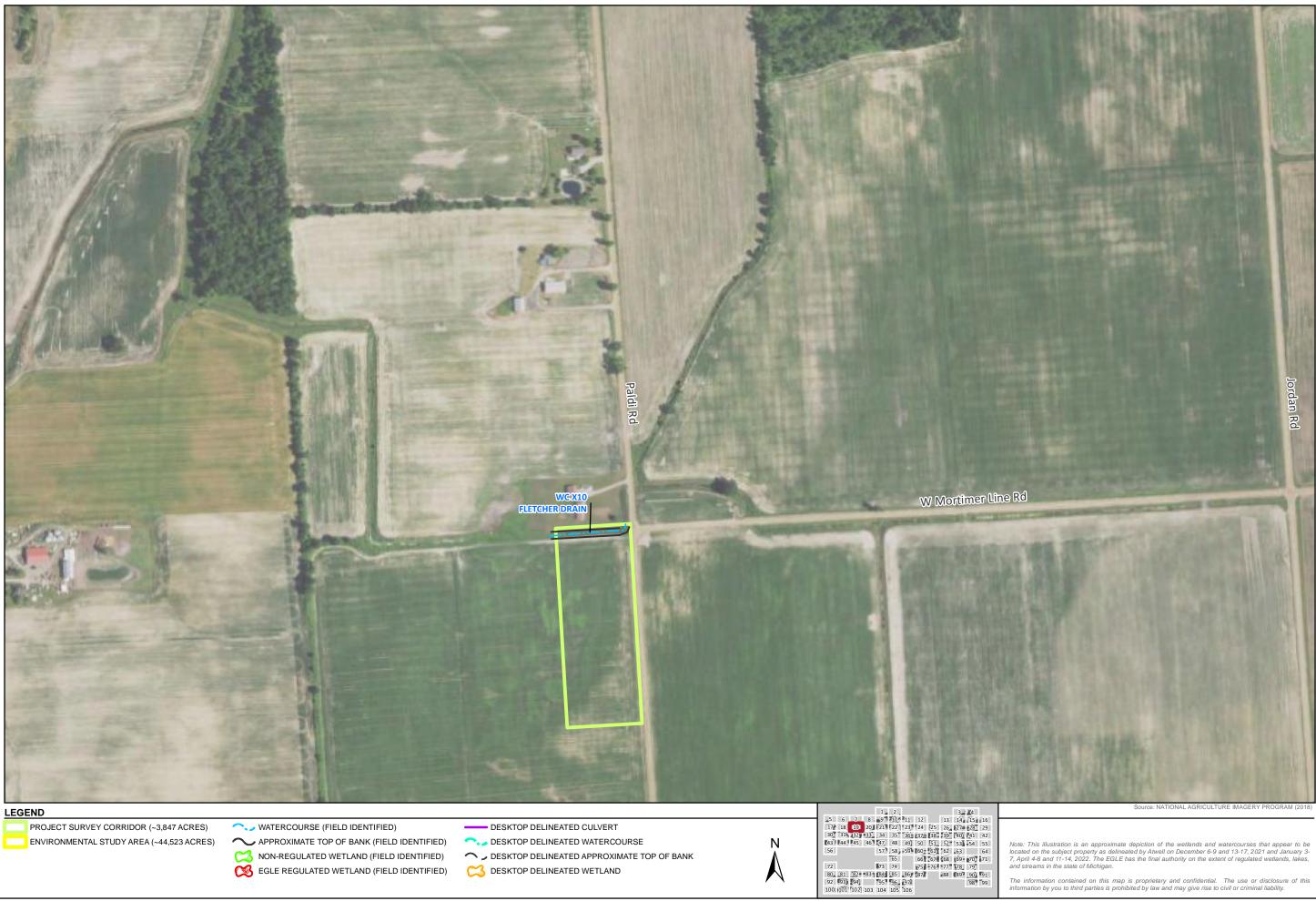
CCS DESKTOP DELINEATED WETLAND

C.J. CH. C.C. JEFF WILLIAMS

21003645

HEET NO: 19 OF 106

Note: This illustration is an approximate depiction of the wetlands and watercourses that appear to be located on the subject properly as delineated by Atwell on December 6-9 and 13-17, 2021 and January 3-7, April 4-8 and 11-14, 2022. The EGLE has the final authority on the extent of regulated wetlands, lakes, and streams in the state of Michigan. The information contained on this map is proprietary and confidential. The use or disclosure of this information by you to third parties is prohibited by law and may give rise to civil or criminal liability.



Country Delineated Watercourse

DESKTOP DELINEATED WETLAND

ENVIRONMENTAL STUDY AREA (~44,523 ACRES)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED)

C.J. CH. C.C. JEFF WILLIAMS

21003645 HEET NO: 20 OF 106

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NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED) CS DESKTOP DELINEATED WETLAND



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ENVIRONMENTAL STUDY AREA (~44,523 ACRES)

Country Delineated Watercourse 

MESKTOP DELINEATED WETLAND

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)

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C.J. CH. C.C.

JEFF WILLIAMS

21003645

HEET NO: 22 OF 106

PROJECT SURVEY CORRIDOR (~3,847 ACRES) ENVIRONMENTAL STUDY AREA (~44,523 ACRES) ── WATERCOURSE (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)

DESKTOP DELINEATED CULVERT APPROXIMATE TOP OF BANK (FIELD IDENTIFIED) NON-REGULATED WETLAND (FIELD IDENTIFIED)

Country Delineated Watercourse 

OSKTOP DELINEATED WETLAND

Note: This illustration is an approximate depiction of the wetlands and watercourses that appear to be located on the subject properly as delineated by Atwell on December 6-9 and 13-17, 2021 and January 3-7, April 4-8 and 11-14, 2022. The EGLE has the final authority on the extent of regulated wetlands, lakes, and streams in the state of Michigan.

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ENVIRONMENTAL STUDY AREA (~44,523 ACRES)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)

CCS DESKTOP DELINEATED WETLAND

Country Delineated Watercourse

Note: This illustration is an approximate depiction of the wetlands and watercourses that appear to be located on the subject properly as delineated by Atwell on December 6-9 and 13-17, 2021 and January 3-7, April 4-8 and 11-14, 2022. The EGLE has the final authority on the extent of regulated wetlands, lakes, and streams in the state of Michigan.



LEGEND

PROJECT SURVEY CORRIDOR (~3,847 ACRES) ENVIRONMENTAL STUDY AREA (~44,523 ACRES) → WATERCOURSE (FIELD IDENTIFIED)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED) EGLE REGULATED WETLAND (FIELD IDENTIFIED) DESKTOP DELINEATED CULVERT

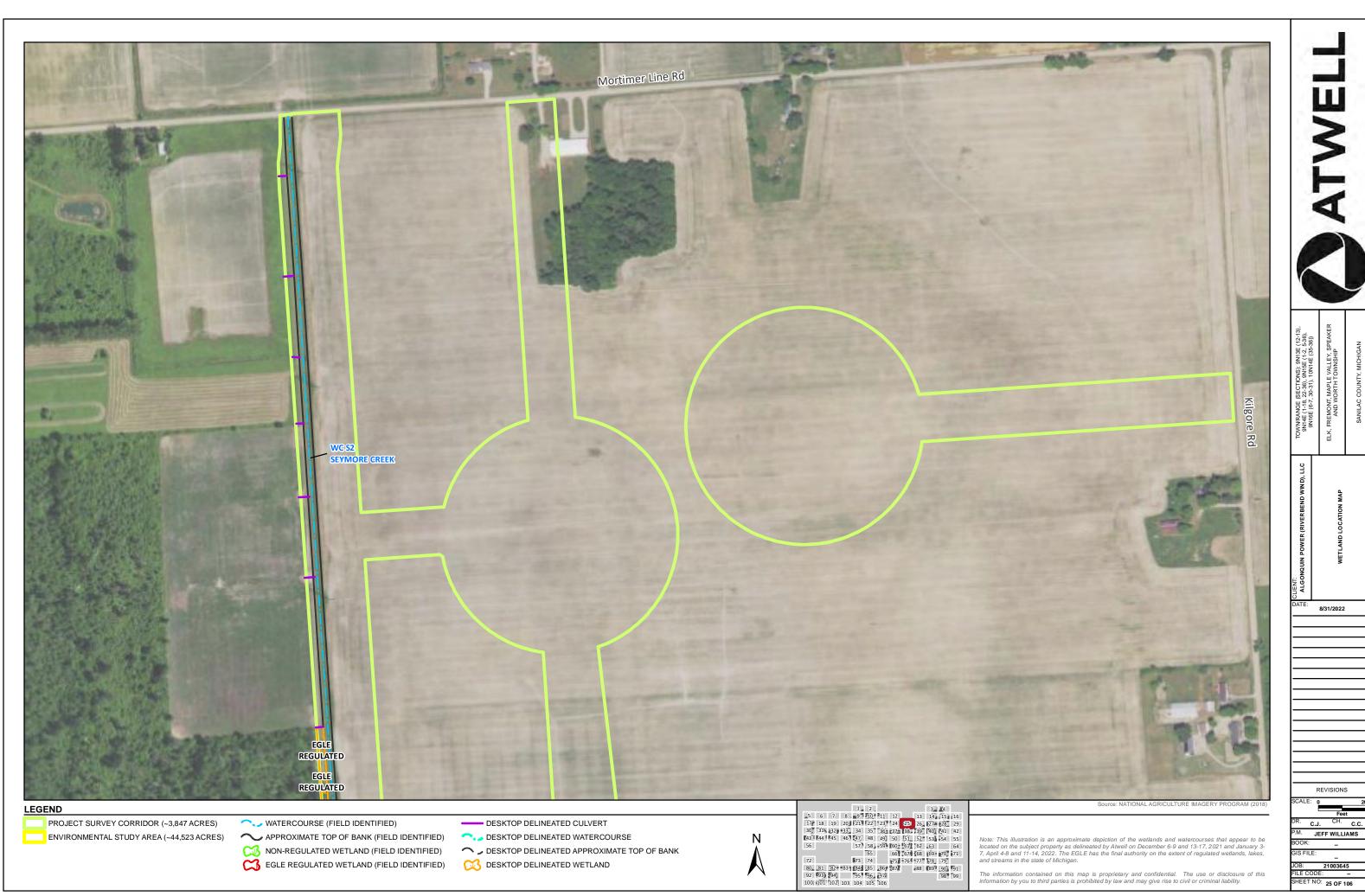
Country Delineated Watercourse 

CC DESKTOP DELINEATED WETLAND

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C.J. CH. C.C. JEFF WILLIAMS 21003645 HEET NO: 24 OF 106



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C.J. CH. C.C. JEFF WILLIAMS

21003645 HEET NO: 26 OF 106

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LEGEND

PROJECT SURVEY CORRIDOR (~3,847 ACRES) ENVIRONMENTAL STUDY AREA (~44,523 ACRES) ── WATERCOURSE (FIELD IDENTIFIED)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

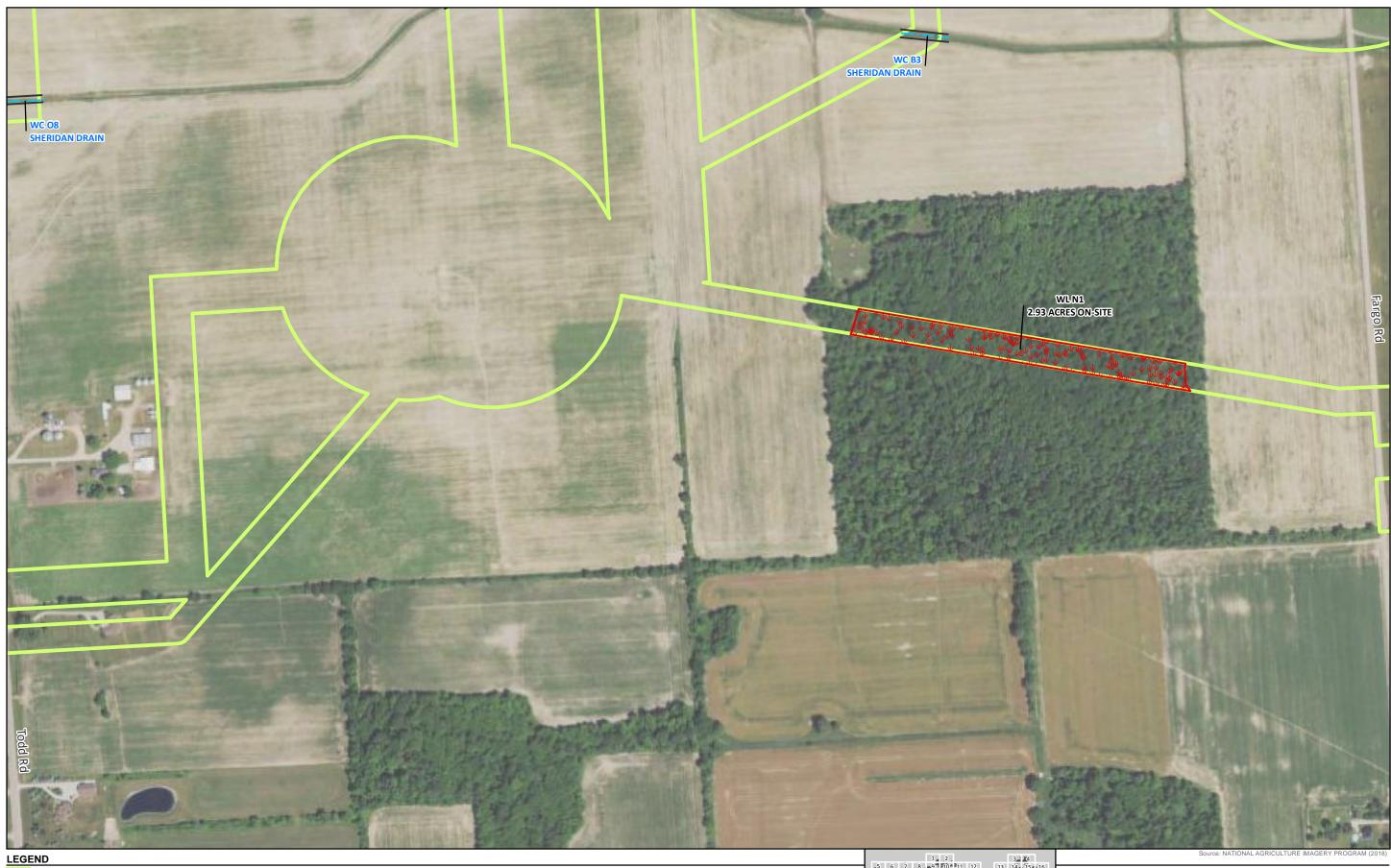
NON-REGULATED WETLAND (FIELD IDENTIFIED) EGLE REGULATED WETLAND (FIELD IDENTIFIED) DESKTOP DELINEATED CULVERT

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DESKTOP DELINEATED WETLAND

Note: This illustration is an approximate depiction of the wetlands and watercourses that appear to be located on the subject properly as delineated by Atwell on December 6-9 and 13-17, 2021 and January 3-7, April 4-8 and 11-14, 2022. The EGLE has the final authority on the extent of regulated wetlands, lakes, and streams in the state of Michigan.



DESKTOP DELINEATED CULVERT

DESKTOP DELINEATED WETLAND

Country Delineated Watercourse

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PROJECT SURVEY CORRIDOR (~3,847 ACRES)

ENVIRONMENTAL STUDY AREA (~44,523 ACRES)

── WATERCOURSE (FIELD IDENTIFIED)

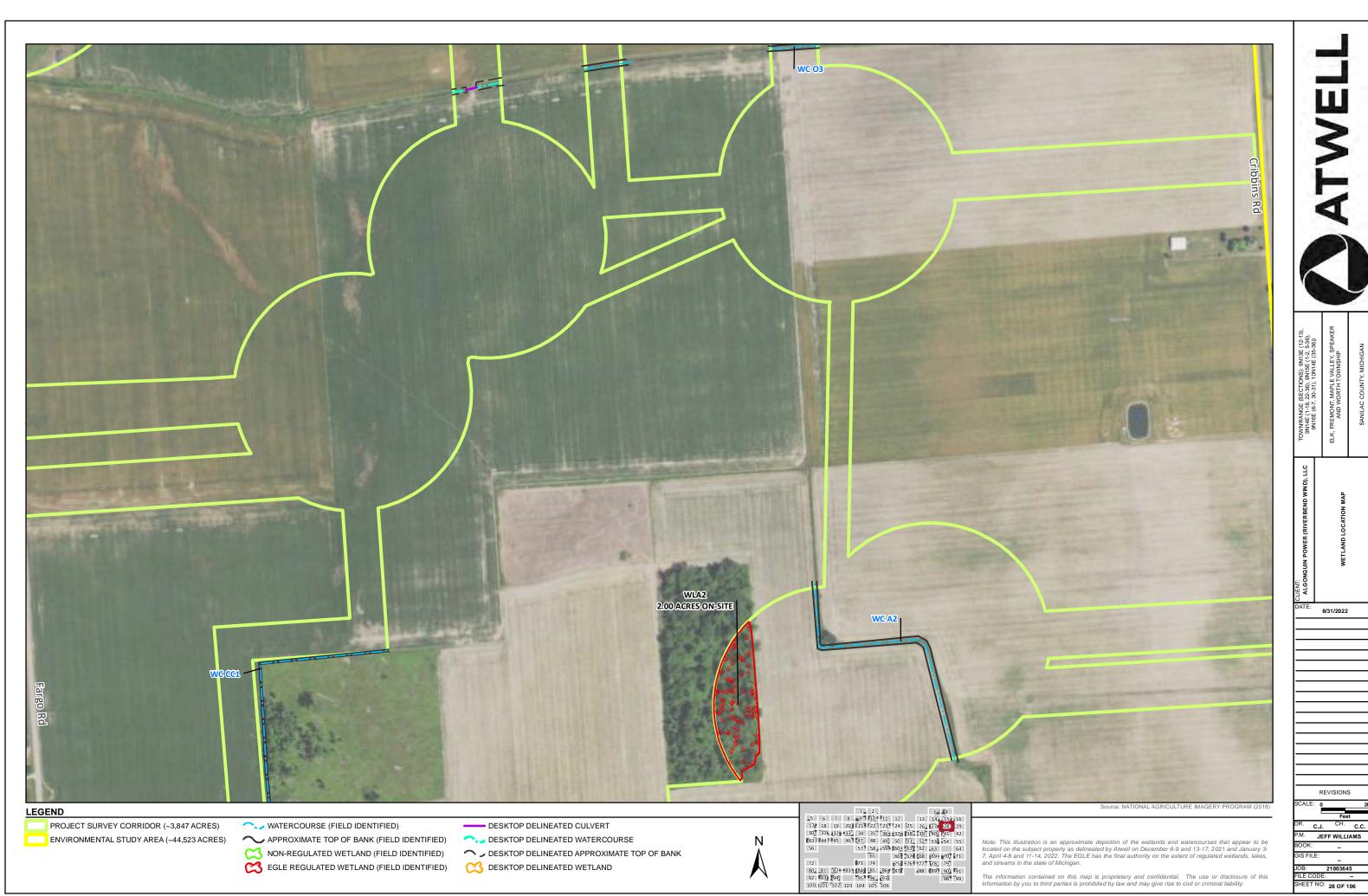
APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)

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Note: This illustration is an approximate depiction of the wetlands and watercourses that appear to be located on the subject properly as delineated by Atwell on December 6-9 and 13-17, 2021 and January 3-7, April 4-8 and 11-14, 2022. The EGLE has the final authority on the extent of regulated wetlands, lakes, and streams in the state of Michigan.



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8/31/2022

21003645

HEET NO: 28 OF 106



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21003645

HEET NO: 29 OF 106



LEGEND

PROJECT SURVEY CORRIDOR (~3,847 ACRES) ENVIRONMENTAL STUDY AREA (~44,523 ACRES) → WATERCOURSE (FIELD IDENTIFIED)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

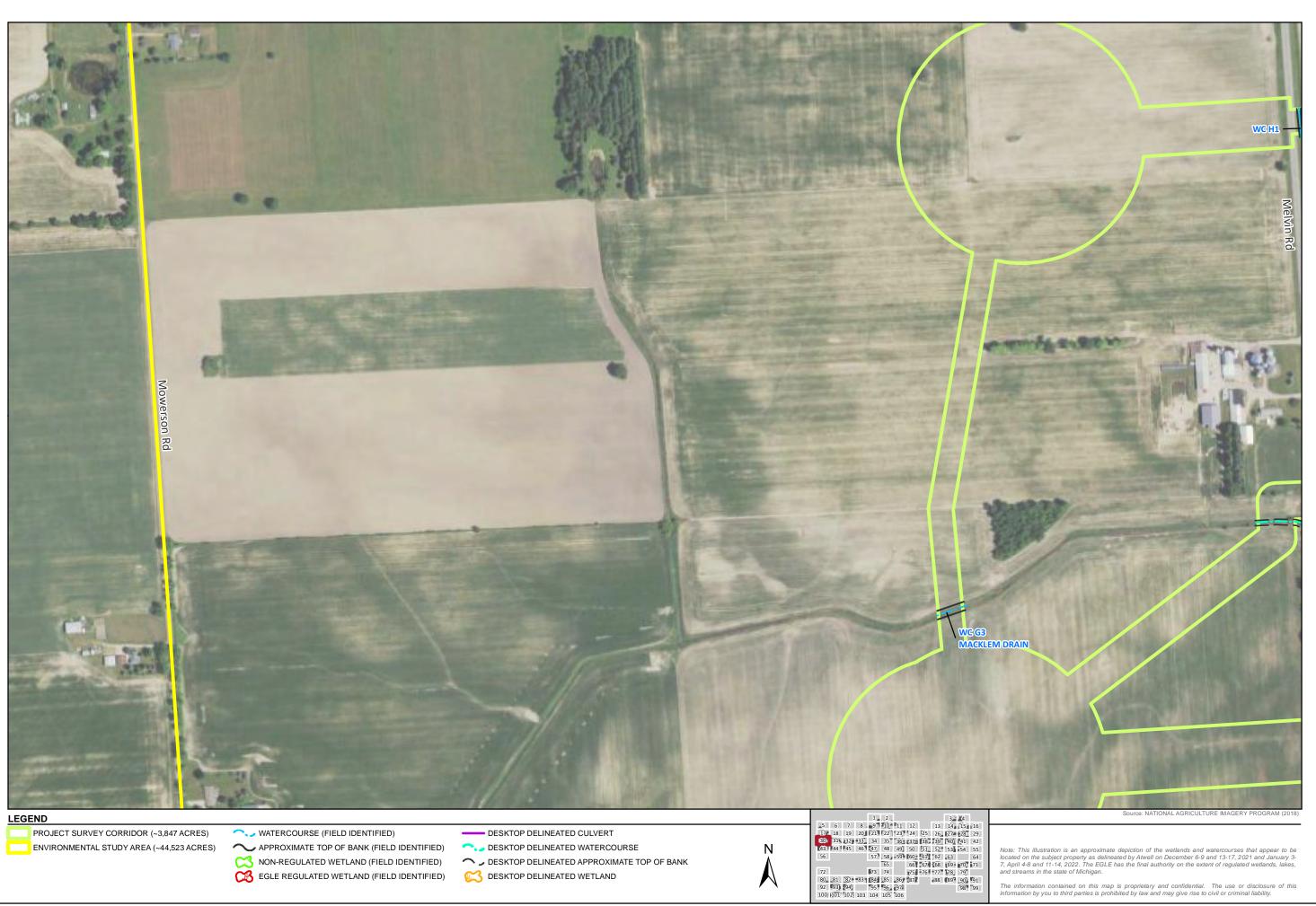
NON-REGULATED WETLAND (FIELD IDENTIFIED) EGLE REGULATED WETLAND (FIELD IDENTIFIED) DESKTOP DELINEATED WETLAND

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DESKTOP DELINEATED WETLAND

8/31/2022 C.J. CH. C.C. JEFF WILLIAMS

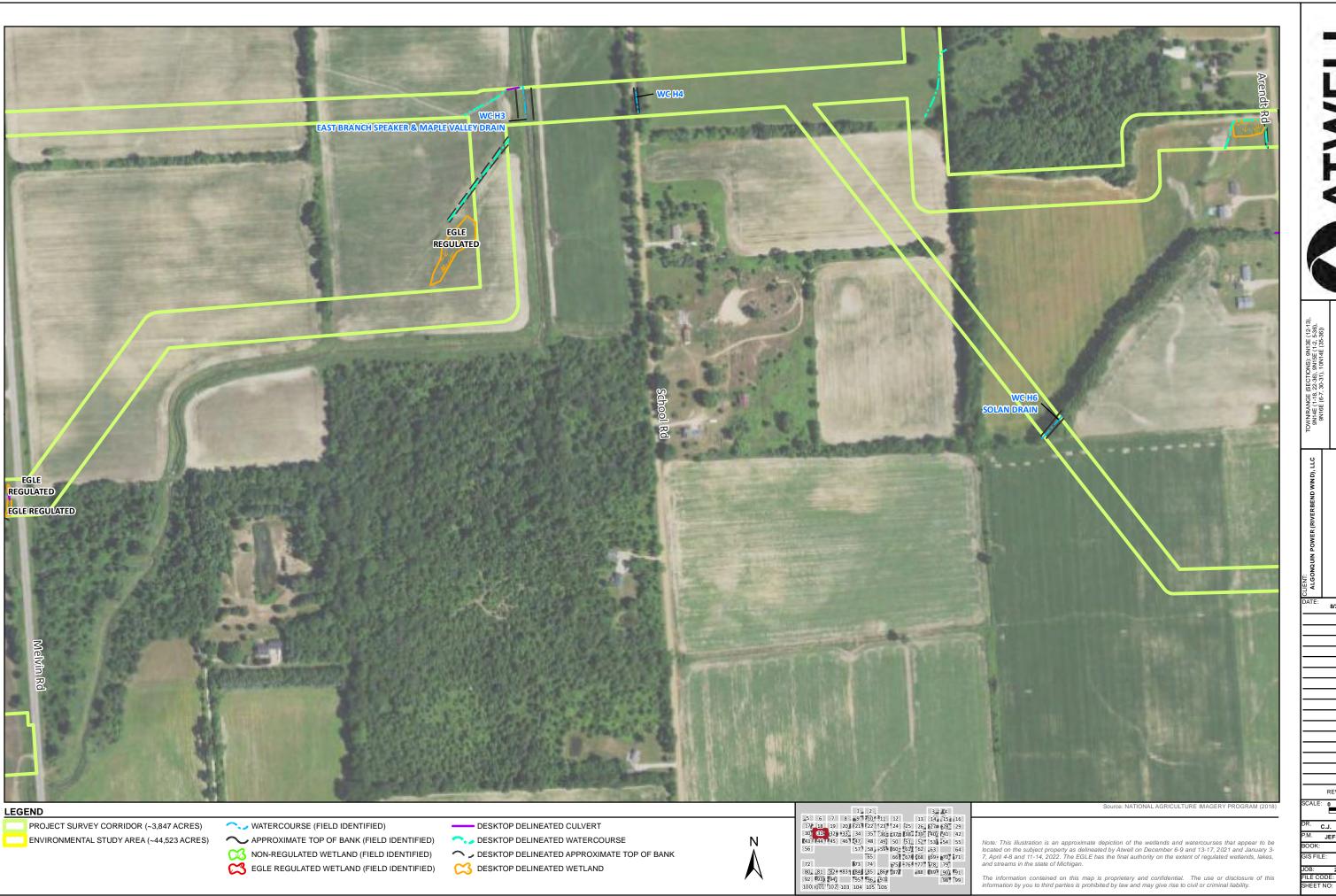
21003645

HEET NO: 30 OF 106

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NON-REGULATED WETLAND (FIELD IDENTIFIED)



WETLAND LOCATION MAP

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8/31/2022

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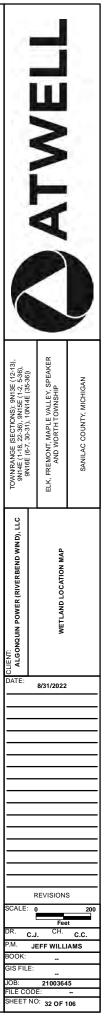
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JEFF WILLIAMS

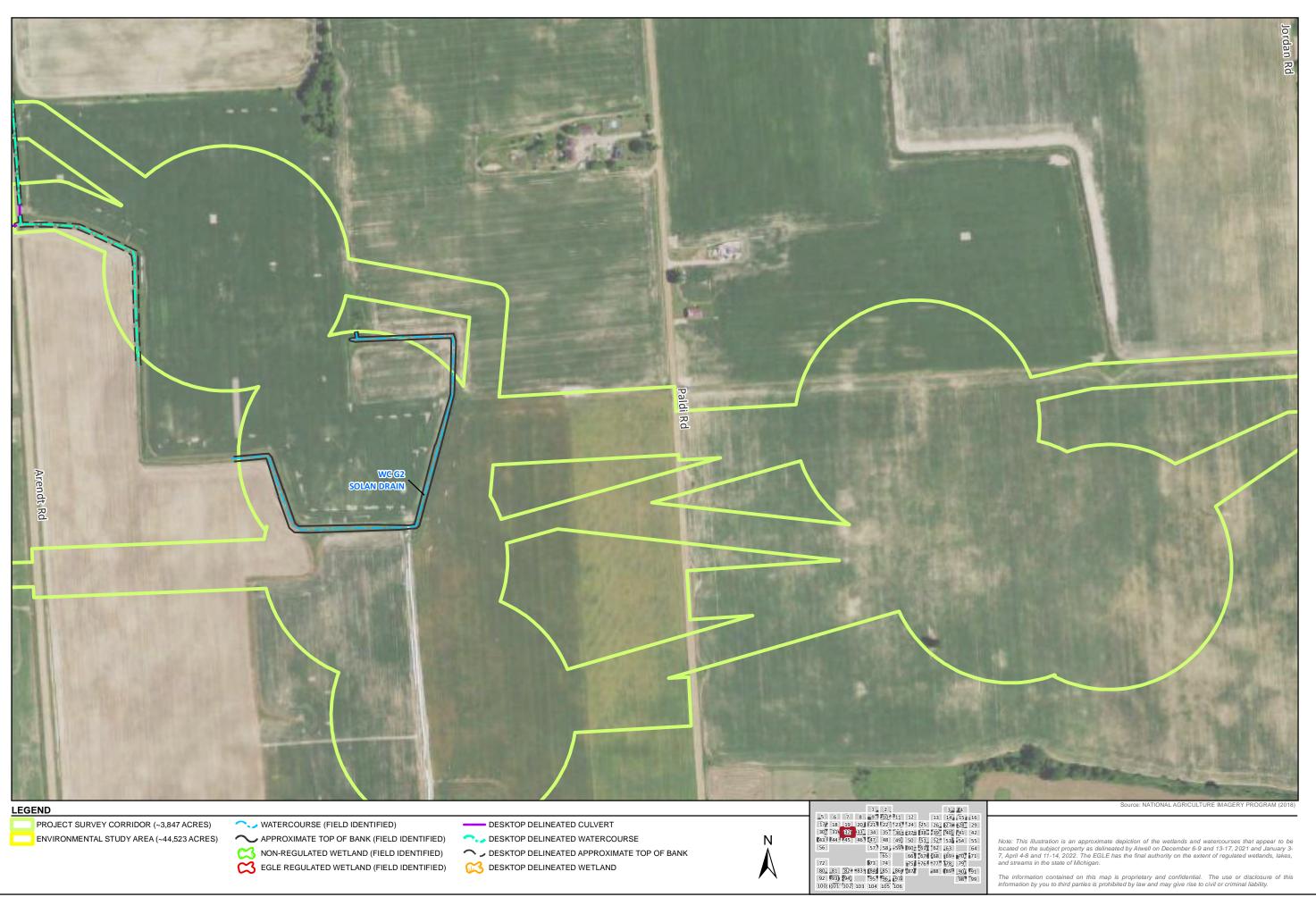
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CHEET NO: 31 OF 106



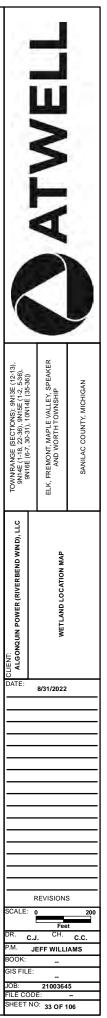
The information contained on this map is proprietary and confidential. The use or disclosure of this information by you to third parties is prohibited by law and may give rise to civil or criminal liability.



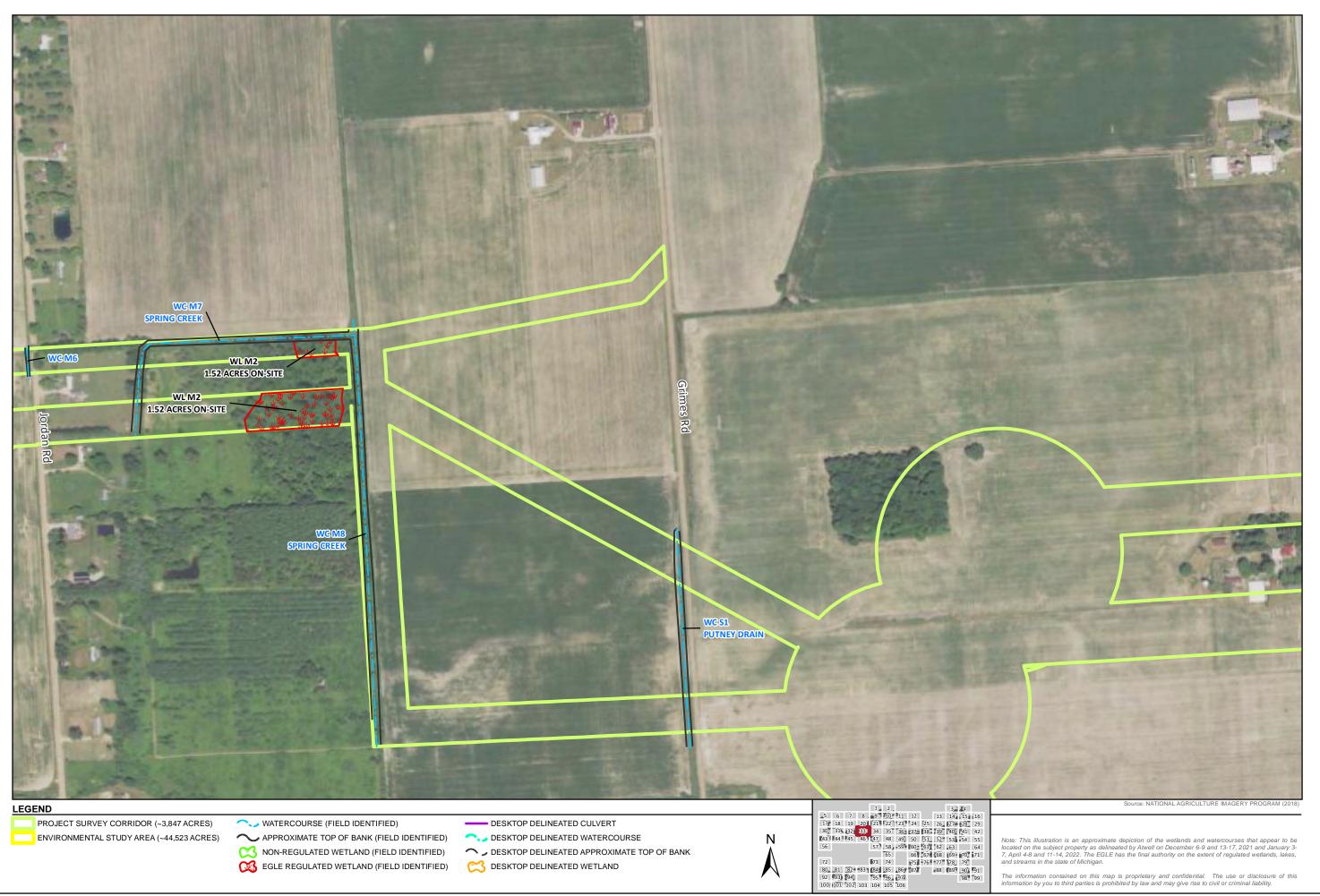
CC DESKTOP DELINEATED WETLAND

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NON-REGULATED WETLAND (FIELD IDENTIFIED)



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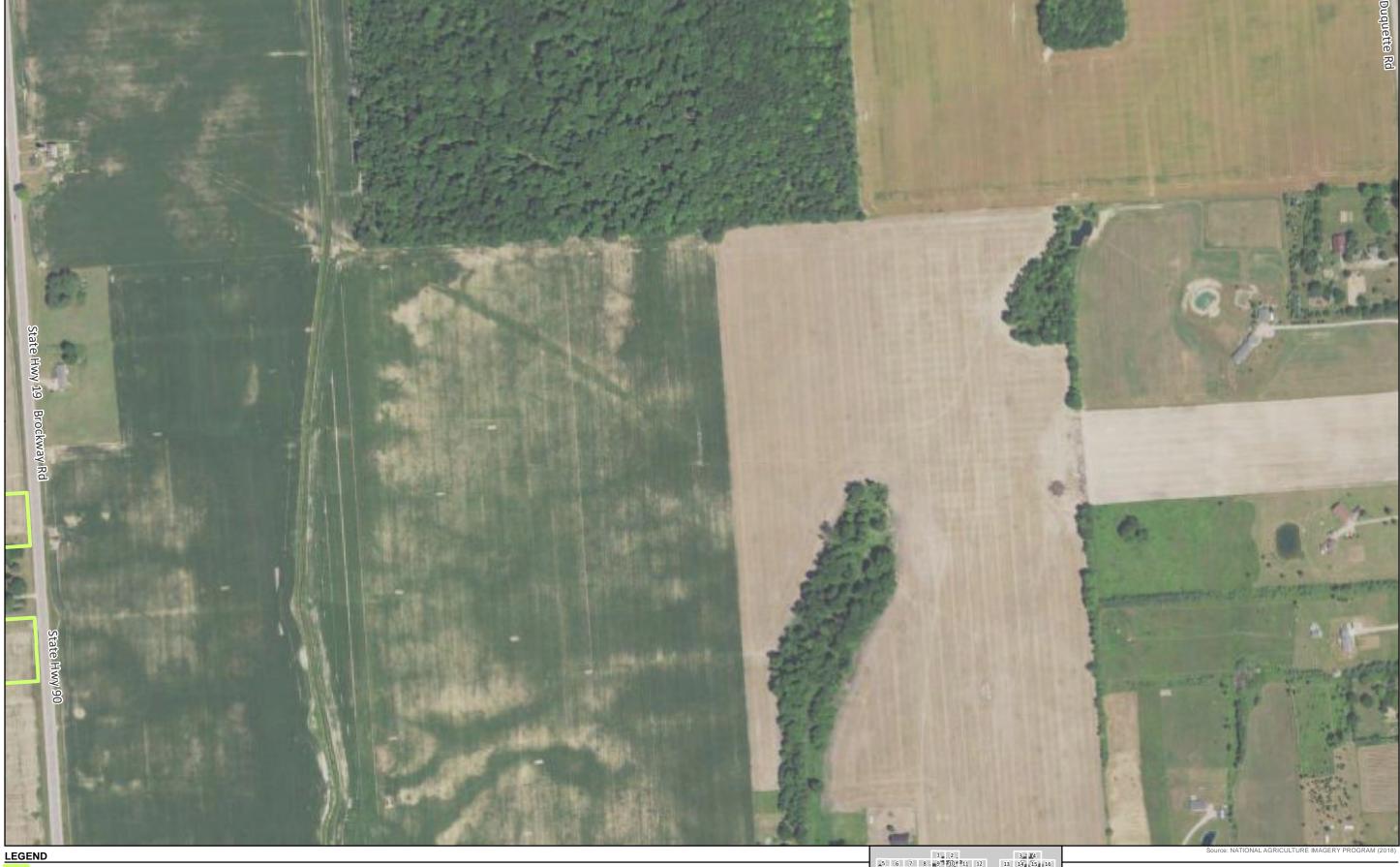
CC DESKTOP DELINEATED WETLAND

NON-REGULATED WETLAND (FIELD IDENTIFIED)

C.J. CH. C.C. JEFF WILLIAMS

21003645 HEET NO: 34 OF 106

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PROJECT SURVEY CORRIDOR (~3,847 ACRES) ENVIRONMENTAL STUDY AREA (~44,523 ACRES) ── WATERCOURSE (FIELD IDENTIFIED)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED) EGLE REGULATED WETLAND (FIELD IDENTIFIED) DESKTOP DELINEATED CULVERT

CONTRACTOR DELINEATED WATERCOURSE

DESKTOP DELINEATED WETLAND

Note: This illustration is an approximate depiction of the wetlands and watercourses that appear to be located on the subject properly as delineated by Atwell on December 6-9 and 13-17, 2021 and January 3-7, April 4-8 and 11-14, 2022. The EGLE has the final authority on the extent of regulated wetlands, lakes, and streams in the state of Michigan.



C.J. CH. C.C. JEFF WILLIAMS

21003645

HEET NO: 35 OF 106

Note: This illustration is an approximate depiction of the wetlands and watercourses that appear to be located on the subject properly as delineated by Atwell on December 6-9 and 13-17, 2021 and January 3-7, April 4-8 and 11-14, 2022. The EGLE has the final authority on the extent of regulated wetlands, lakes, and streams in the state of Michigan.

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DESKTOP DELINEATED CULVERT

DESKTOP DELINEATED WETLAND

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PROJECT SURVEY CORRIDOR (~3,847 ACRES)

ENVIRONMENTAL STUDY AREA (~44,523 ACRES)

── WATERCOURSE (FIELD IDENTIFIED)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED)

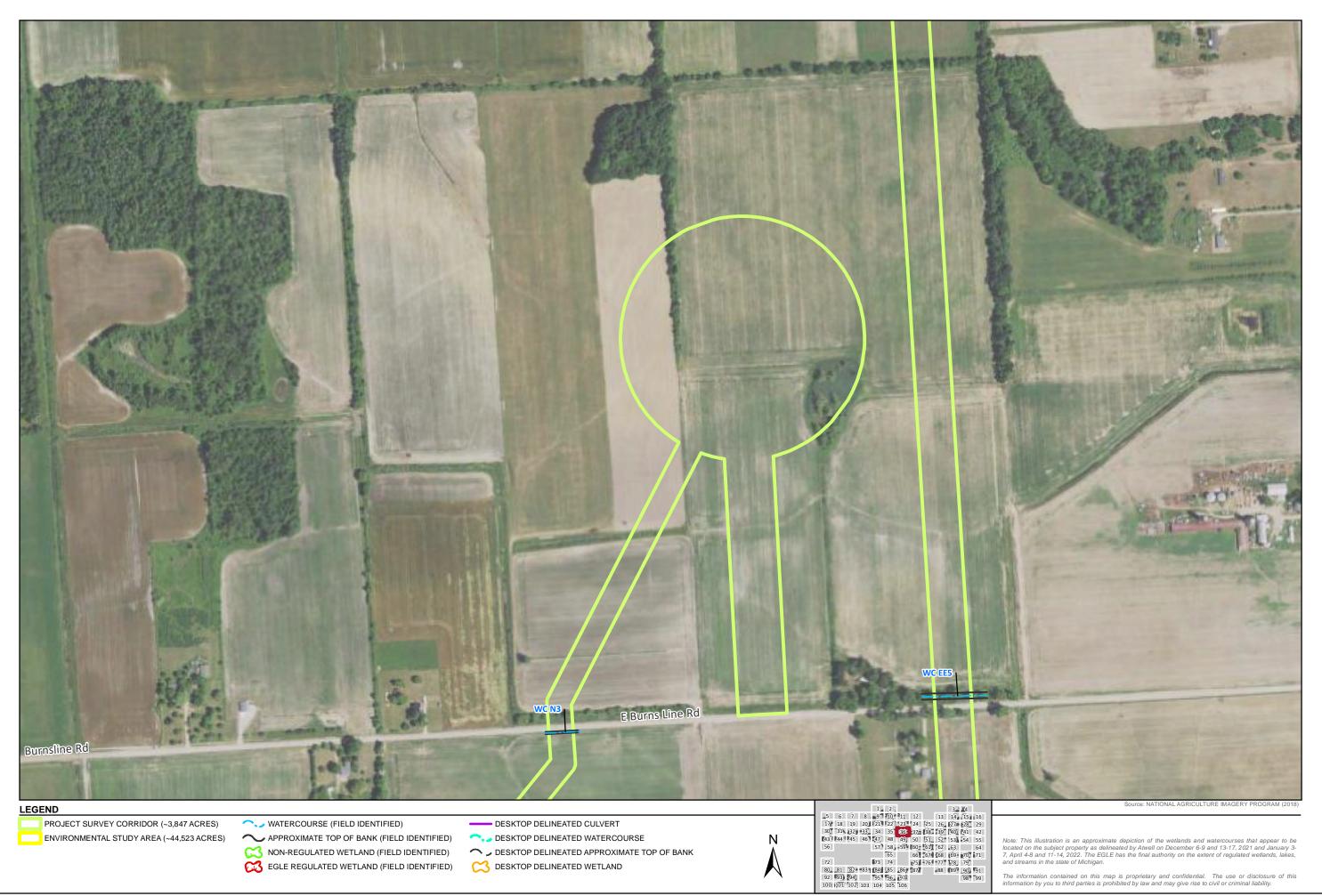


C.J. CH. C.C. JEFF WILLIAMS

21003645 HEET NO: 36 OF 106

Note: This illustration is an approximate depiction of the wetlands and watercourses that appear to be located on the subject properly as delineated by Atwell on December 6-9 and 13-17, 2021 and January 3-7, April 4-8 and 11-14, 2022. The EGLE has the final authority on the extent of regulated wetlands, lakes, and streams in the state of Michigan.

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ENVIRONMENTAL STUDY AREA (~44,523 ACRES)

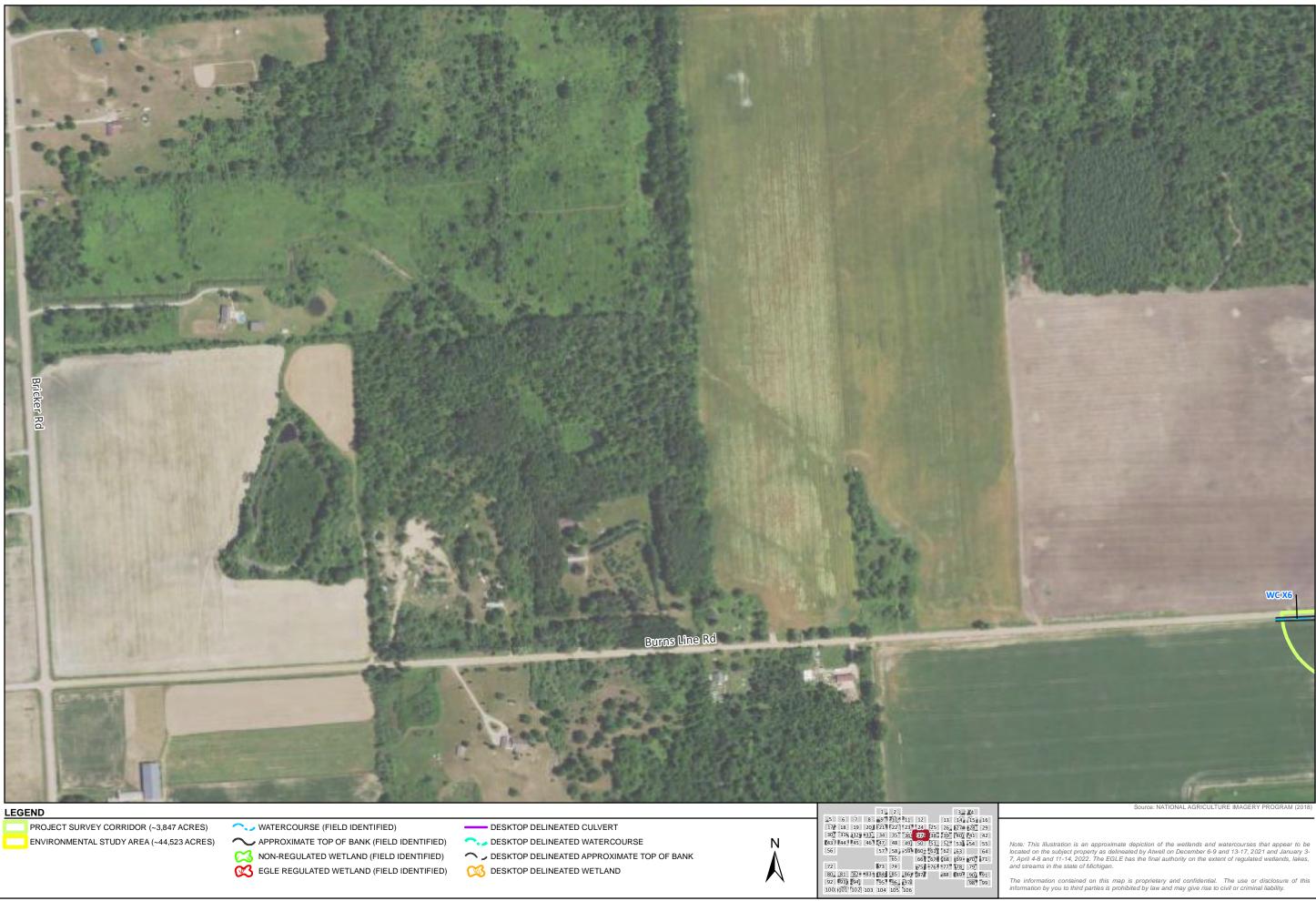
APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED)

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HEET NO: 37 OF 106

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ENVIRONMENTAL STUDY AREA (~44,523 ACRES)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED)



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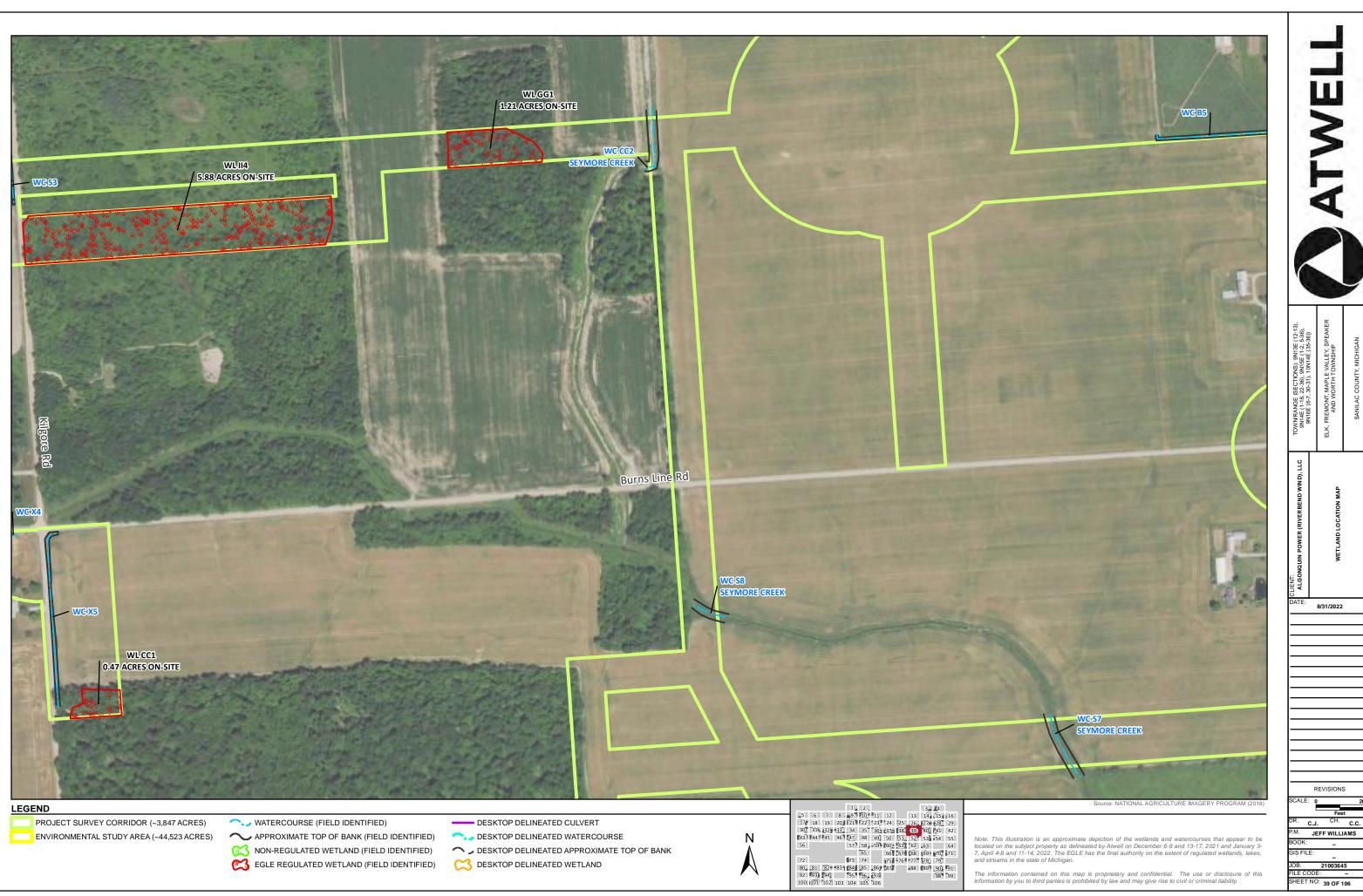
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HEET NO: 38 OF 106

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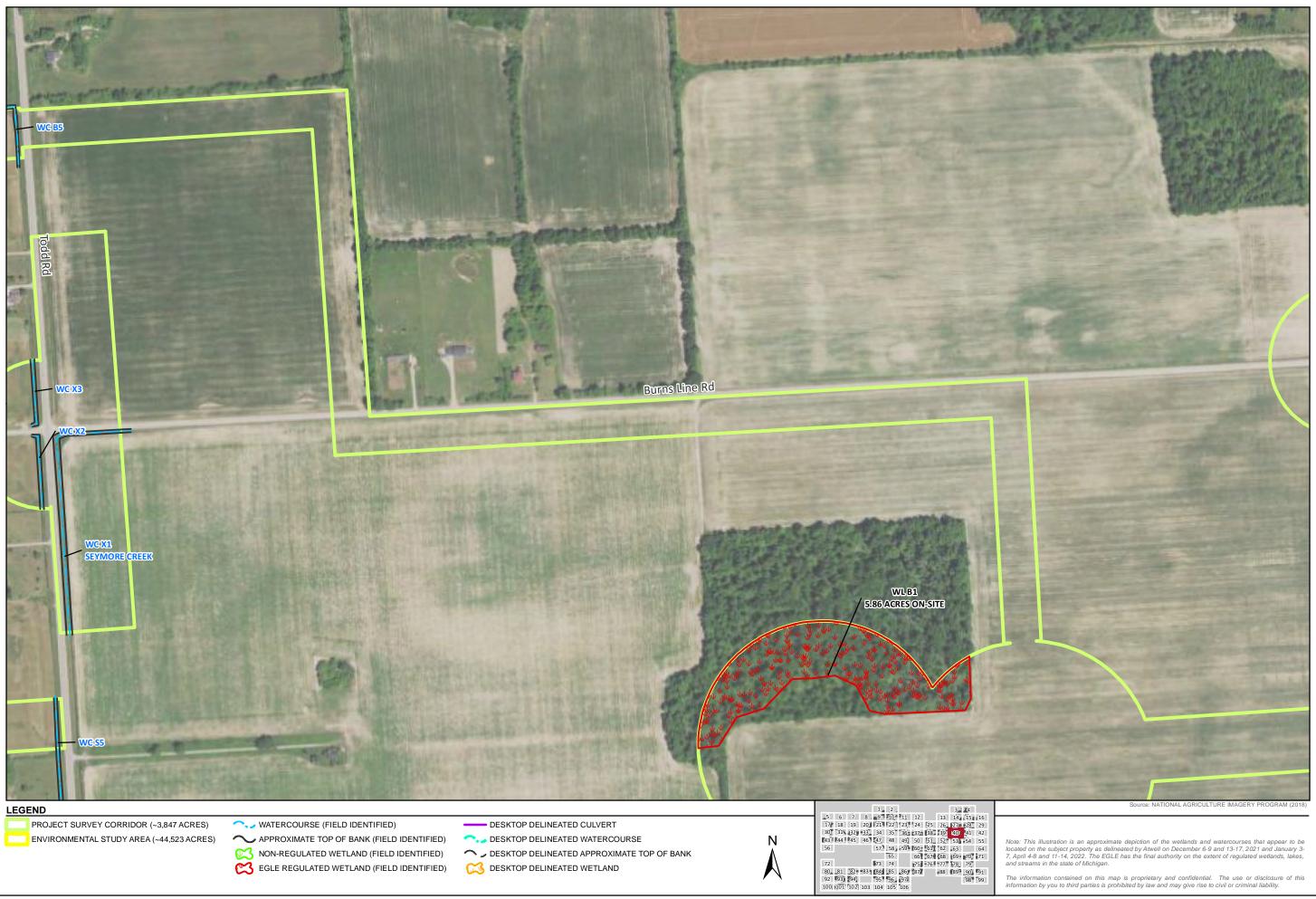
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NON-REGULATED WETLAND (FIELD IDENTIFIED)





HEET NO: 40 OF 106



Country Delineated Watercourse

DESKTOP DELINEATED WETLAND

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ENVIRONMENTAL STUDY AREA (~44,523 ACRES)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED)



C.J. CH. C.C. JEFF WILLIAMS

21003645 HEET NO: 41 OF 106

── WATERCOURSE (FIELD IDENTIFIED) DESKTOP DELINEATED CULVERT

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)

Country Delineated Watercourse

CAST DESKTOP DELINEATED WETLAND

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ENVIRONMENTAL STUDY AREA (~44,523 ACRES)

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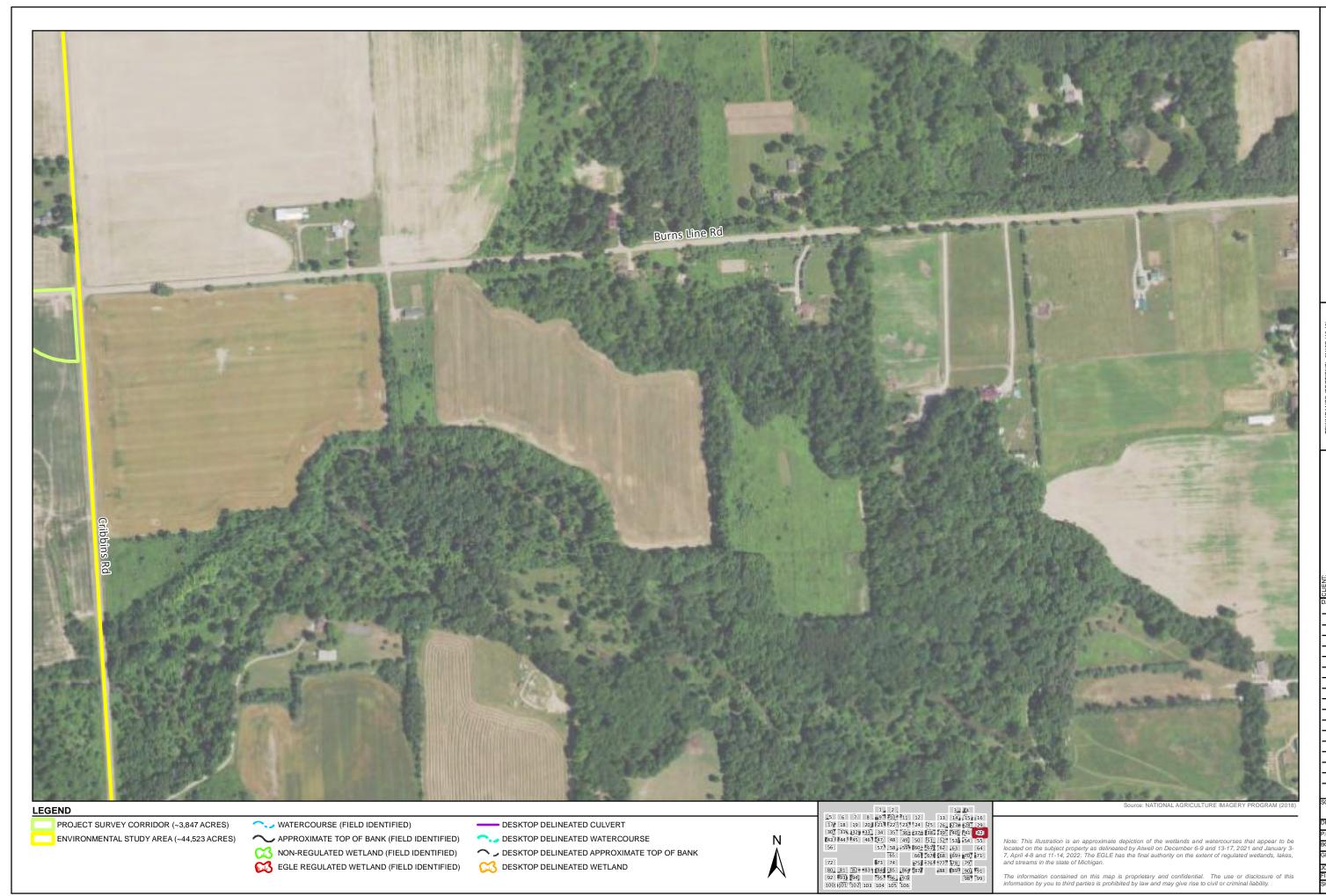
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HEET NO: 42 OF 106

Note: This illustration is an approximate depiction of the wetlands and watercourses that appear to be located on the subject properly as delineated by Atwell on December 6-9 and 13-17, 2021 and January 3-7, April 4-8 and 11-14, 2022. The EGLE has the final authority on the extent of regulated wetlands, lakes, and streams in the state of Michigan.

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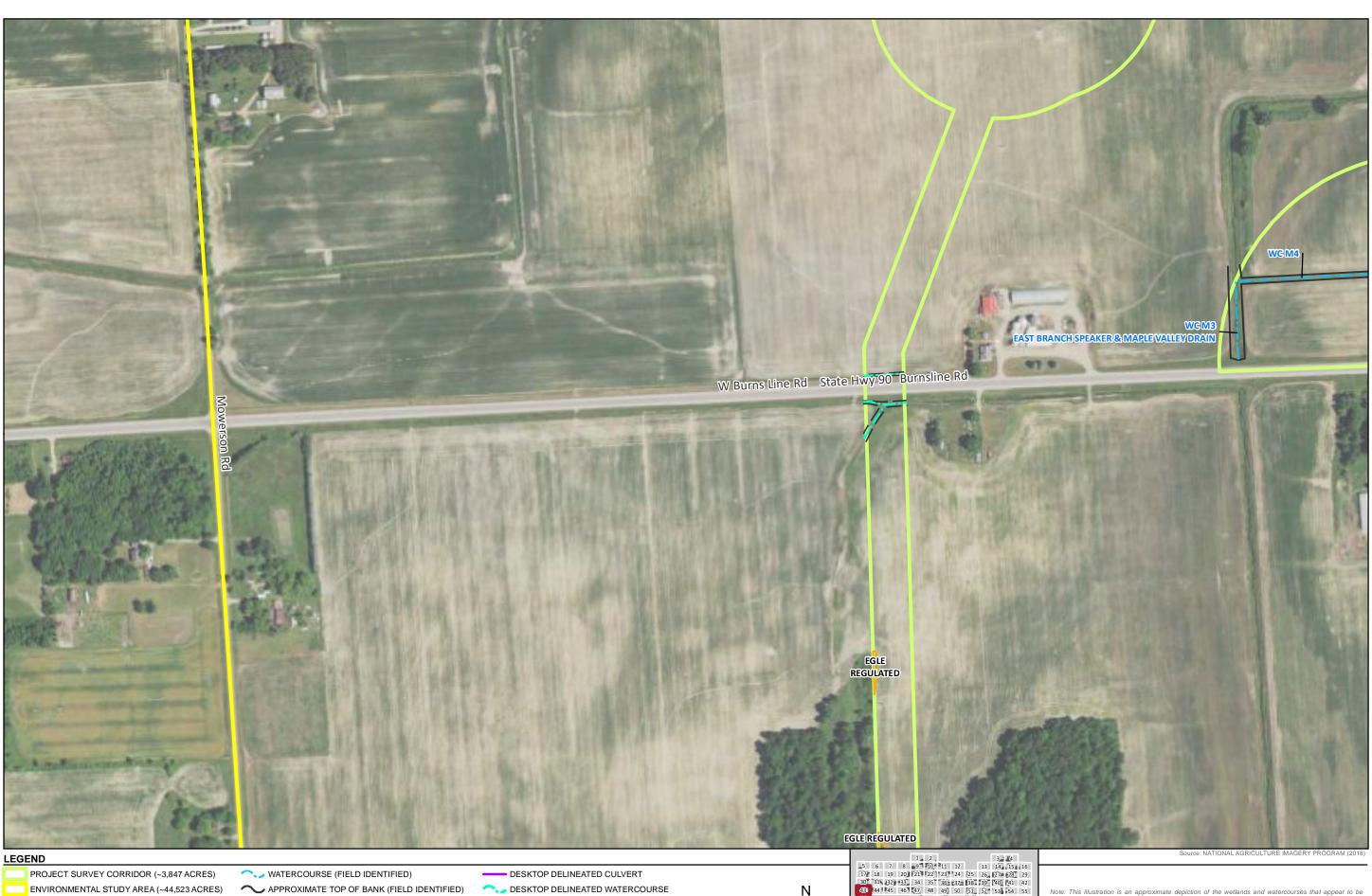
PROJECT SURVEY CORRIDOR (~3,847 ACRES)

ENVIRONMENTAL STUDY AREA (~44,523 ACRES)

→ WATERCOURSE (FIELD IDENTIFIED)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED)



C.J. CH. C.C.

JEFF WILLIAMS

21003645

HEET NO: 43 OF 106

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NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)

DESKTOP DELINEATED WETLAND

Note: This illustration is an approximate depiction of the wetlands and watercourses that appear to be located on the subject properly as delineated by Atwell on December 6-9 and 13-17, 2021 and January 3-7, April 4-8 and 11-14, 2022. The EGLE has the final authority on the extent of regulated wetlands, lakes, and streams in the state of Michigan.



PROJECT SURVEY CORRIDOR (~3,847 ACRES) ENVIRONMENTAL STUDY AREA (~44,523 ACRES) ── WATERCOURSE (FIELD IDENTIFIED)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED) NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)

Country Delineated Watercourse

CC DESKTOP DELINEATED WETLAND

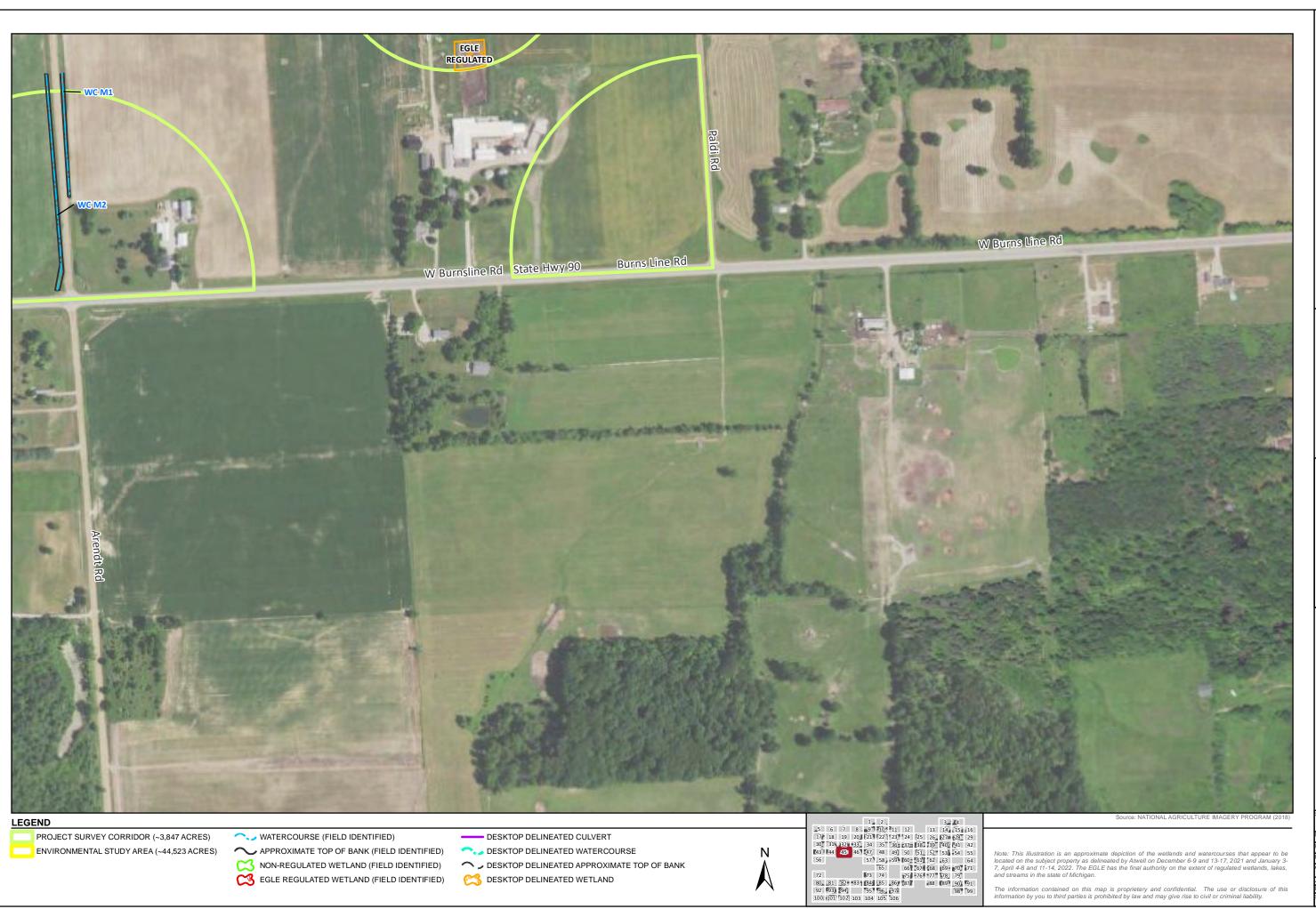
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8/31/2022

C.J. CH. C.C. JEFF WILLIAMS

21003645 HEET NO: 44 OF 106



CS DESKTOP DELINEATED WETLAND

8/31/2022

C.J. CH. C.C.

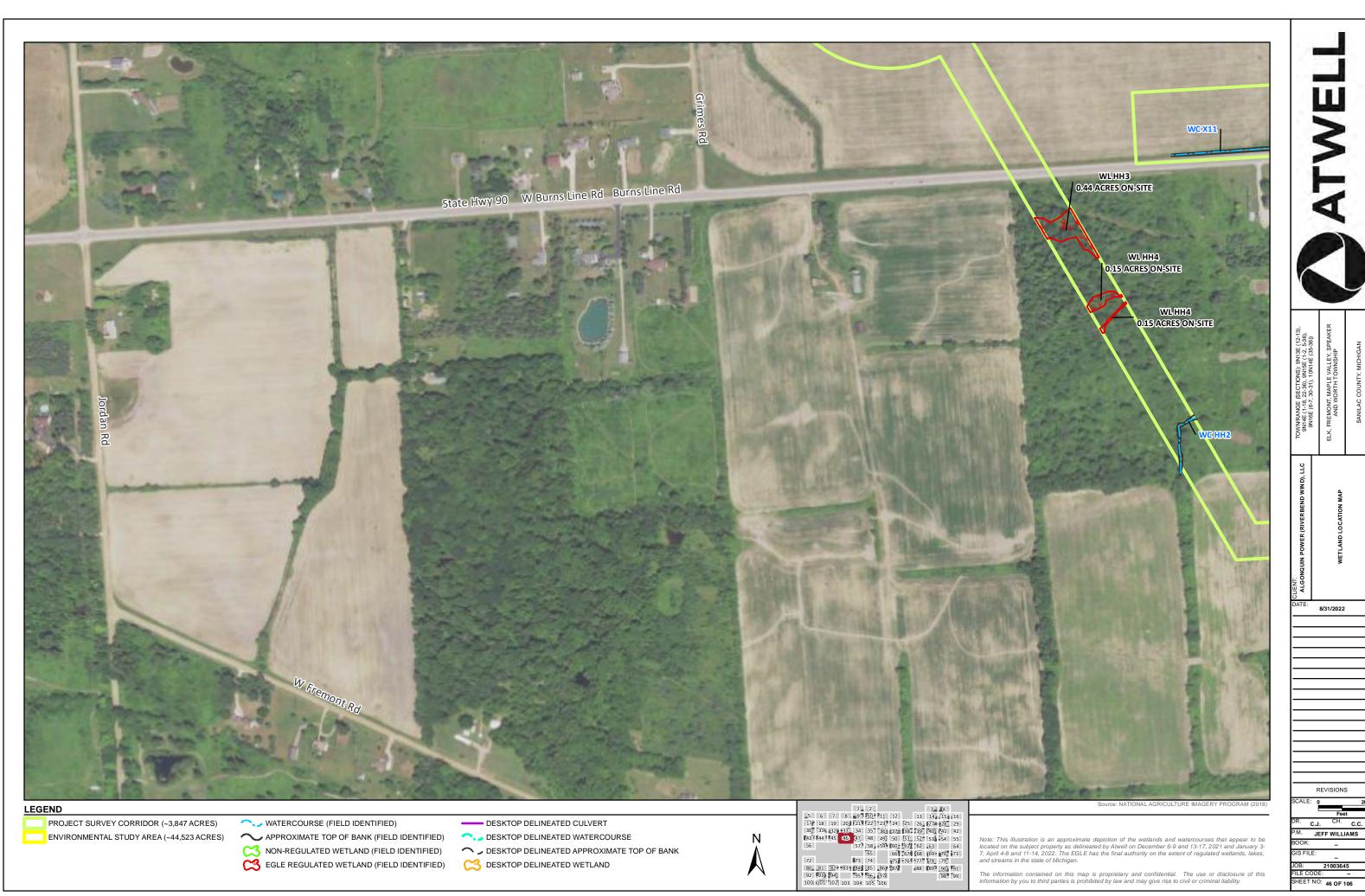
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JEFF WILLIAMS

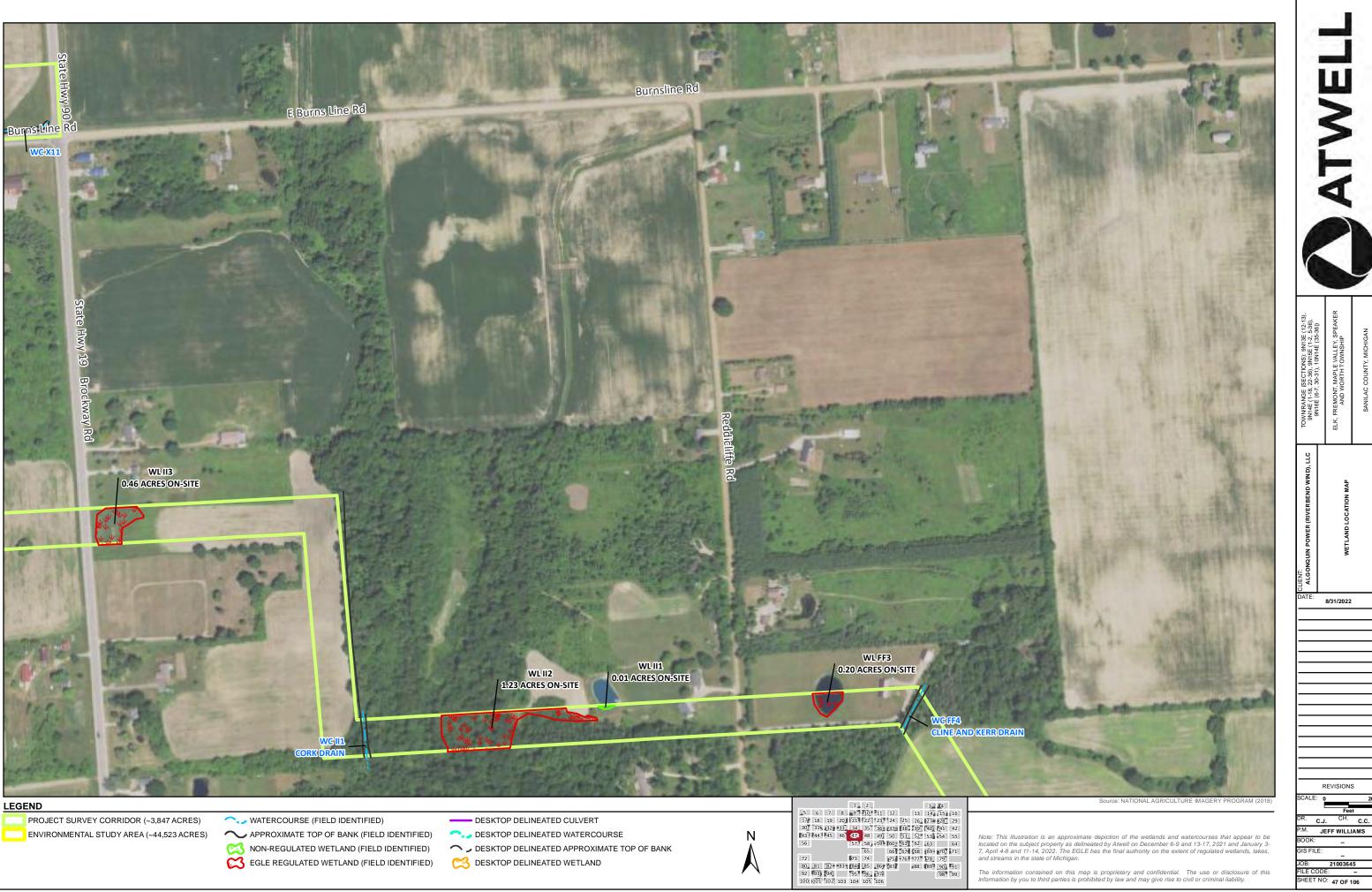
HEET NO: 45 OF 106

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NON-REGULATED WETLAND (FIELD IDENTIFIED)



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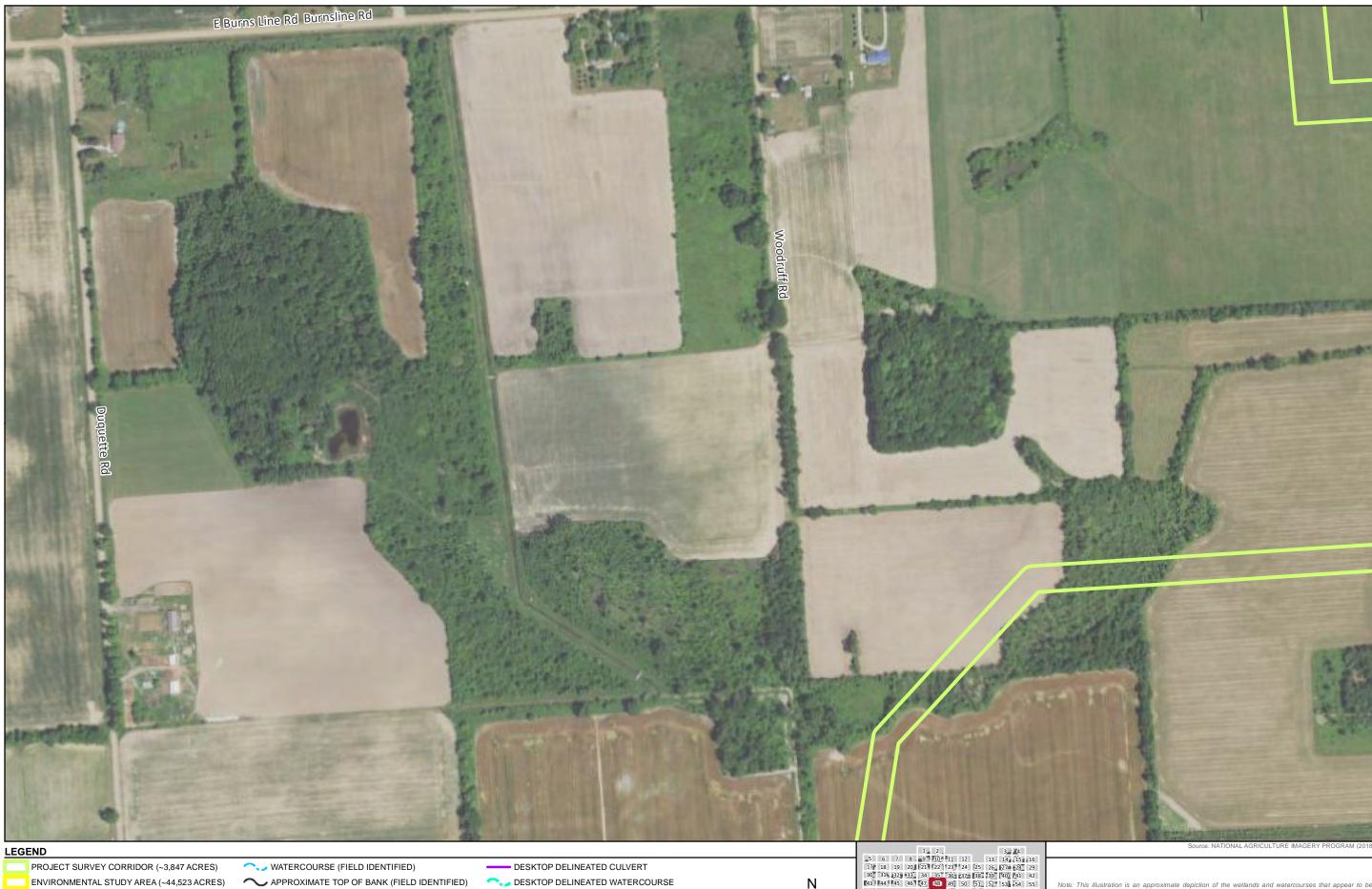


JEFF WILLIAMS

21003645 HEET NO: 48 OF 106

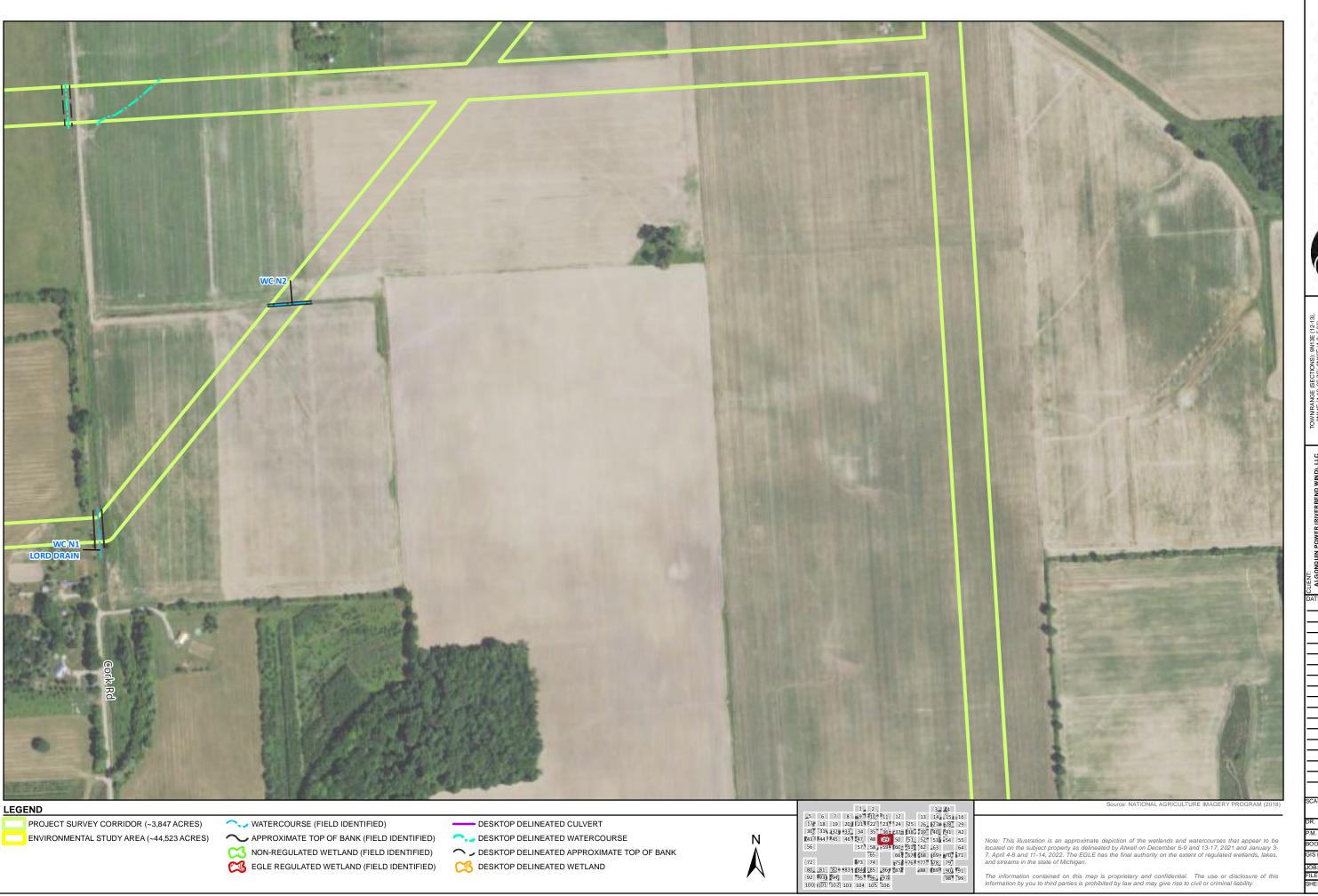
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MESKTOP DELINEATED WETLAND

NON-REGULATED WETLAND (FIELD IDENTIFIED)



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21003645 HEET NO: 49 OF 106

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21003645 HEET NO: 50 OF 106

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EGLE REGULATED WETLAND (FIELD IDENTIFIED)

CC DESKTOP DELINEATED WETLAND



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HEET NO: 51 OF 106

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NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)

DESKTOP DELINEATED WETLAND

Note: This illustration is an approximate depiction of the wetlands and watercourses that appear to be located on the subject properly as delineated by Atwell on December 6-9 and 13-17, 2021 and January 3-7, April 4-8 and 11-14, 2022. The EGLE has the final authority on the extent of regulated wetlands, lakes, and streams in the state of Michigan.



C.J. CH. C.C. JEFF WILLIAMS

21003645 HEET NO: 52 OF 106

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED) NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)

Country Delineated Watercourse

CC DESKTOP DELINEATED WETLAND

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ENVIRONMENTAL STUDY AREA (~44,523 ACRES)



LEGEND

PROJECT SURVEY CORRIDOR (~3,847 ACRES) ENVIRONMENTAL STUDY AREA (~44,523 ACRES) ── WATERCOURSE (FIELD IDENTIFIED)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED) EGLE REGULATED WETLAND (FIELD IDENTIFIED) DESKTOP DELINEATED CULVERT

Country Delineated Watercourse

CC DESKTOP DELINEATED WETLAND

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C.J. CH. C.C.

JEFF WILLIAMS

21003645

HEET NO: 53 OF 106



C.J. CH. C.C. JEFF WILLIAMS

21003645

HEET NO: 54 OF 106

NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)

Country Delineated Watercourse

CONTRACTOR DELINEATED WETLAND

Note: This illustration is an approximate depiction of the wetlands and watercourses that appear to be located on the subject properly as delineated by Atwell on December 6-9 and 13-17, 2021 and January 3-7, April 4-8 and 11-14, 2022. The EGLE has the final authority on the extent of regulated wetlands, lakes, and streams in the state of Michigan.

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PROJECT SURVEY CORRIDOR (~3,847 ACRES)

ENVIRONMENTAL STUDY AREA (~44,523 ACRES)

C.J. CH. C.C.

JEFF WILLIAMS

HEET NO: 55 OF 106

21003645

Note: This illustration is an approximate depiction of the wetlands and watercourses that appear to be located on the subject properly as delineated by Atwell on December 6-9 and 13-17, 2021 and January 3-7, April 4-8 and 11-14, 2022. The EGLE has the final authority on the extent of regulated wetlands, lakes, and streams in the state of Michigan.

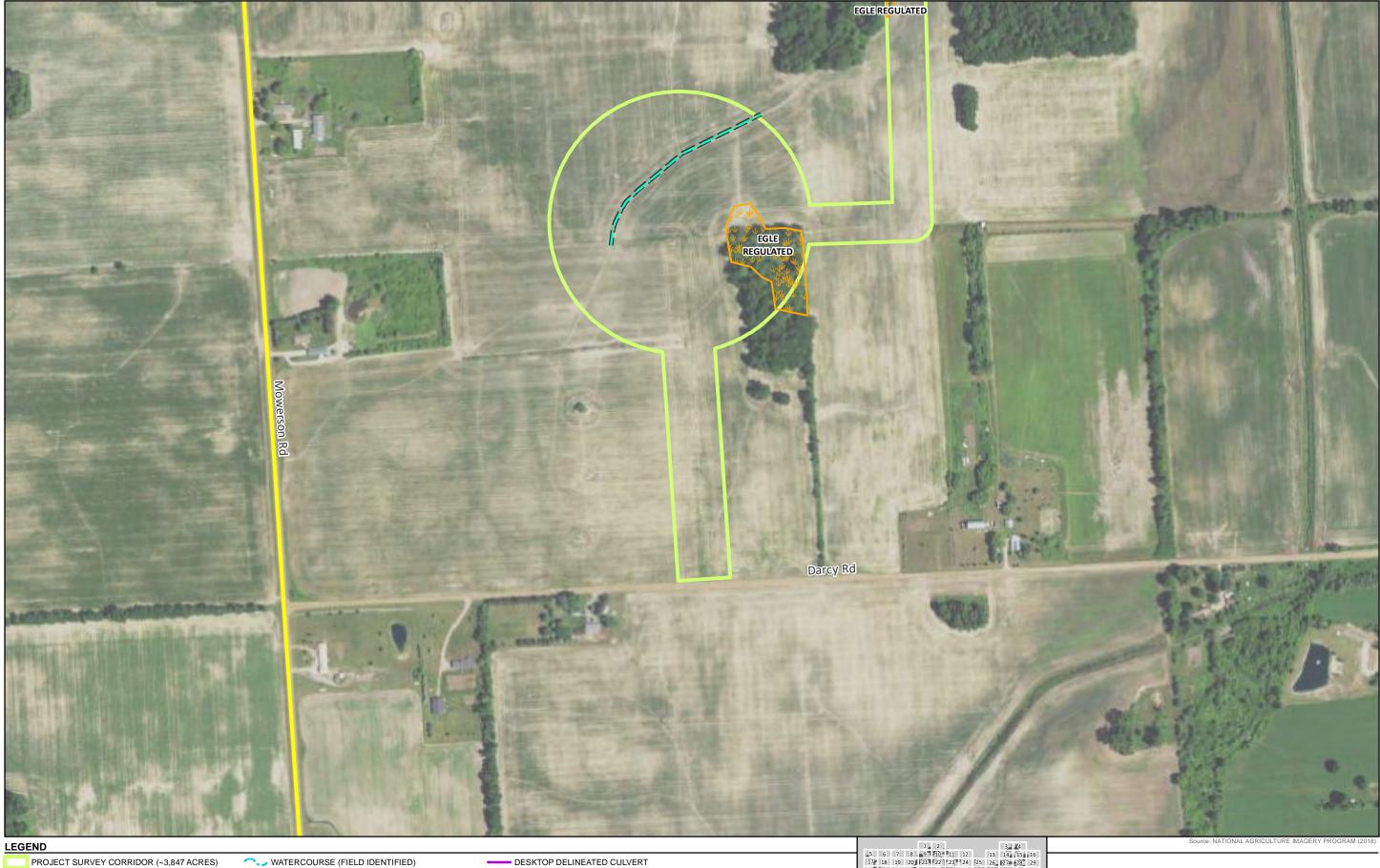
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→ DESKTOP DELINEATED APPROXIMATE TOP OF BANK

CCS DESKTOP DELINEATED WETLAND

NON-REGULATED WETLAND (FIELD IDENTIFIED)



 $G: Vobs 2100 \ T21003645\_Riverbend\_Sanilac Co\_MI \ Projects \ Wetlands \ T21003645\_WLM.mxd$ 

── WATERCOURSE (FIELD IDENTIFIED) DESKTOP DELINEATED CULVERT APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)

Country Delineated Watercourse

DESKTOP DELINEATED WETLAND

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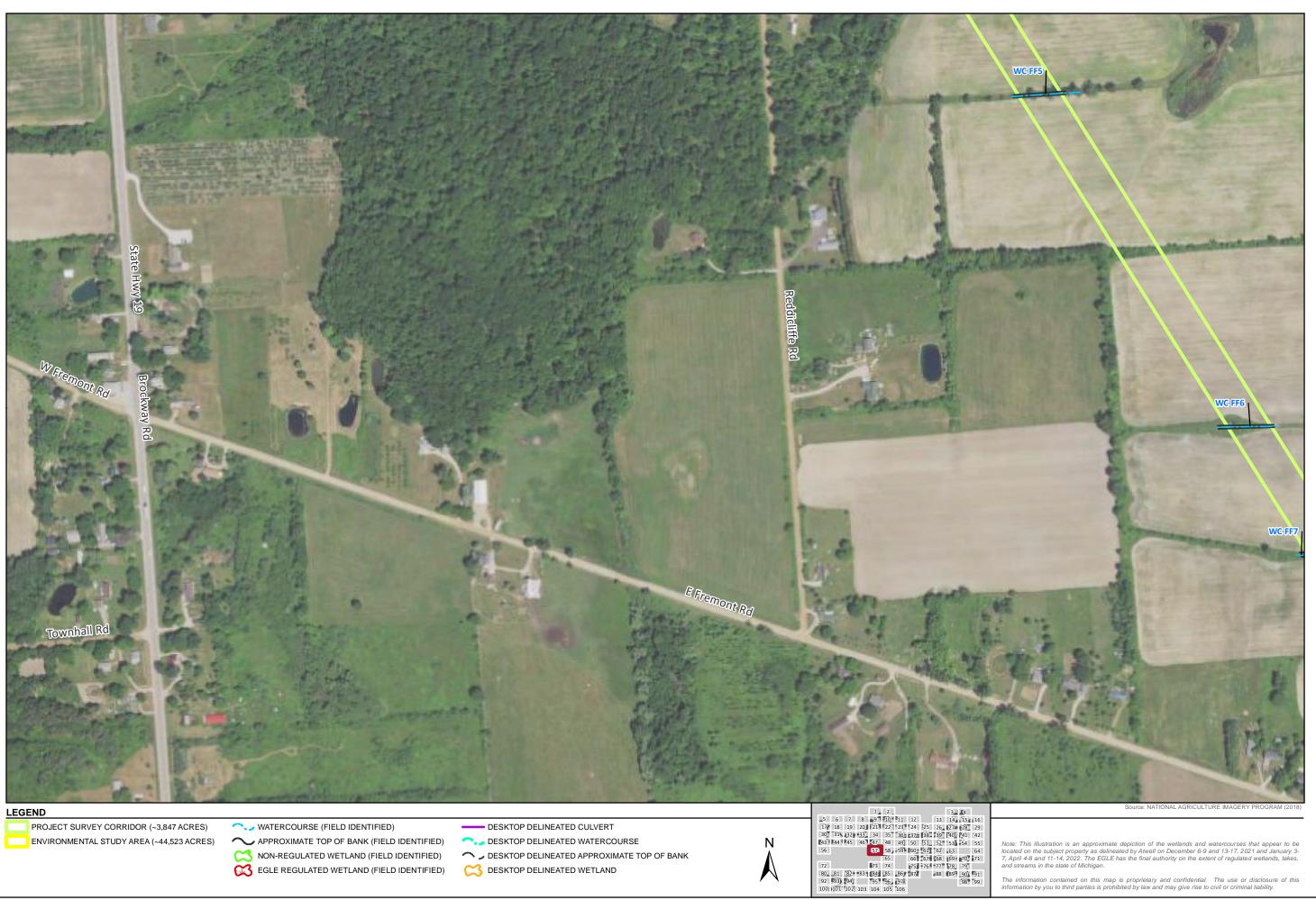
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21003645 HEET NO: 56 OF 106

ENVIRONMENTAL STUDY AREA (~44,523 ACRES)

Note: This illustration is an approximate depiction of the wetlands and watercourses that appear to be located on the subject properly as delineated by Atwell on December 6-9 and 13-17, 2021 and January 3-7, April 4-8 and 11-14, 2022. The EGLE has the final authority on the extent of regulated wetlands, lakes, and streams in the state of Michigan.

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ENVIRONMENTAL STUDY AREA (~44,523 ACRES)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

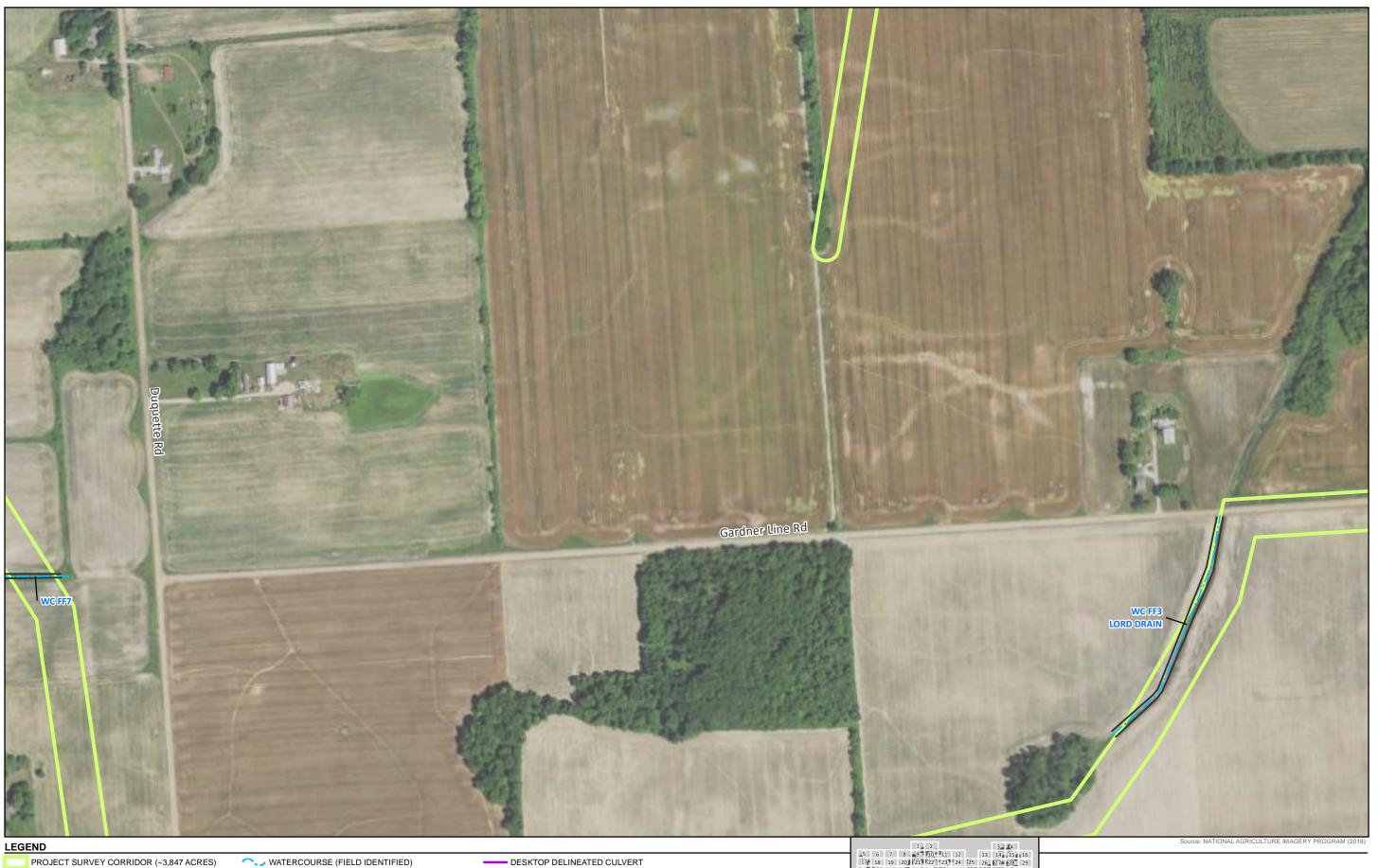
NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)

COURSE DESKTOP DELINEATED WATERCOURSE

CC DESKTOP DELINEATED WETLAND

HEET NO: 58 OF 106



 $G: \label{loss} G: \label{loss} G: \label{loss} G: \label{loss} We tlands \label{loss} T21003645\_WLM.mxd$ 

ENVIRONMENTAL STUDY AREA (~44,523 ACRES)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED)

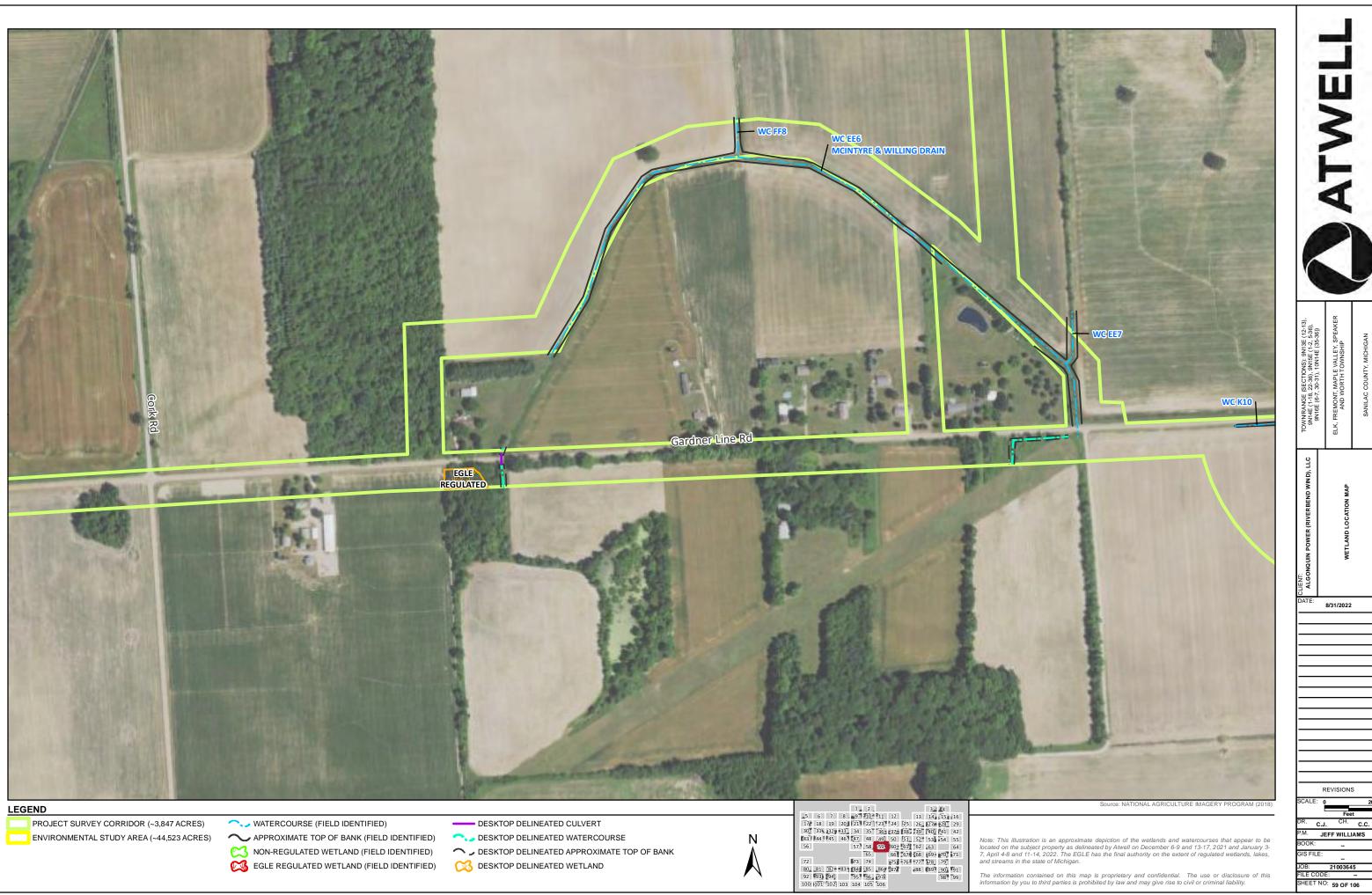
EGLE REGULATED WETLAND (FIELD IDENTIFIED)

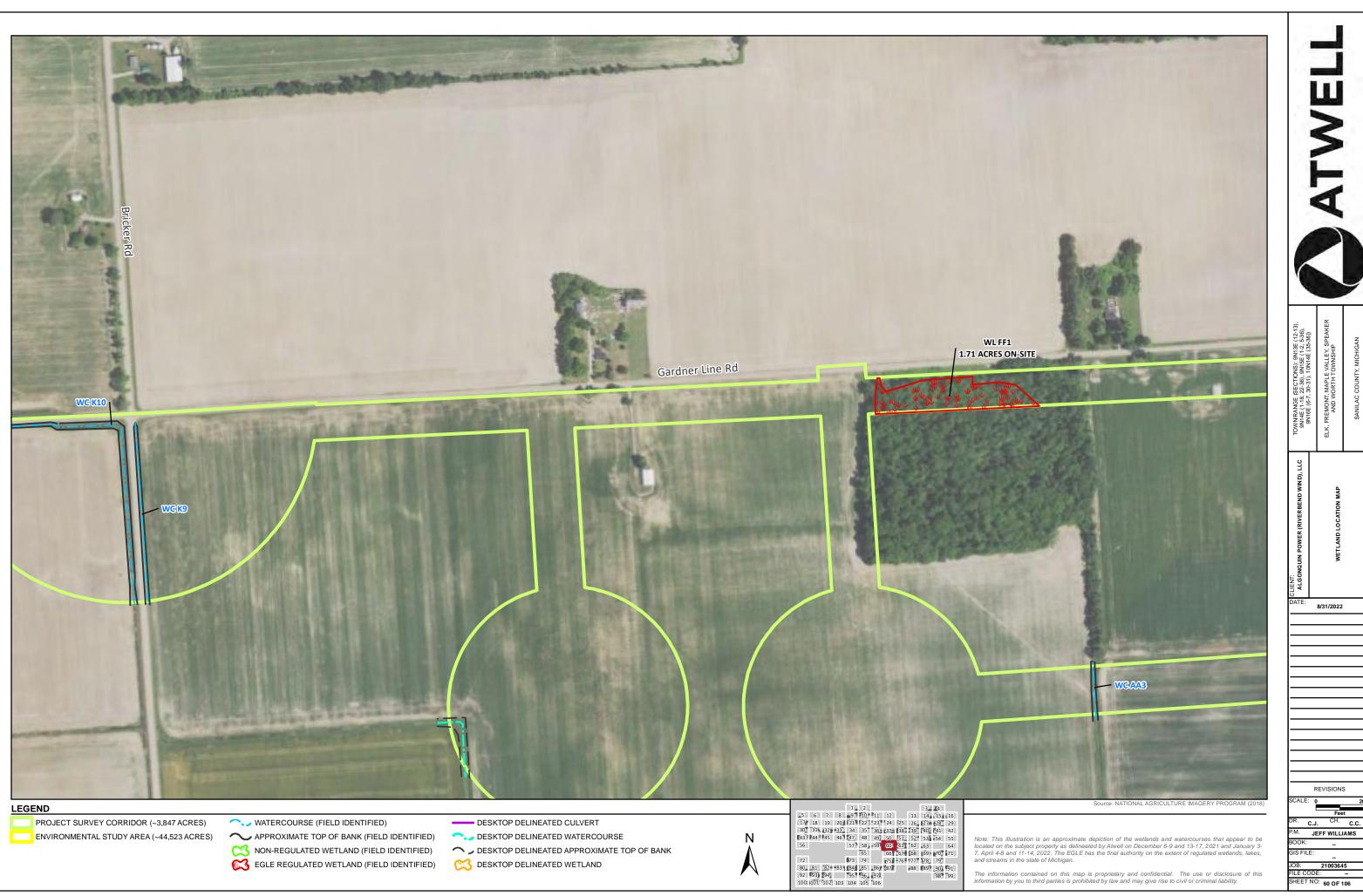
DESKTOP DELINEATED CULVERT

COURSE DESKTOP DELINEATED WATERCOURSE 

CONTRACTOR DELINEATED WETLAND

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 $G: Vobs2100 \ T21003645\_Riverbend\_SanilacCo\_MI\ Projects \ Wetlands \ T21003645\_WLM.mxd$ 



C.J. CH. C.C.

JEFF WILLIAMS

21003645 HEET NO: 61 OF 106

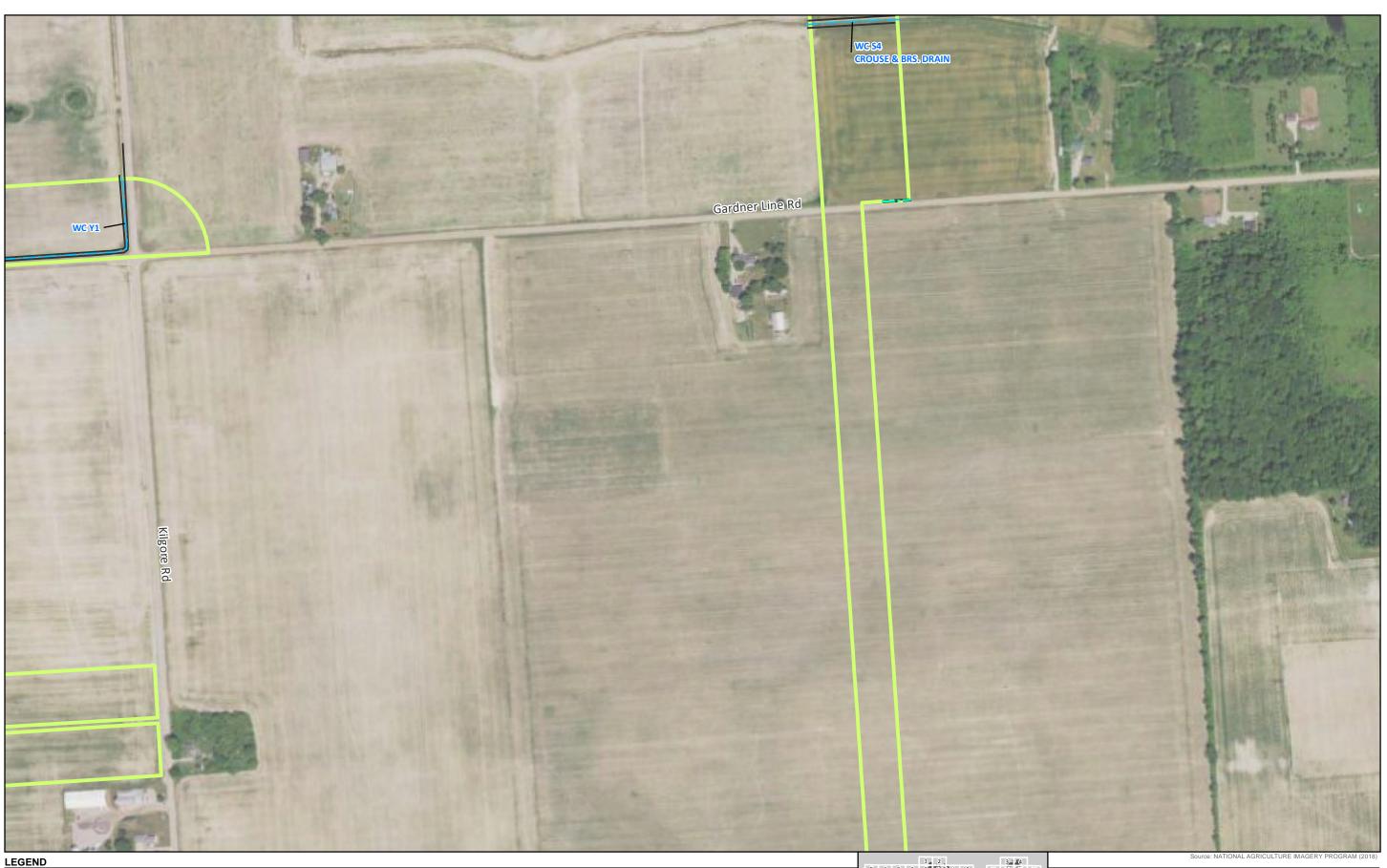
Country Delineated Watercourse

NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)

M DESKTOP DELINEATED WETLAND

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DESKTOP DELINEATED CULVERT

Country Delineated Watercourse

100) £01 102 103 104 105 106 Information by you to third parties is prohibited by law and may give rise

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ATWELL

WETT AMIN CONTRA BANK

8/31/2022

8/31/2022

REVISIONS

Feet CH. CC

C.J. CH. C.C.

M. JEFF WILLIAMS

OOK: \_\_

OB: 21003645
FILE CODE: SHEET NO: 62 OF 106

PROJECT SURVEY CORRIDOR (~3,847 ACRES)

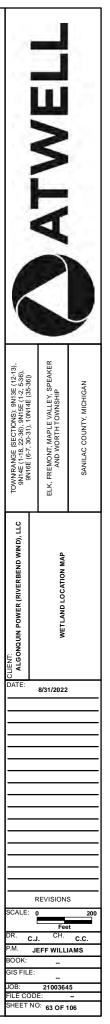
ENVIRONMENTAL STUDY AREA (~44,523 ACRES)

── WATERCOURSE (FIELD IDENTIFIED)

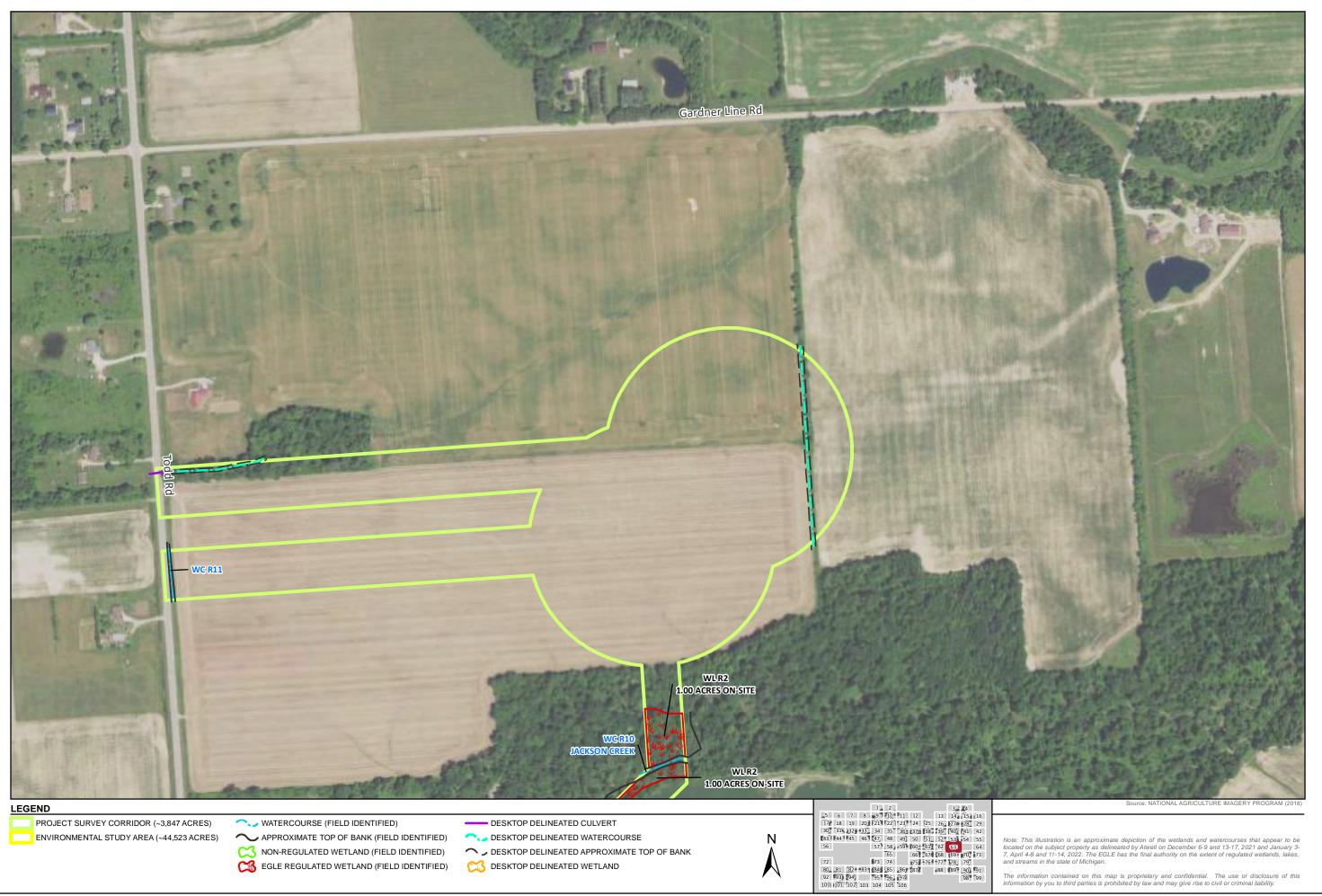
APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED) CS DESKTOP DELINEATED WETLAND



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DESKTOP DELINEATED WETLAND

NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)



C.J. CH. C.C. JEFF WILLIAMS

21003645 HEET NO: 64 OF 106

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## $G: \label{loss} G: \label{loss} G: \label{loss} G: \label{loss} We tlands \label{loss} T21003645\_WLM.mxd$

PROJECT SURVEY CORRIDOR (~3,847 ACRES)

ENVIRONMENTAL STUDY AREA (~44,523 ACRES)

── WATERCOURSE (FIELD IDENTIFIED)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)

DESKTOP DELINEATED CULVERT

CC DESKTOP DELINEATED WETLAND

COURSE DESKTOP DELINEATED WATERCOURSE

LEGEND

21003645

HEET NO: 65 OF 106



LEGEND

PROJECT SURVEY CORRIDOR (~3,847 ACRES)
ENVIRONMENTAL STUDY AREA (~44,523 ACRES)

→ WATERCOURSE (FIELD IDENTIFIED)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)

—— DESKTOP DELINEATED CULVERT

DESKTOP DELINEATED WATERCOURSE

DESKTOP DELINEATED APPROXIMATE TOP OF BANK

DESKTOP DELINEATED WETLAND

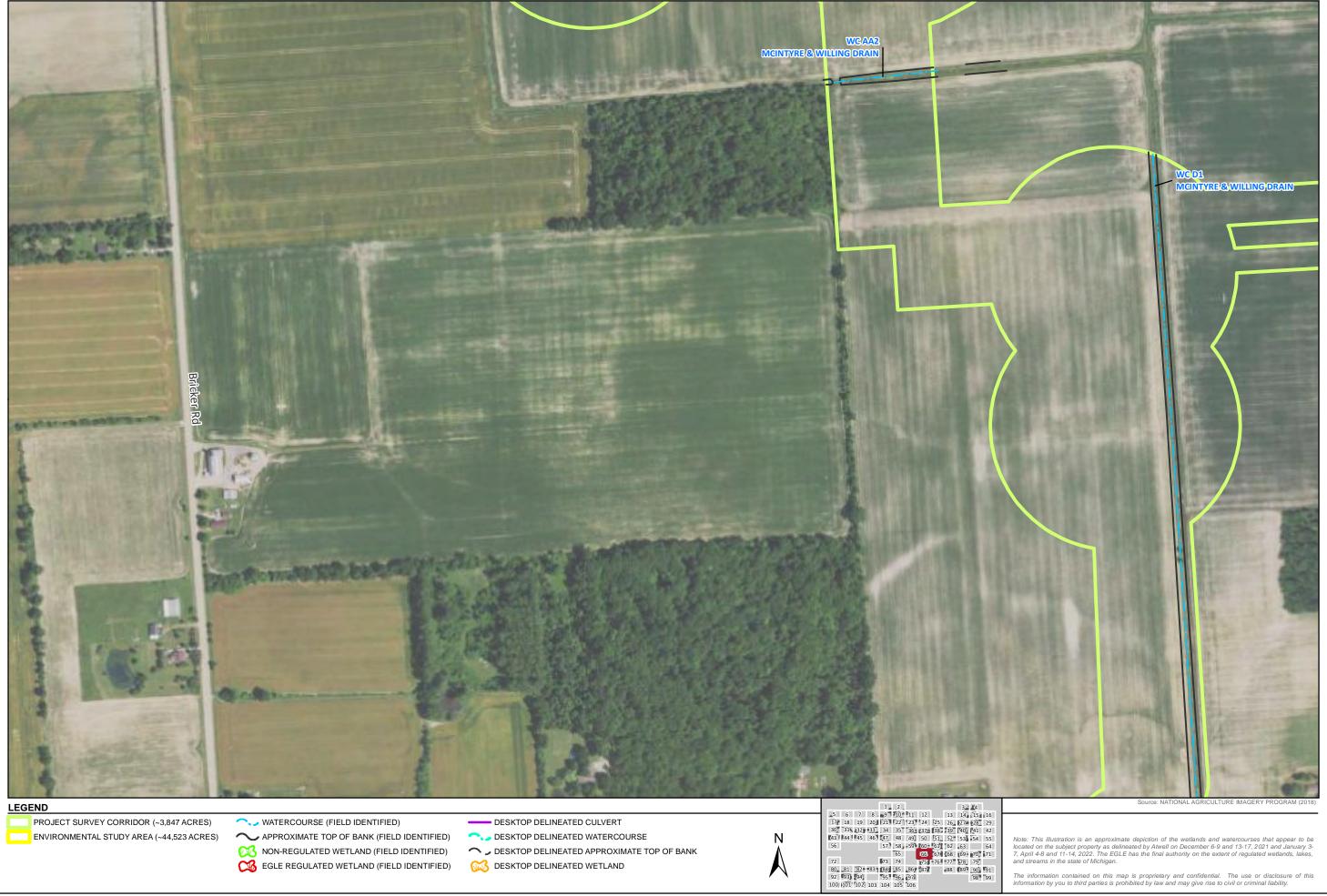
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21003645

HEET NO: 66 OF 106

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DESKTOP DELINEATED CULVERT

M DESKTOP DELINEATED WETLAND

Country Delineated Watercourse

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PROJECT SURVEY CORRIDOR (~3,847 ACRES)

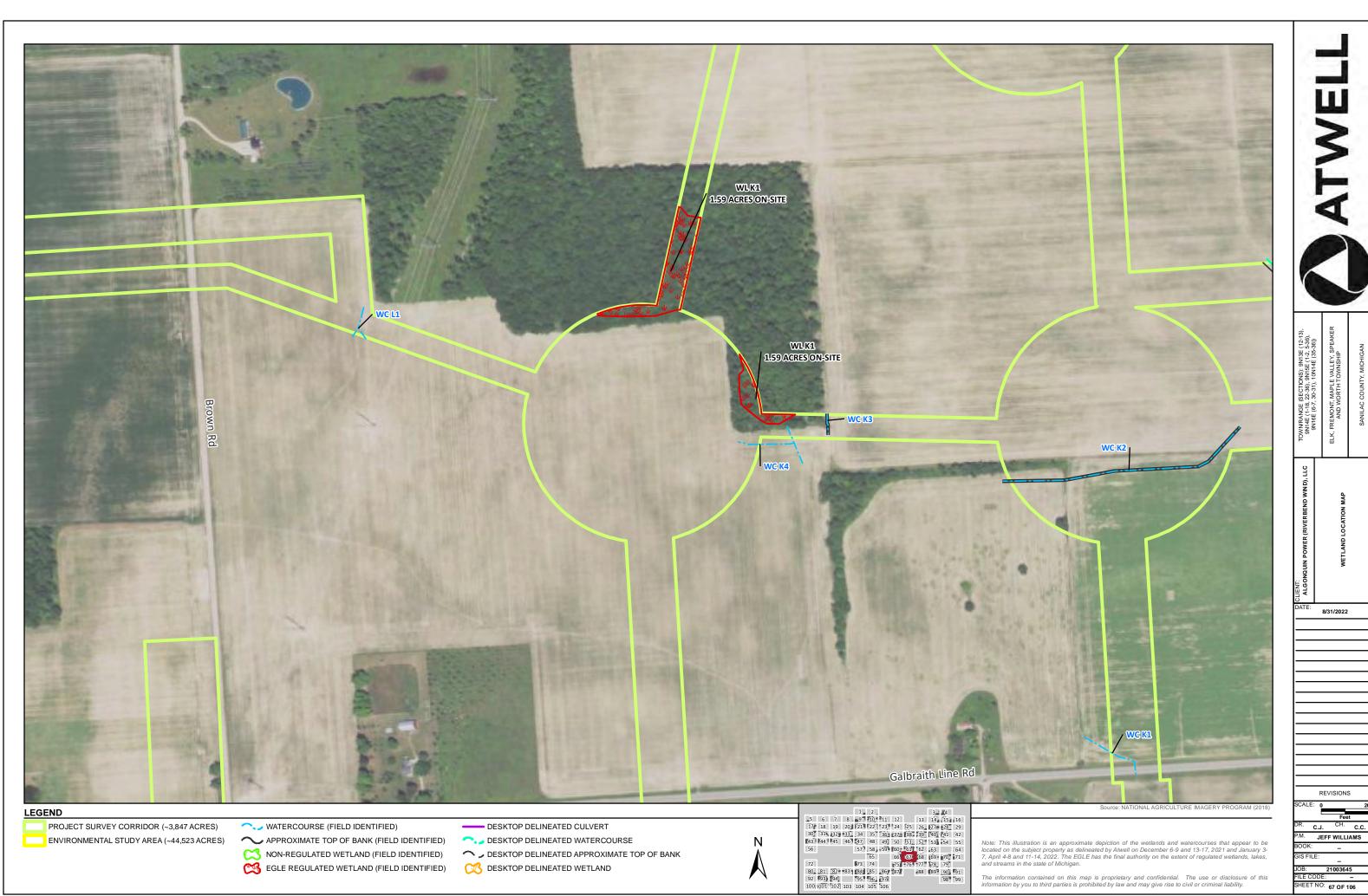
ENVIRONMENTAL STUDY AREA (~44,523 ACRES)

── WATERCOURSE (FIELD IDENTIFIED)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)



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JEFF WILLIAMS

21003645

HEET NO: 68 OF 106



LEGEND

PROJECT SURVEY CORRIDOR (~3,847 ACRES)
ENVIRONMENTAL STUDY AREA (~44,523 ACRES)

─ WATERCOURSE (FIELD IDENTIFIED)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)

DESKTOP DELINEATED CULVERT

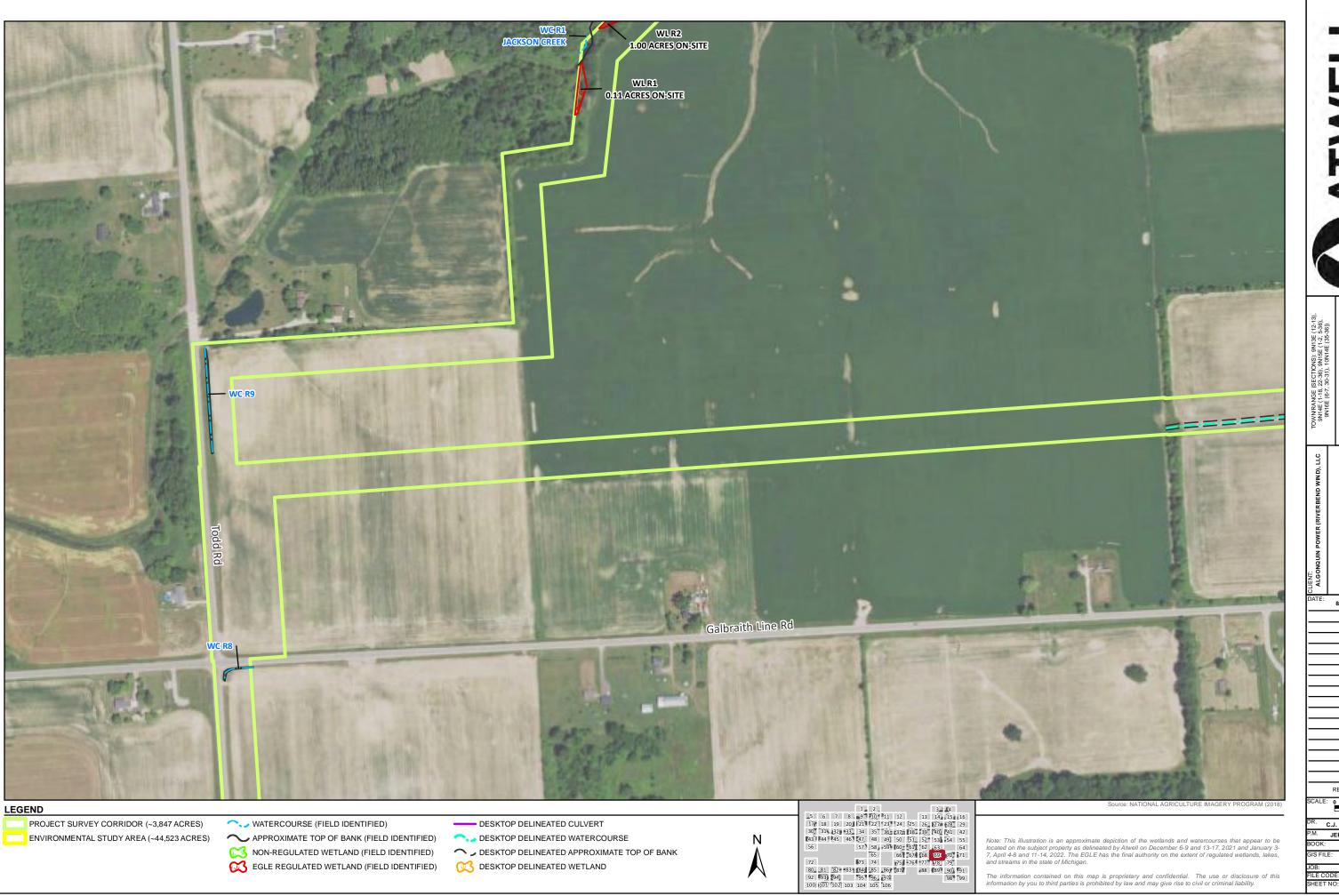
DESKTOP DELINEATED WATERCOURSE

DESKTOP DELINEATED APPROXIMATE TOP OF BANK

DESKTOP DELINEATED WETLAND

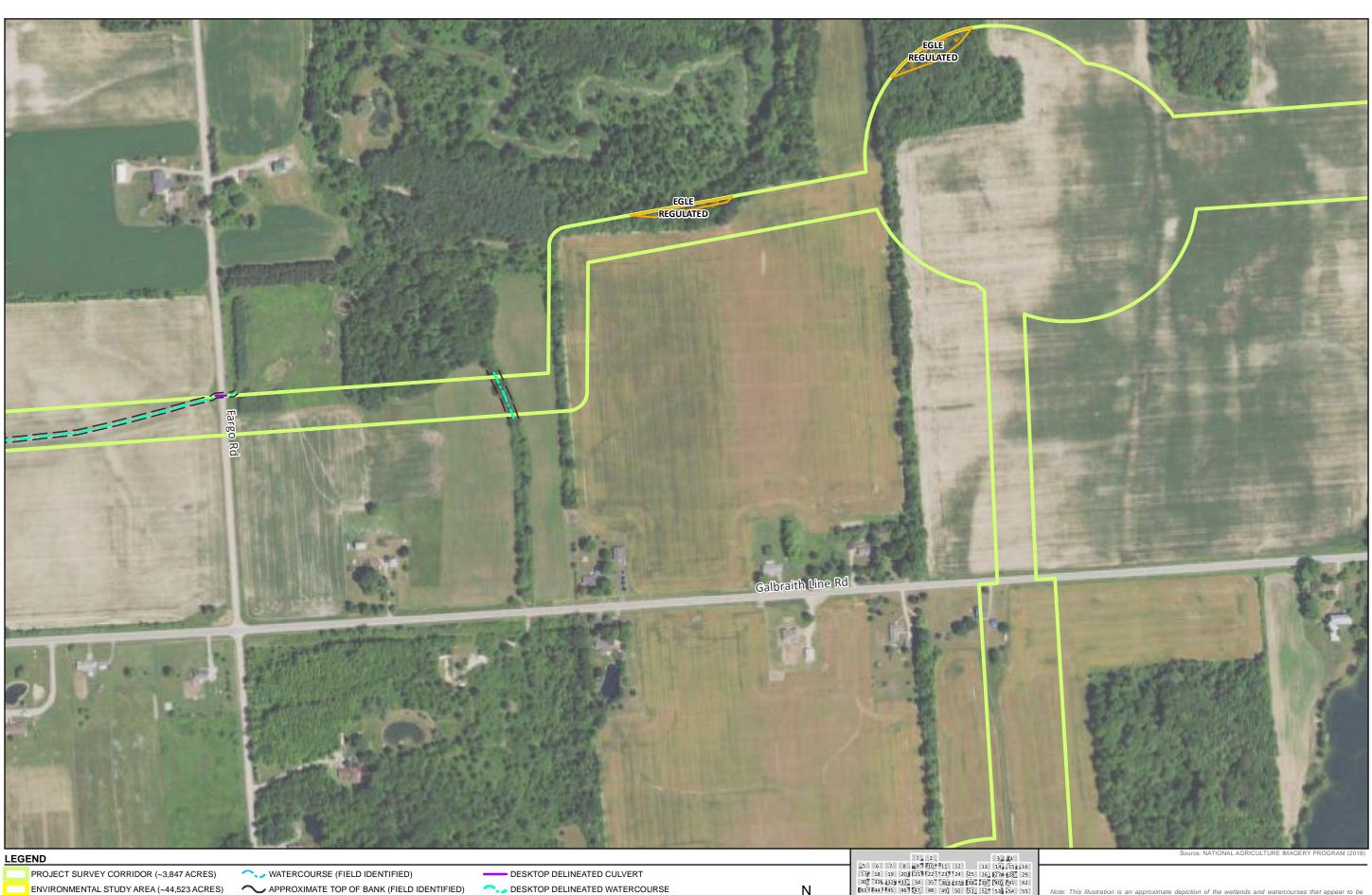
1 2 3 44 15 16 17 18 19 20 21 21 23 24 25 26, 272 28 29 30 31 44 45 46 47 48 49 50 51, 52 53 54 55 56 27 81 81 82

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21003645 HEET NO: 69 OF 106



JEFF WILLIAMS

21003645 HEET NO: 70 OF 106

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED) DESKTOP DELINEATED WATERCOURSE

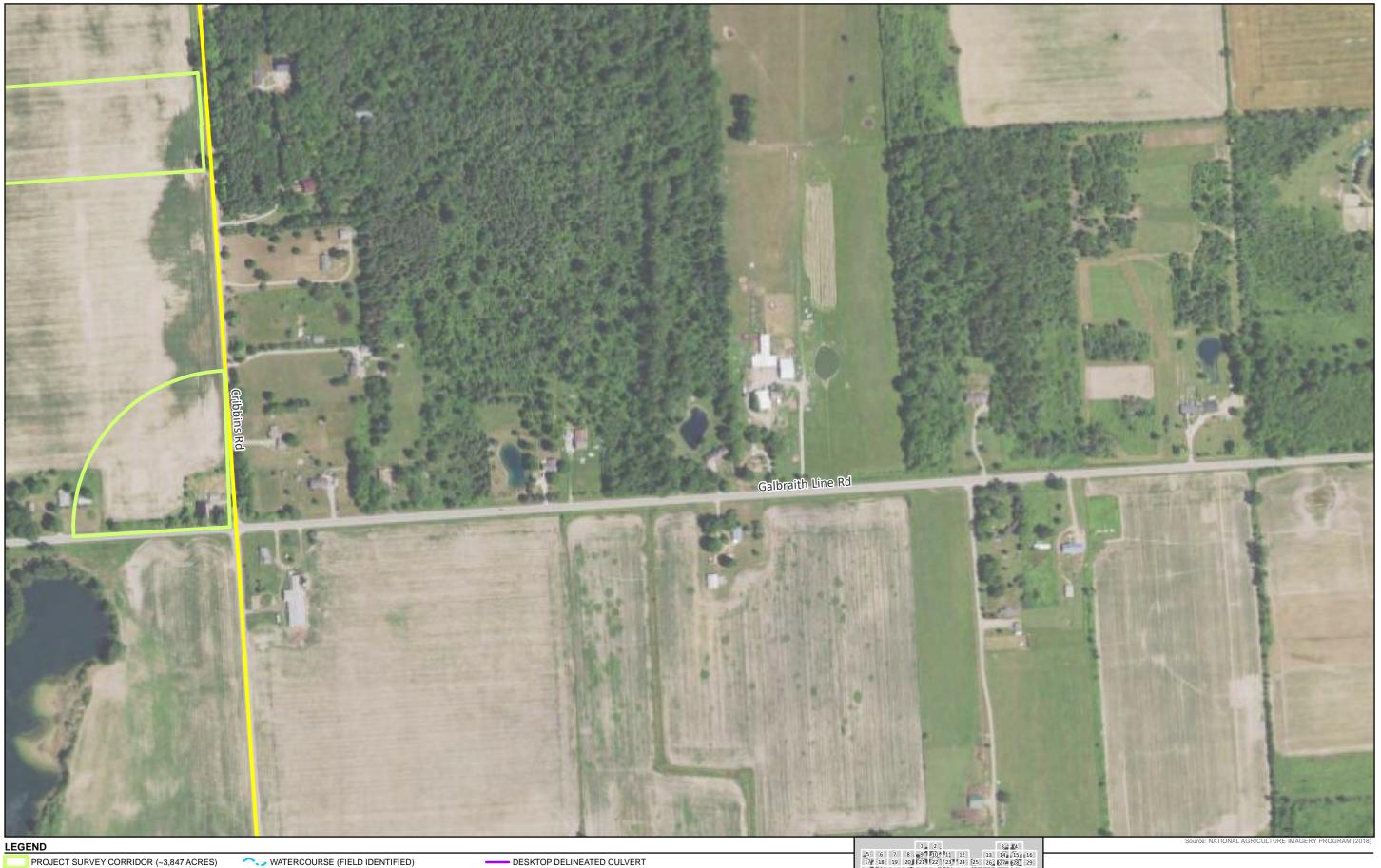
NON-REGULATED WETLAND (FIELD IDENTIFIED) EGLE REGULATED WETLAND (FIELD IDENTIFIED) DESKTOP DELINEATED WETLAND

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_5	6	7	8,	.91	10	11	12		13	14	15	16
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56				57	58	-59	60	61	62	.63		64
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72				73	74		75	76	-77	78	79	
80						867	87		#88	(89)	90	91
92	93)	94		95	96	97					98	99
100	101	102	102	104	100	100						

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21003645

HEET NO: 71 OF 106



Country Delineated Watercourse

DESKTOP DELINEATED WETLAND

 $G: Vobs2100 \ T21003645\_Riverbend\_SanilacCo\_MI\ Projects \ Wetlands \ T21003645\_WLM.mxd$ 

ENVIRONMENTAL STUDY AREA (~44,523 ACRES)

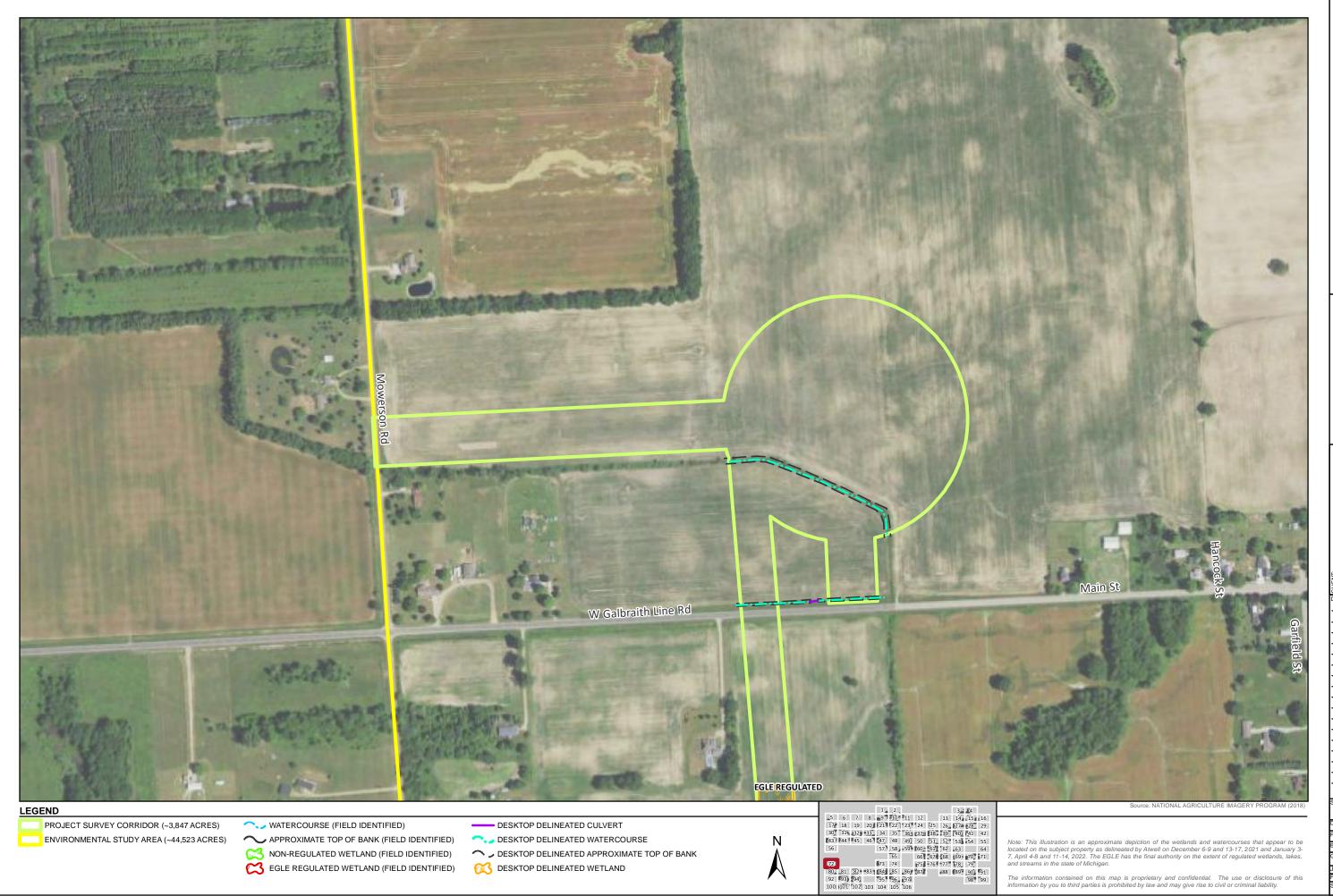
APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)

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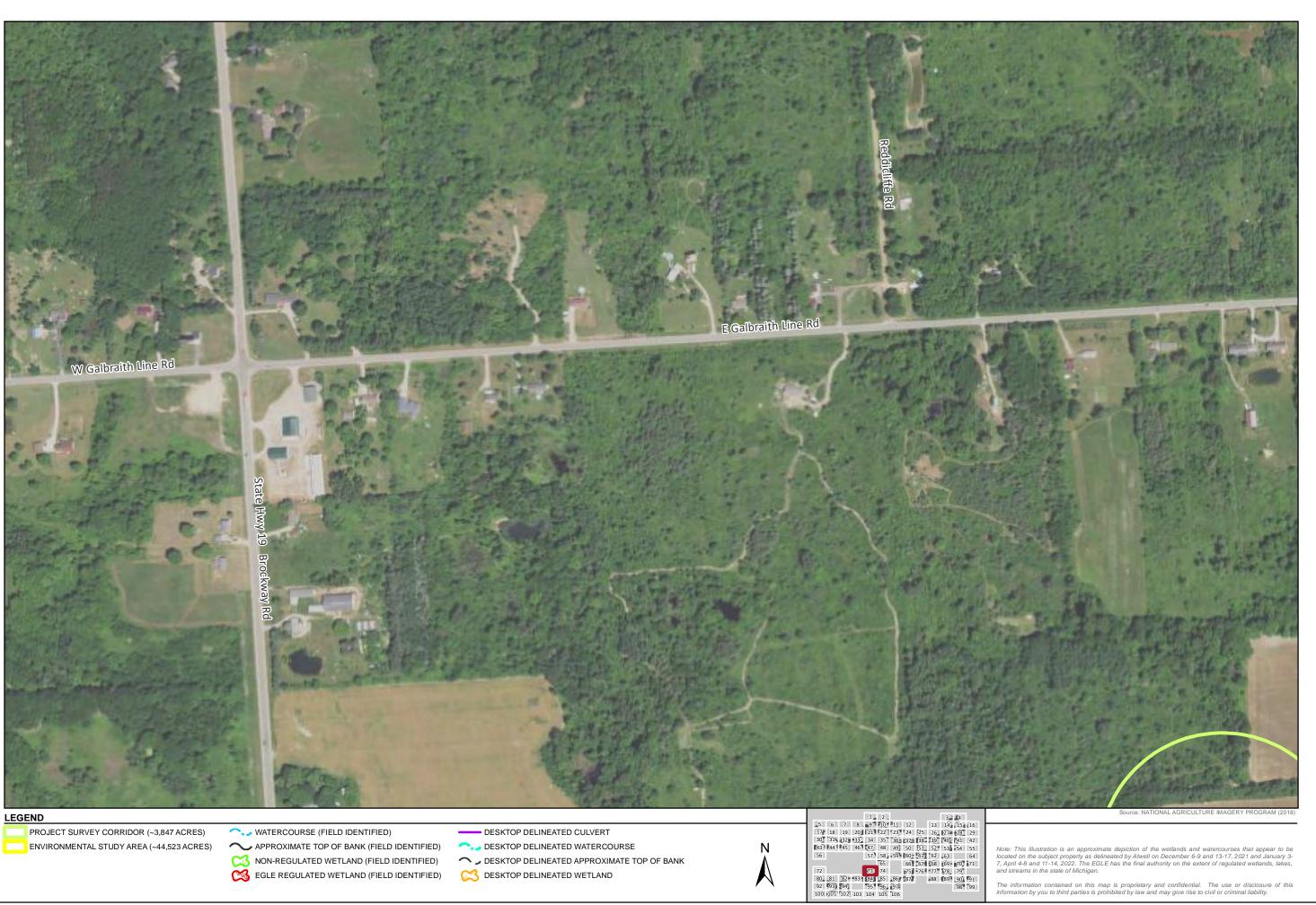
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M DESKTOP DELINEATED WETLAND

NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)



 $G: Vobs 2100 \ T21003645\_Riverbend\_Sanilac Co\_MI \ Projects \ Wetlands \ T21003645\_WLM.mxd$ 

EGLE REGULATED WETLAND (FIELD IDENTIFIED)

CC DESKTOP DELINEATED WETLAND

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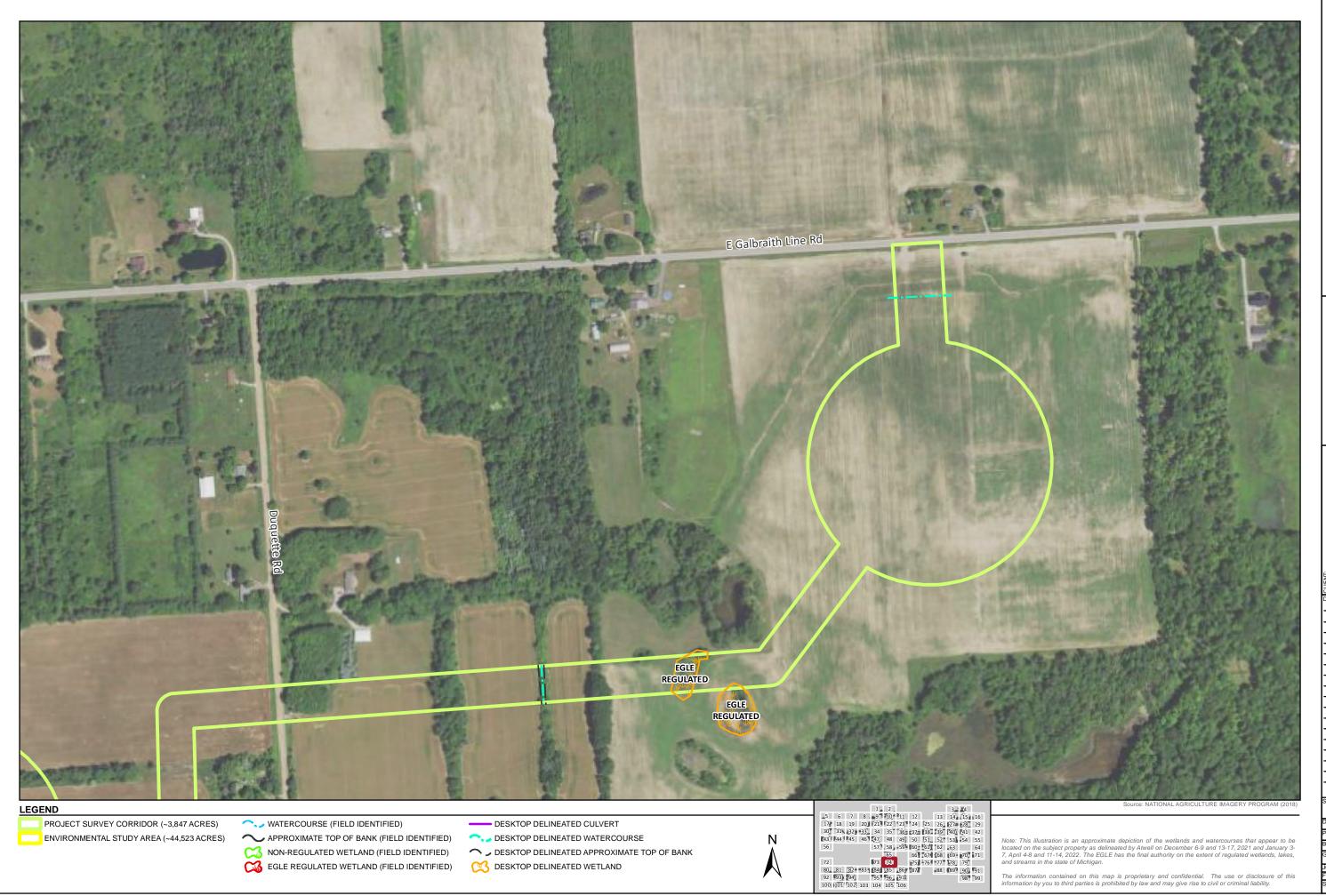
C.J. CH. C.C.

JEFF WILLIAMS

8/31/2022

21003645 HEET NO: 73 OF 106

HEET NO: 74 OF 106



Comparison of the control of the con

DESKTOP DELINEATED WETLAND

NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)

 $G: Vobs 2100 \ T21003645\_Riverbend\_Sanilac Co\_MI \ Projects \ Wetlands \ T21003645\_WLM.mxd$ 

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PROJECT SURVEY CORRIDOR (~3,847 ACRES) ENVIRONMENTAL STUDY AREA (~44,523 ACRES)

── WATERCOURSE (FIELD IDENTIFIED)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED) EGLE REGULATED WETLAND (FIELD IDENTIFIED) DESKTOP DELINEATED CULVERT

Comparison of the control of the con 

DESKTOP DELINEATED WETLAND

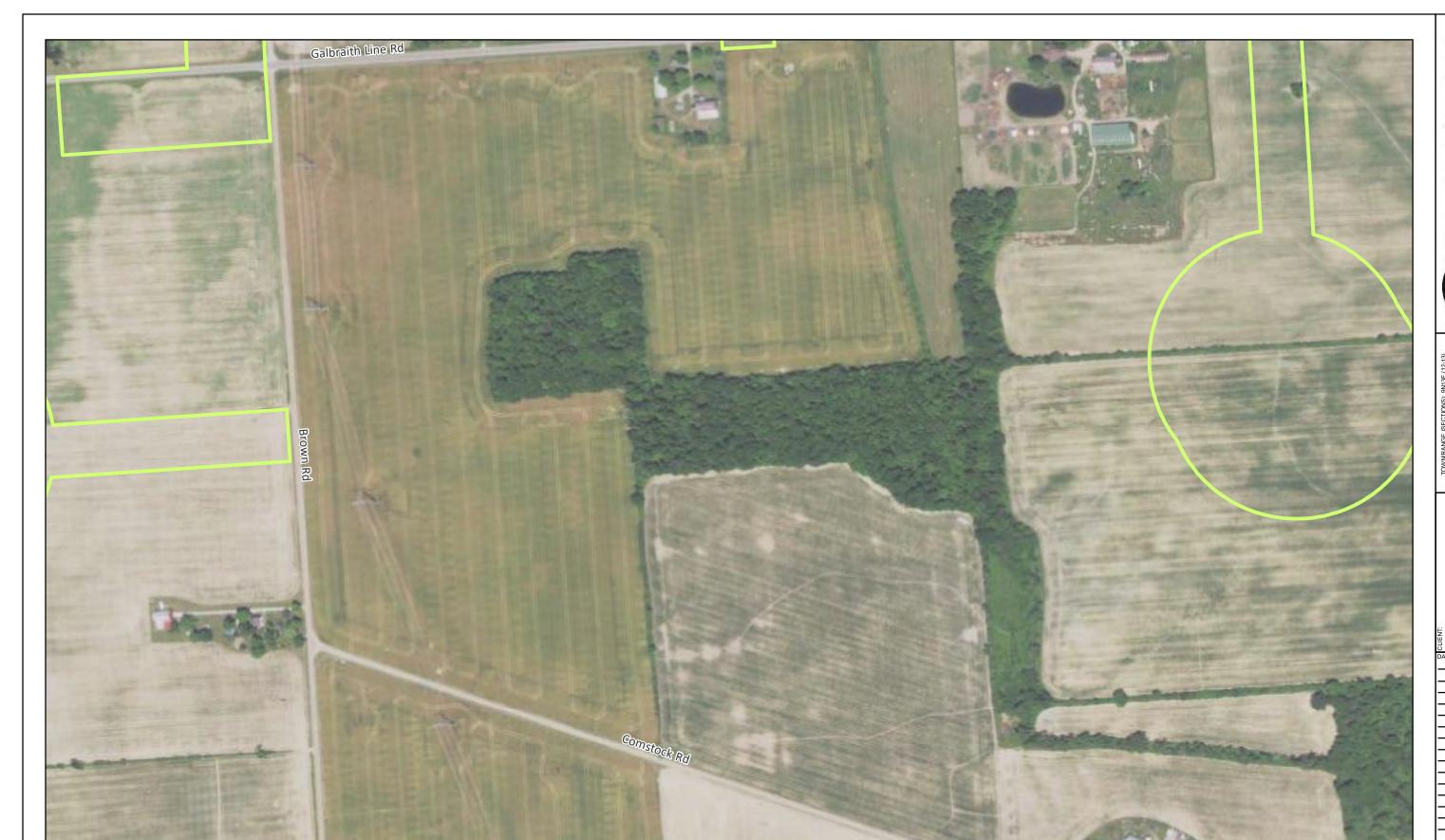
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21003645

HEET NO: 76 OF 106



LEGEND

PROJECT SURVEY CORRIDOR (~3,847 ACRES) ENVIRONMENTAL STUDY AREA (~44,523 ACRES) ── WATERCOURSE (FIELD IDENTIFIED)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED) EGLE REGULATED WETLAND (FIELD IDENTIFIED) DESKTOP DELINEATED CULVERT

Comparison of the control of the con 

CS DESKTOP DELINEATED WETLAND

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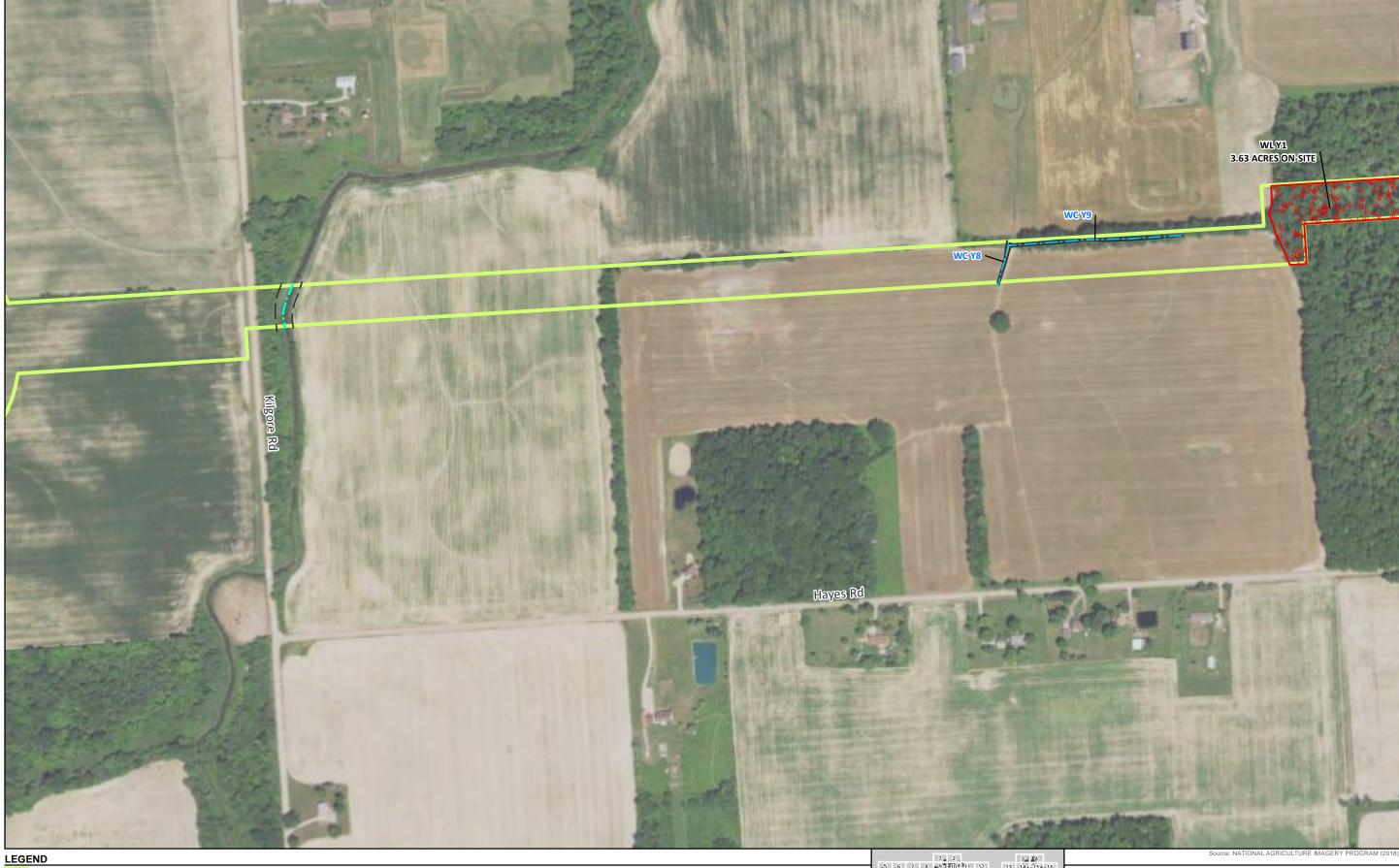
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21003645 HEET NO: 77 OF 106

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PROJECT SURVEY CORRIDOR (~3,847 ACRES) ENVIRONMENTAL STUDY AREA (~44,523 ACRES) ── WATERCOURSE (FIELD IDENTIFIED)

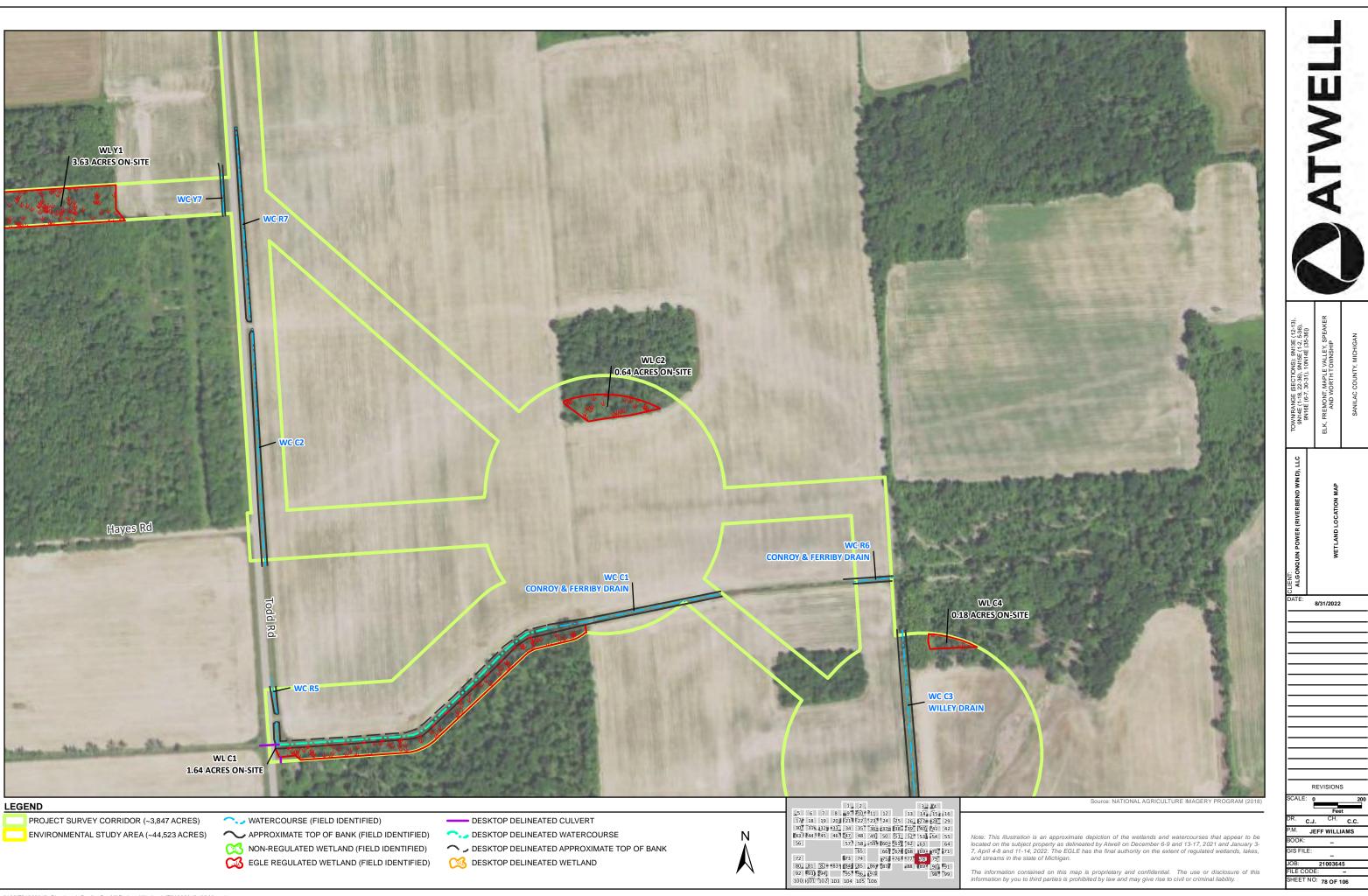
APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED) EGLE REGULATED WETLAND (FIELD IDENTIFIED) DESKTOP DELINEATED CULVERT

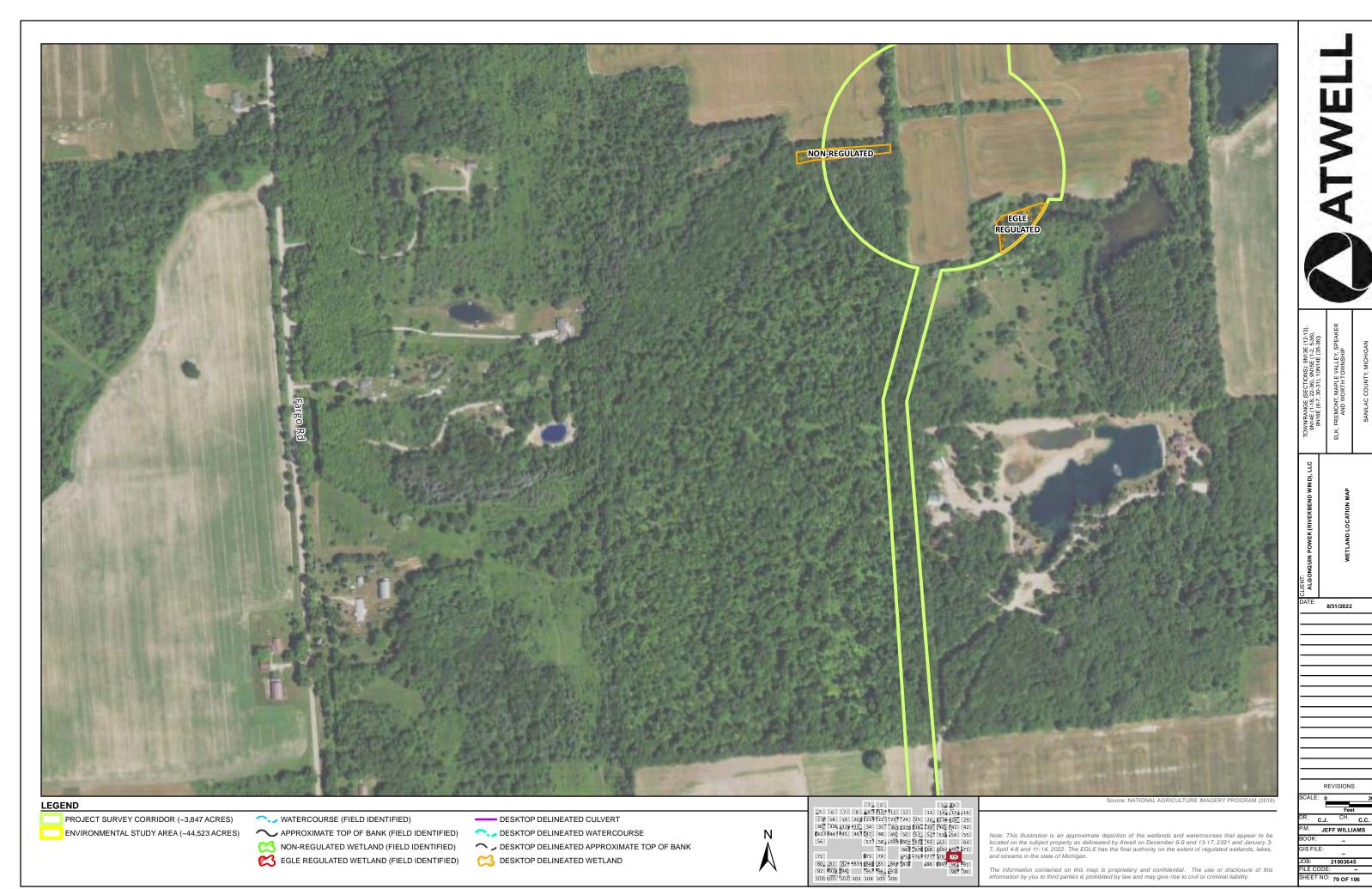
Country Delineated Watercourse 

DESKTOP DELINEATED WETLAND

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 $G: Vobs2100 \ T21003645\_Riverbend\_SanilacCo\_MI\ Projects \ Wetlands \ T21003645\_WLM.mxd$ 



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HEET NO: 79 OF 106

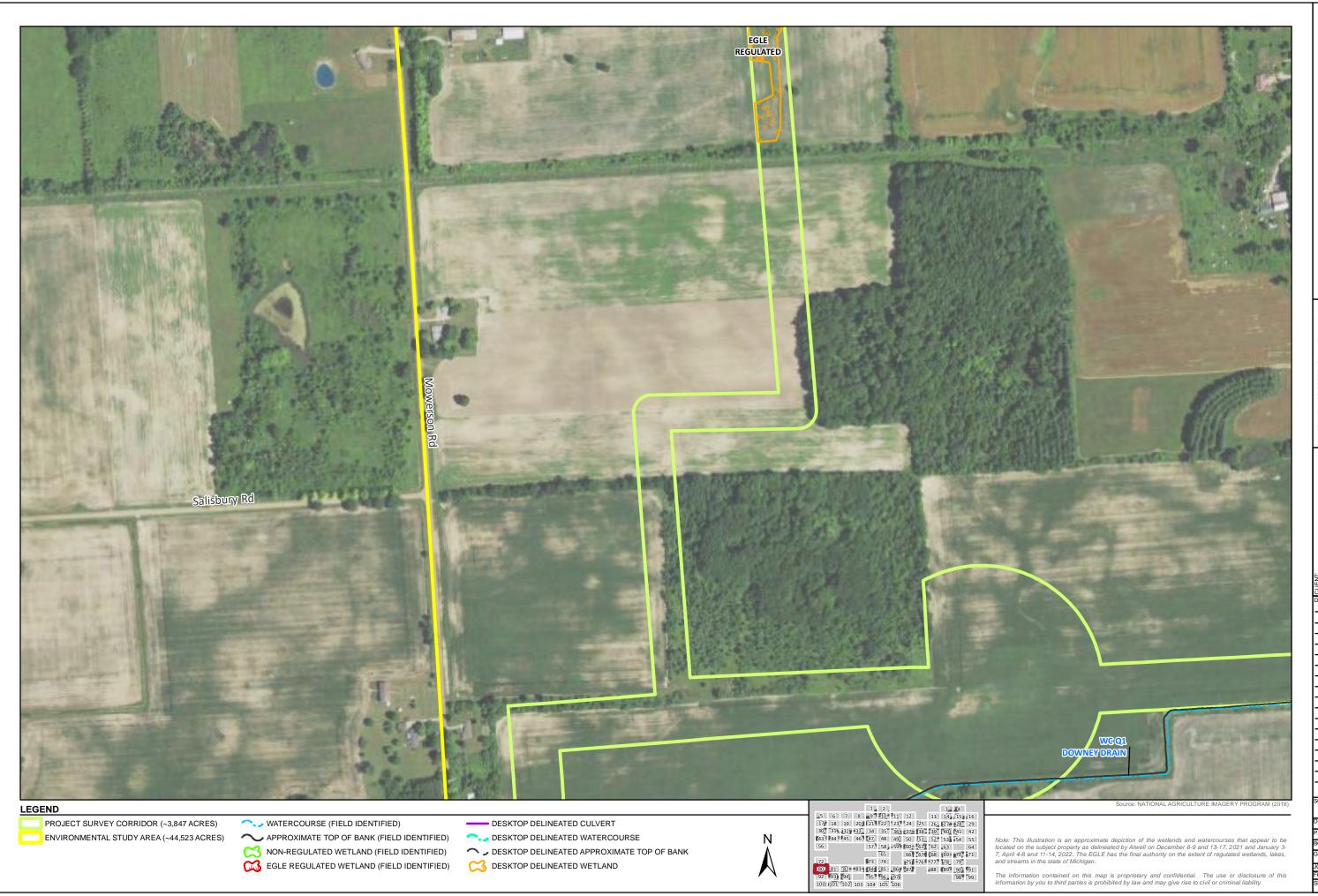
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EGLE REGULATED WETLAND (FIELD IDENTIFIED)

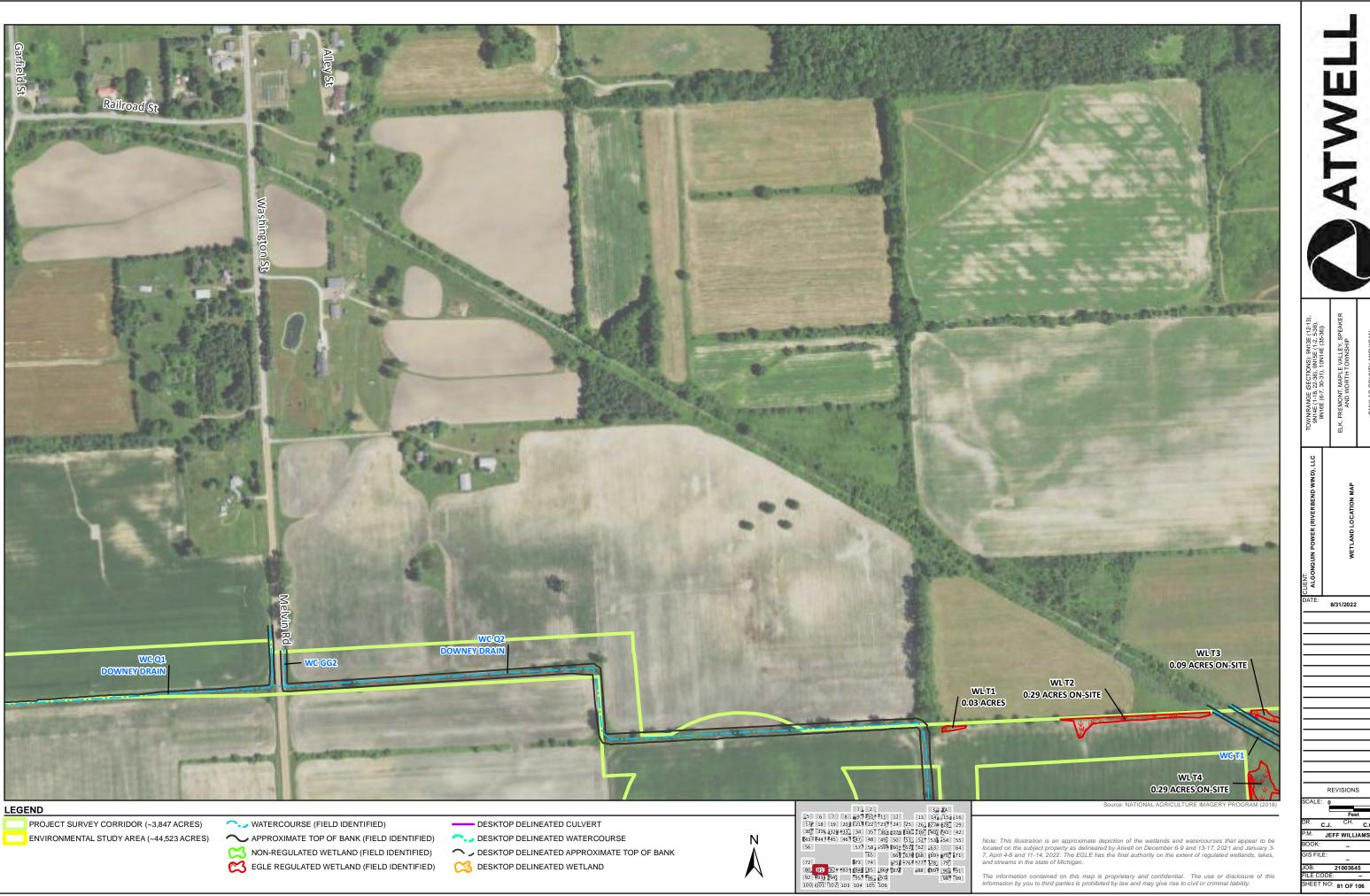
CA DESKTOP DELINEATED WETLAND

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EGLE REGULATED WETLAND (FIELD IDENTIFIED)

MESKTOP DELINEATED WETLAND

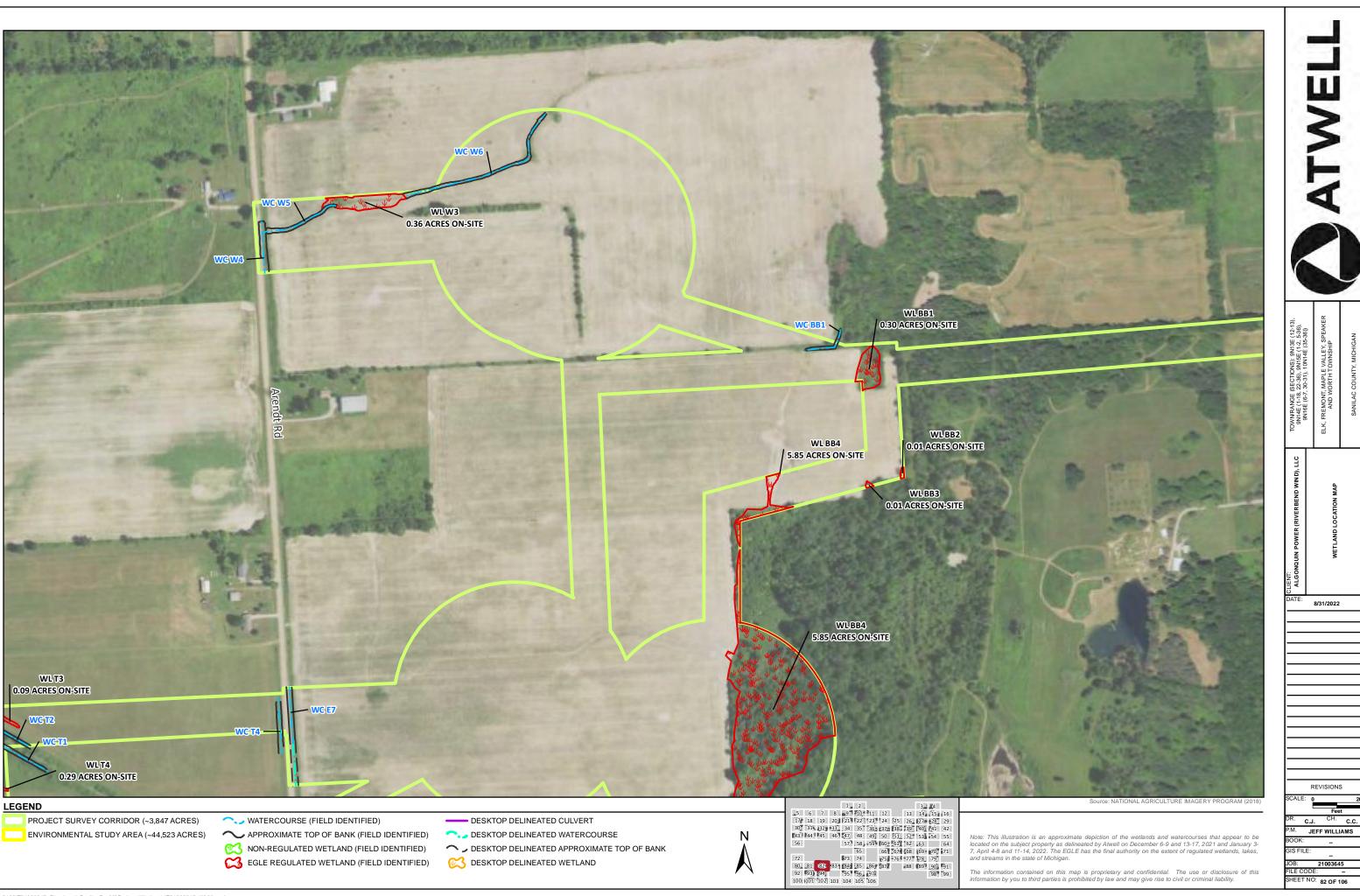


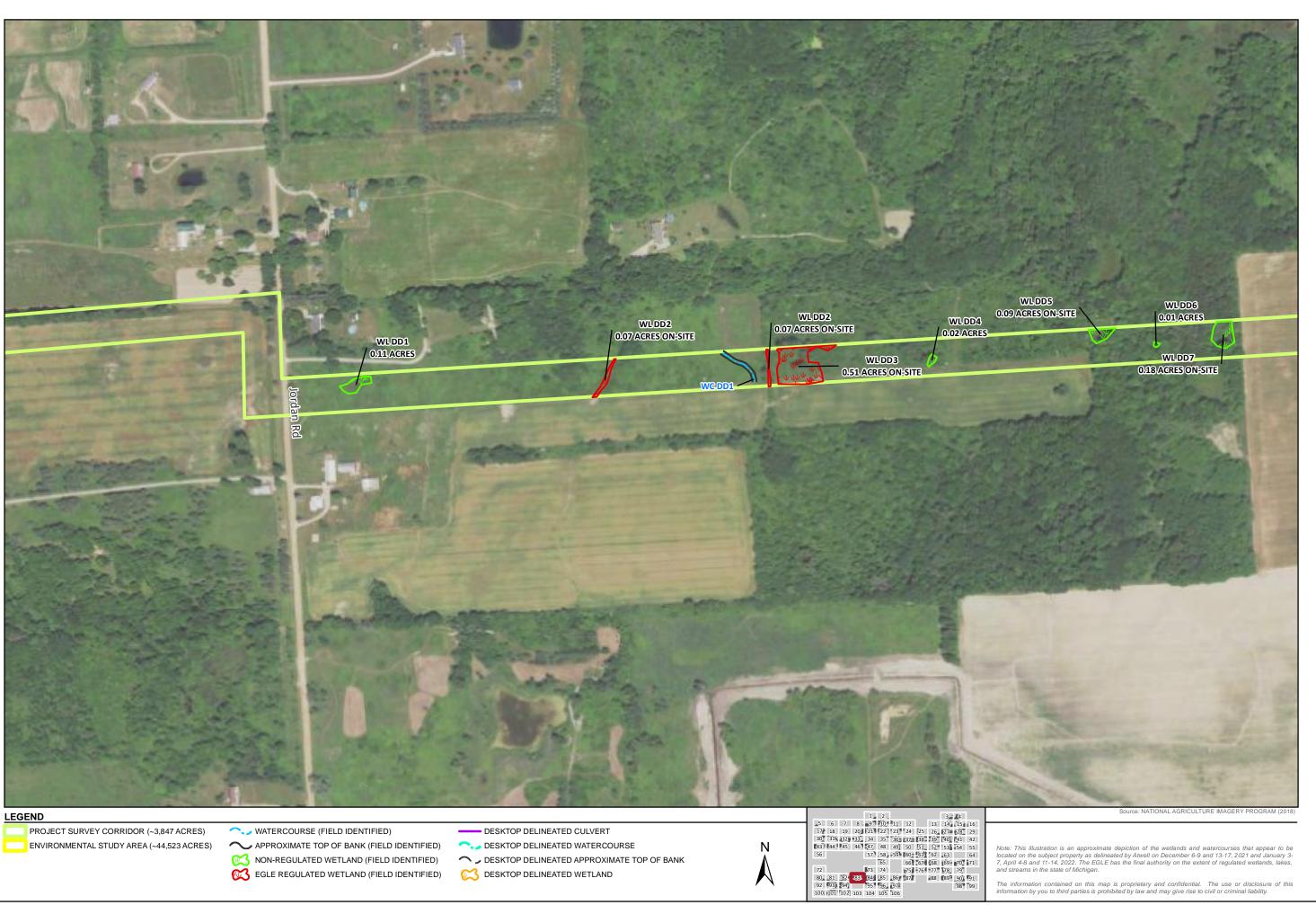
 $G: Vobs 2100 \ T21003645\_Riverbend\_Sanilac Co\_MI \ Projects \ Wetlands \ T21003645\_WLM.mxd$ 

8/31/2022

C.J. CH. C.C. JEFF WILLIAMS

21003645





 $G: Vobs 2100 \ T21003645\_Riverbend\_Sanilac Co\_MI \ Projects \ Wetlands \ T21003645\_WLM.mxd$ 

NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)

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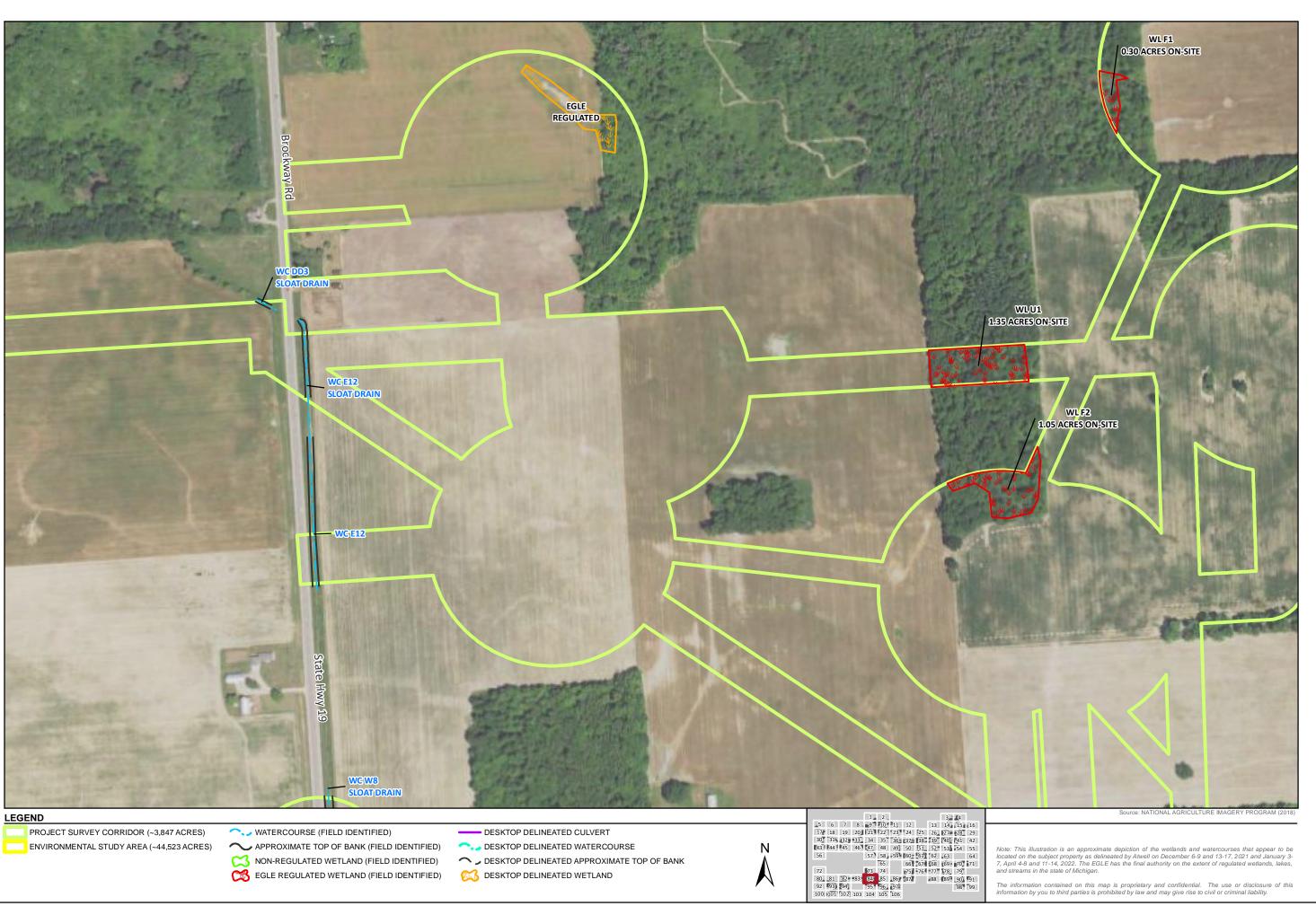
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8/31/2022

21003645 HEET NO: 83 OF 106

DESKTOP DELINEATED WETLAND



 $G: \label{loss} G: \label{loss} G: \label{loss} G: \label{loss} We tlands \label{loss} T21003645\_WLM.mxd$ 

EGLE REGULATED WETLAND (FIELD IDENTIFIED)

DESKTOP DELINEATED WETLAND

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8/31/2022

C.J. CH. C.C.

JEFF WILLIAMS

21003645 HEET NO: 84 OF 106

C.J. CH. C.C. JEFF WILLIAMS

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PROJECT SURVEY CORRIDOR (~3,847 ACRES) ENVIRONMENTAL STUDY AREA (~44,523 ACRES)

LEGEND

── WATERCOURSE (FIELD IDENTIFIED)

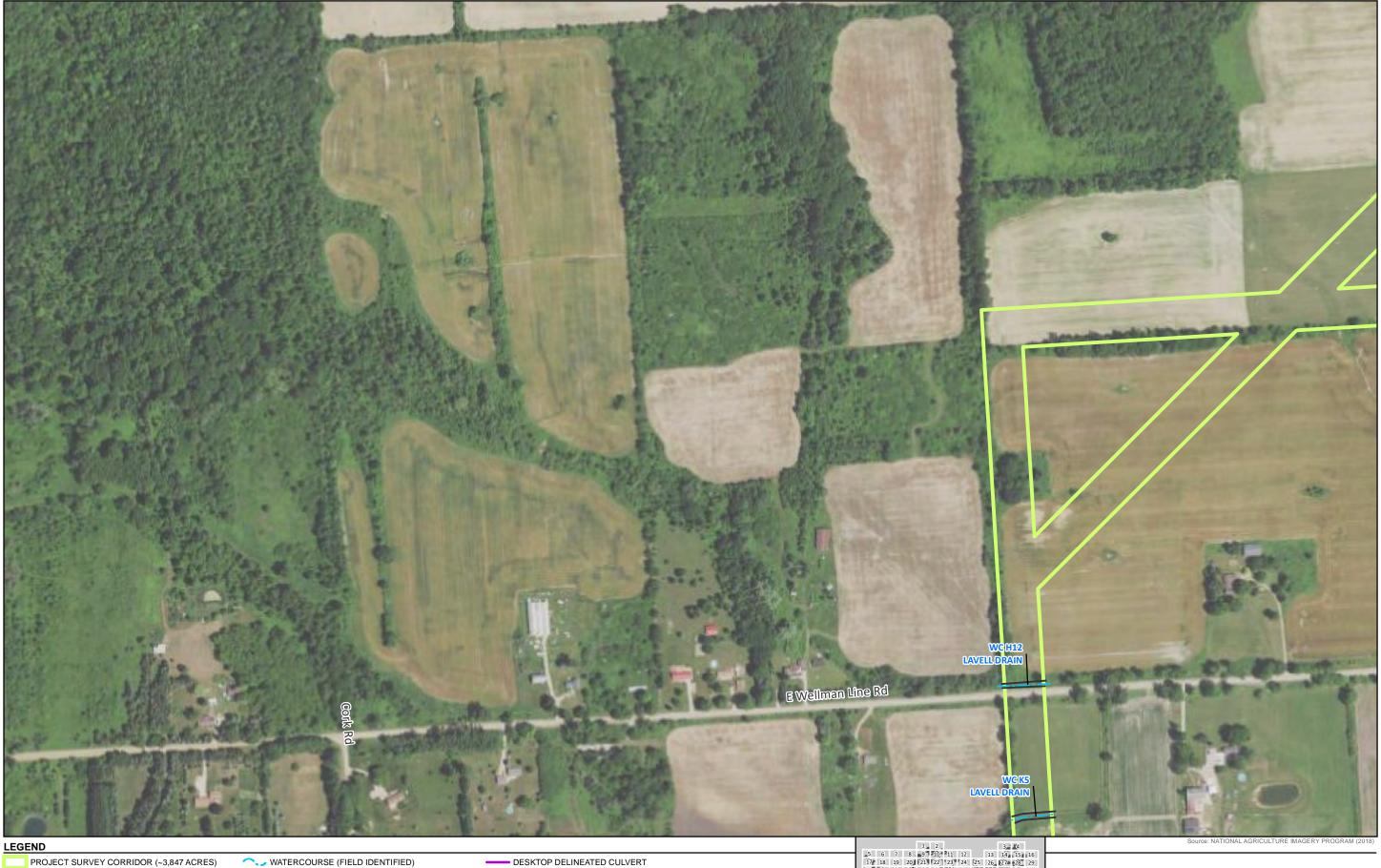
APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED) EGLE REGULATED WETLAND (FIELD IDENTIFIED) DESKTOP DELINEATED CULVERT

Country Delineated Watercourse

→ DESKTOP DELINEATED APPROXIMATE TOP OF BANK

Note: This illustration is an approximate depiction of the wetlands and watercourses that appear to be located on the subject property as delineated by Atwell on December 6-9 and 13-17, 2021 and January 3-7, April 4-8 and 11-14, 2022. The EGLE has the final authority on the extent of regulated wetlands, lakes, and streams in the state of Michigan.



 $G: Vobs 2100 \ T21003645\_Riverbend\_Sanilac Co\_MI \ Projects \ Wetlands \ T21003645\_WLM.mxd$ 

ENVIRONMENTAL STUDY AREA (~44,523 ACRES)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED) EGLE REGULATED WETLAND (FIELD IDENTIFIED) DESKTOP DELINEATED CULVERT

COURSE DESKTOP DELINEATED WATERCOURSE 

DESKTOP DELINEATED WETLAND

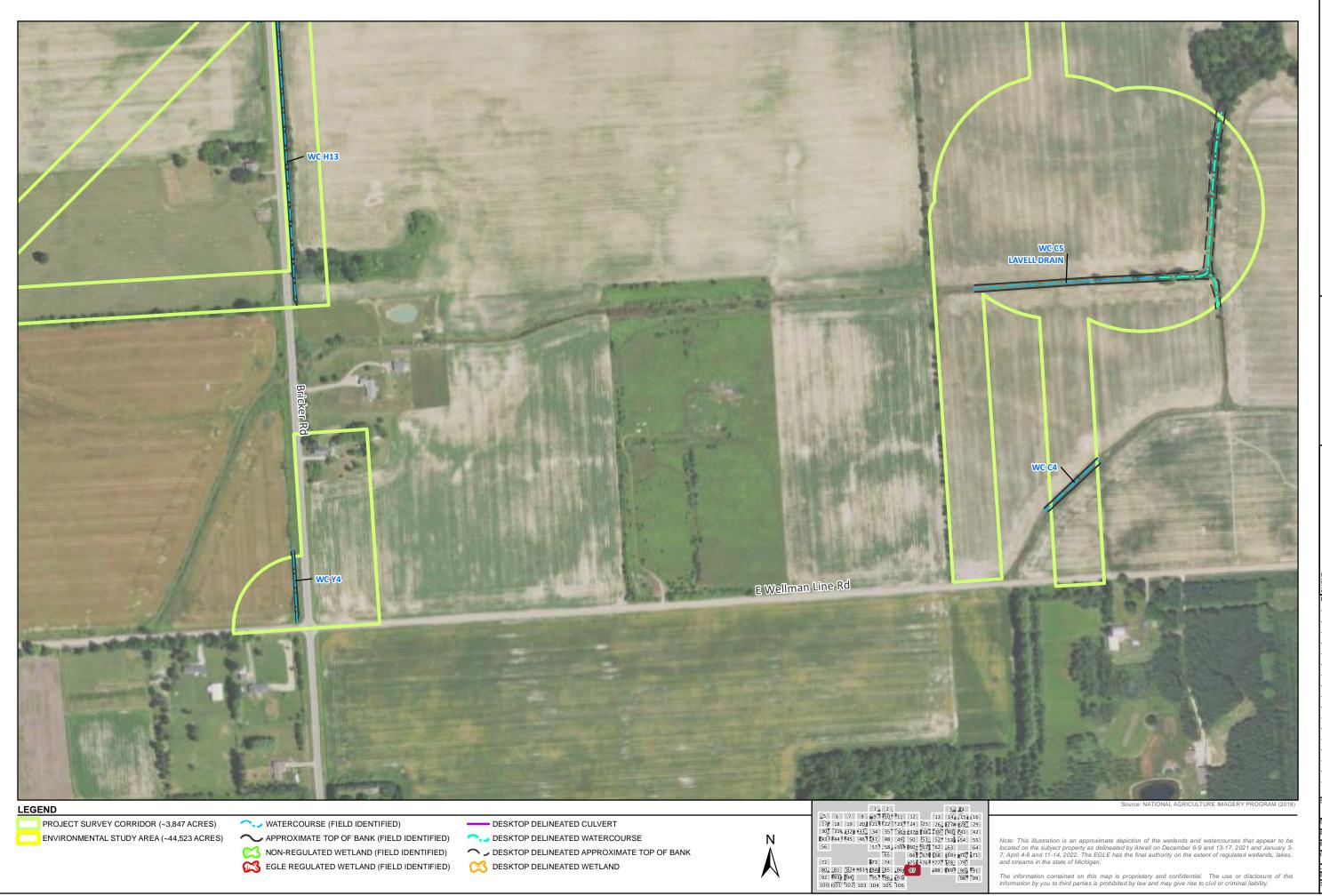
1 2 3 4 15 16 17 18 19 20 21 21 22 23 24 25 26, 272 28 29 30 31 44 45 46 47 48 49 50 51, 52 53 54 55 56 27 8 8 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 100 | 101 | 102 | 103 | 104 | 105 | 106 |

Note: This illustration is an approximate depiction of the wetlands and watercourses that appear to be located on the subject properly as delineated by Atwell on December 6-9 and 13-17, 2021 and January 3-7, April 4-8 and 11-14, 2022. The EGLE has the final authority on the extent of regulated wetlands, lakes, and streams in the state of Michigan.

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21003645 HEET NO: 86 OF 106

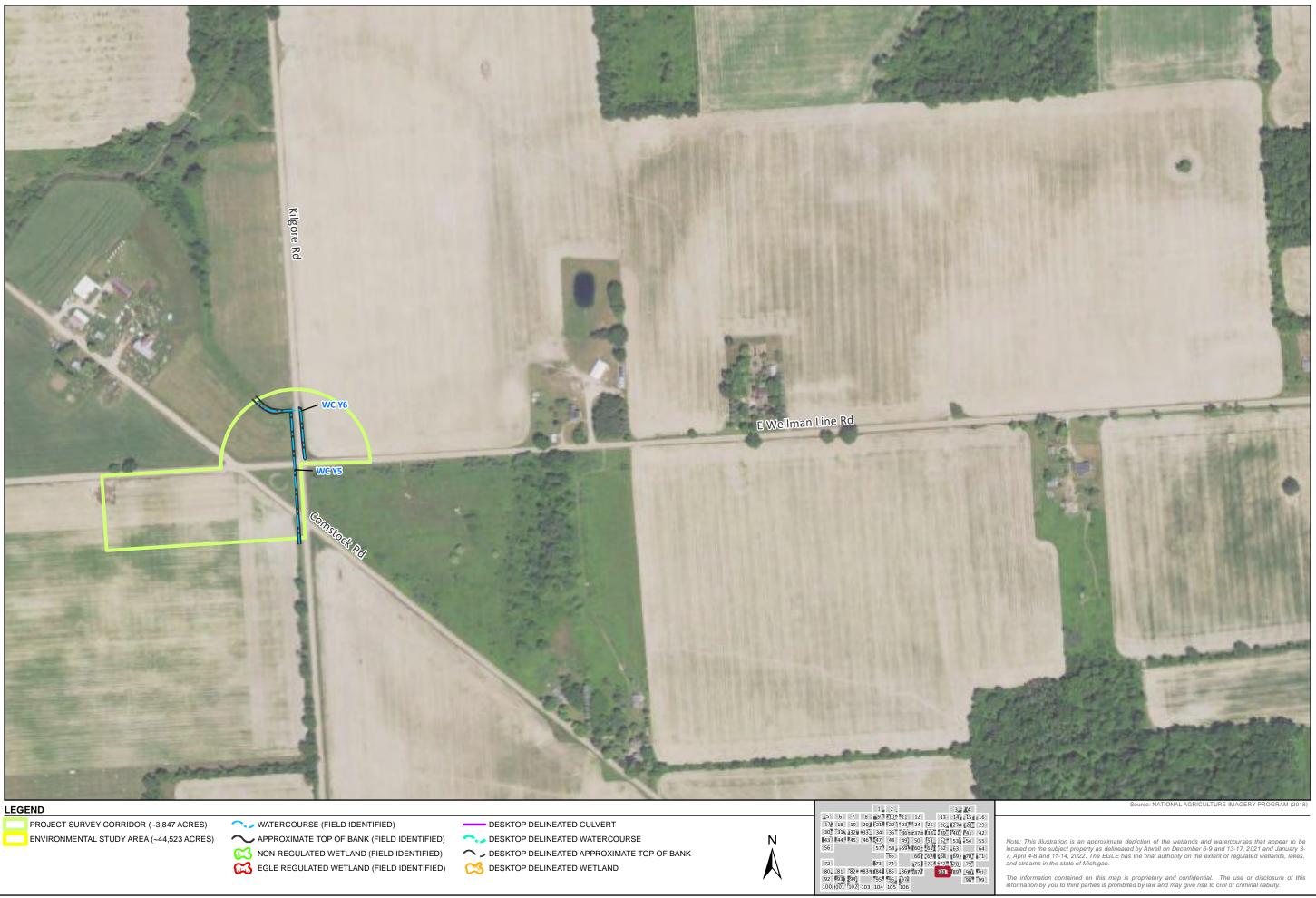
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EGLE REGULATED WETLAND (FIELD IDENTIFIED)

M DESKTOP DELINEATED WETLAND

HEET NO: 88 OF 106



Country Delineated Watercourse

CS DESKTOP DELINEATED WETLAND

Note: This illustration is an approximate depiction of the wetlands and watercourses that appear to be located on the subject properly as delineated by Atwell on December 6-9 and 13-17, 2021 and January 3-7, April 4-8 and 11-14, 2022. The EGLE has the final authority on the extent of regulated wetlands, lakes, and streams in the state of Michigan.

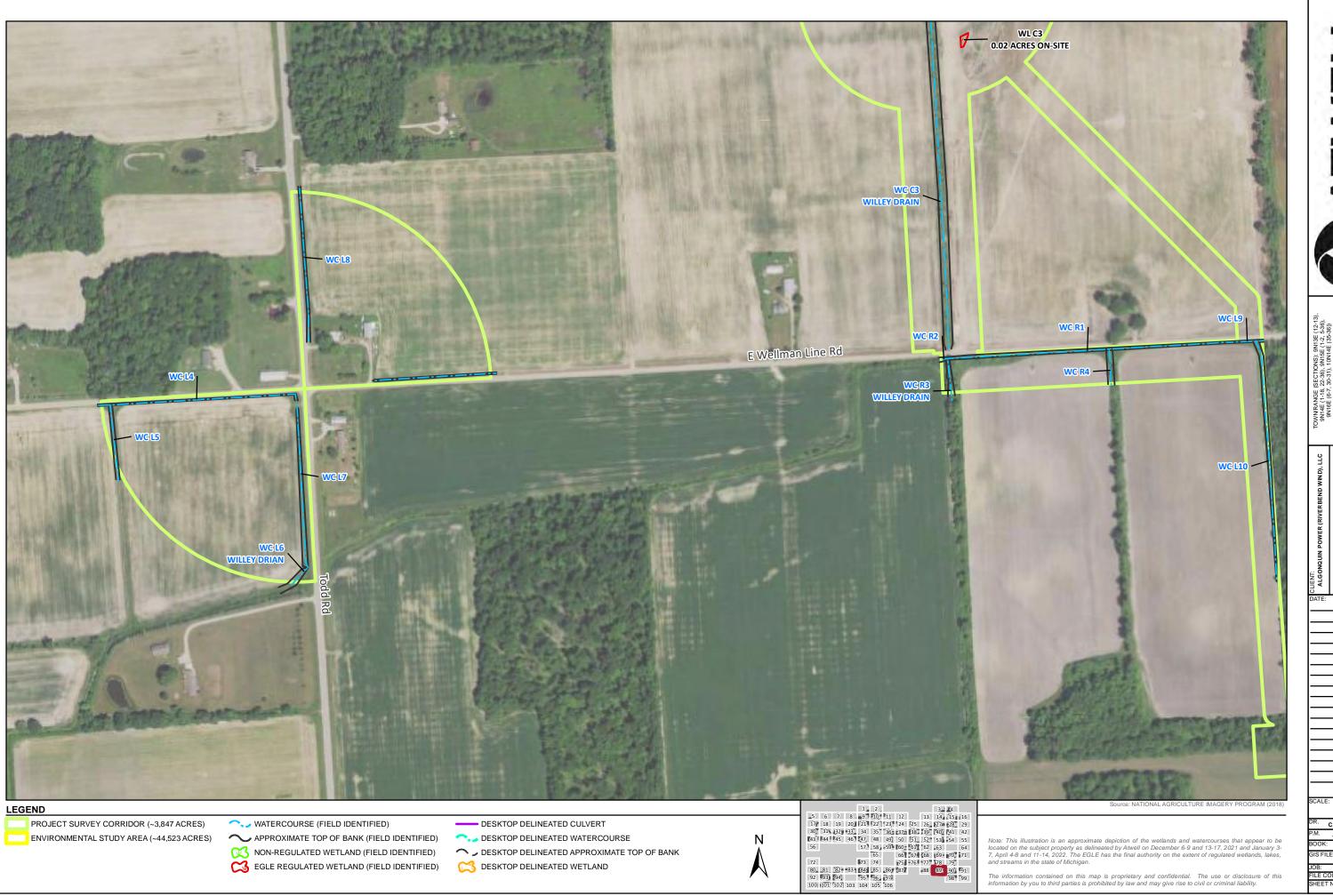
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ENVIRONMENTAL STUDY AREA (~44,523 ACRES)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)



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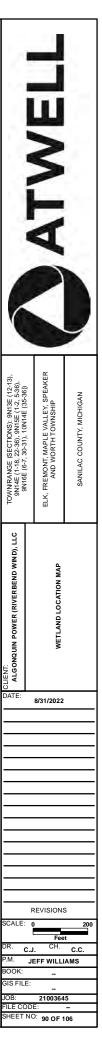
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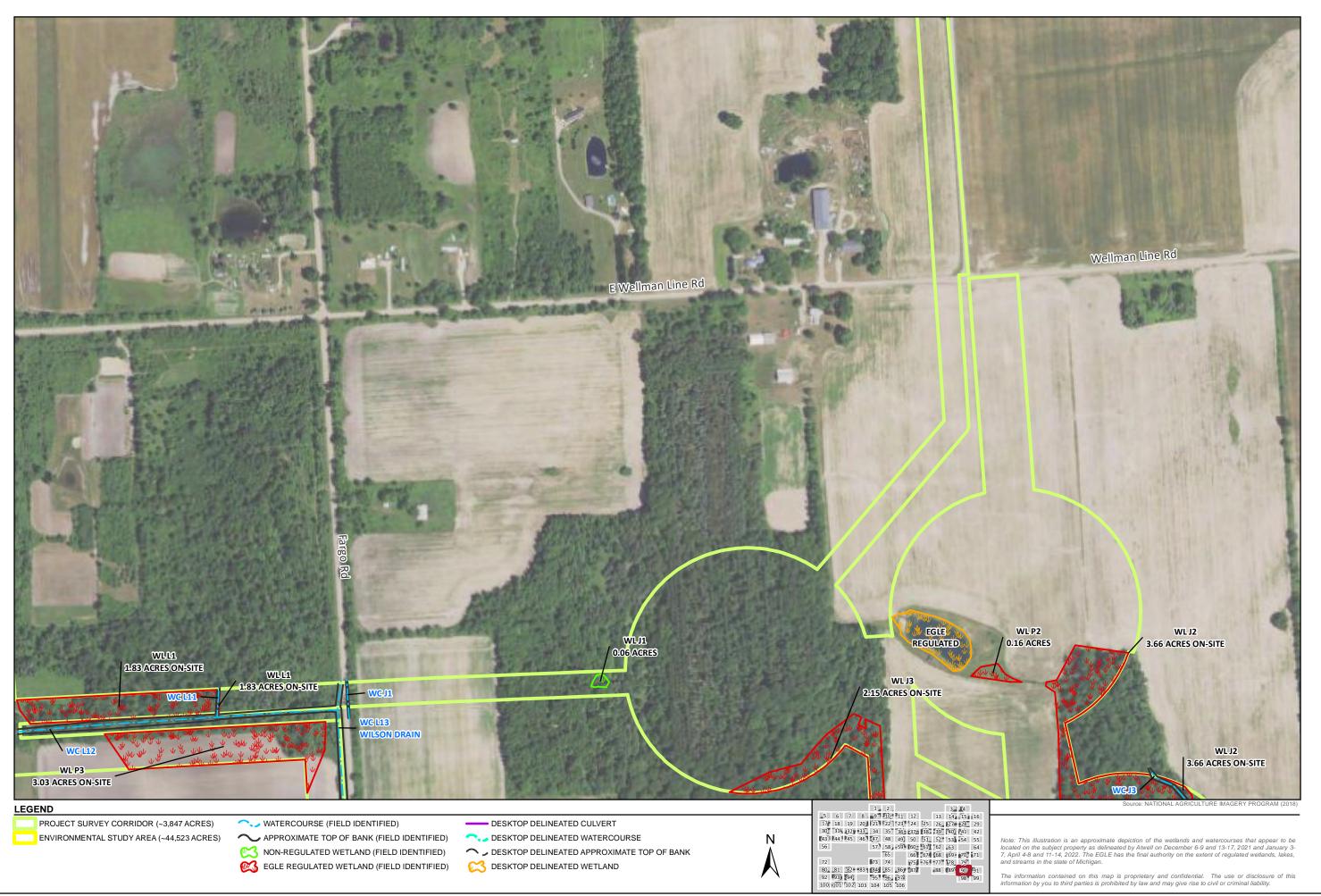
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SFILE:

GIS FILE: \_JOB: 21003645
FILE CODE: \_SHEET NO: 89 OF 106



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EGLE REGULATED WETLAND (FIELD IDENTIFIED)

CC DESKTOP DELINEATED WETLAND

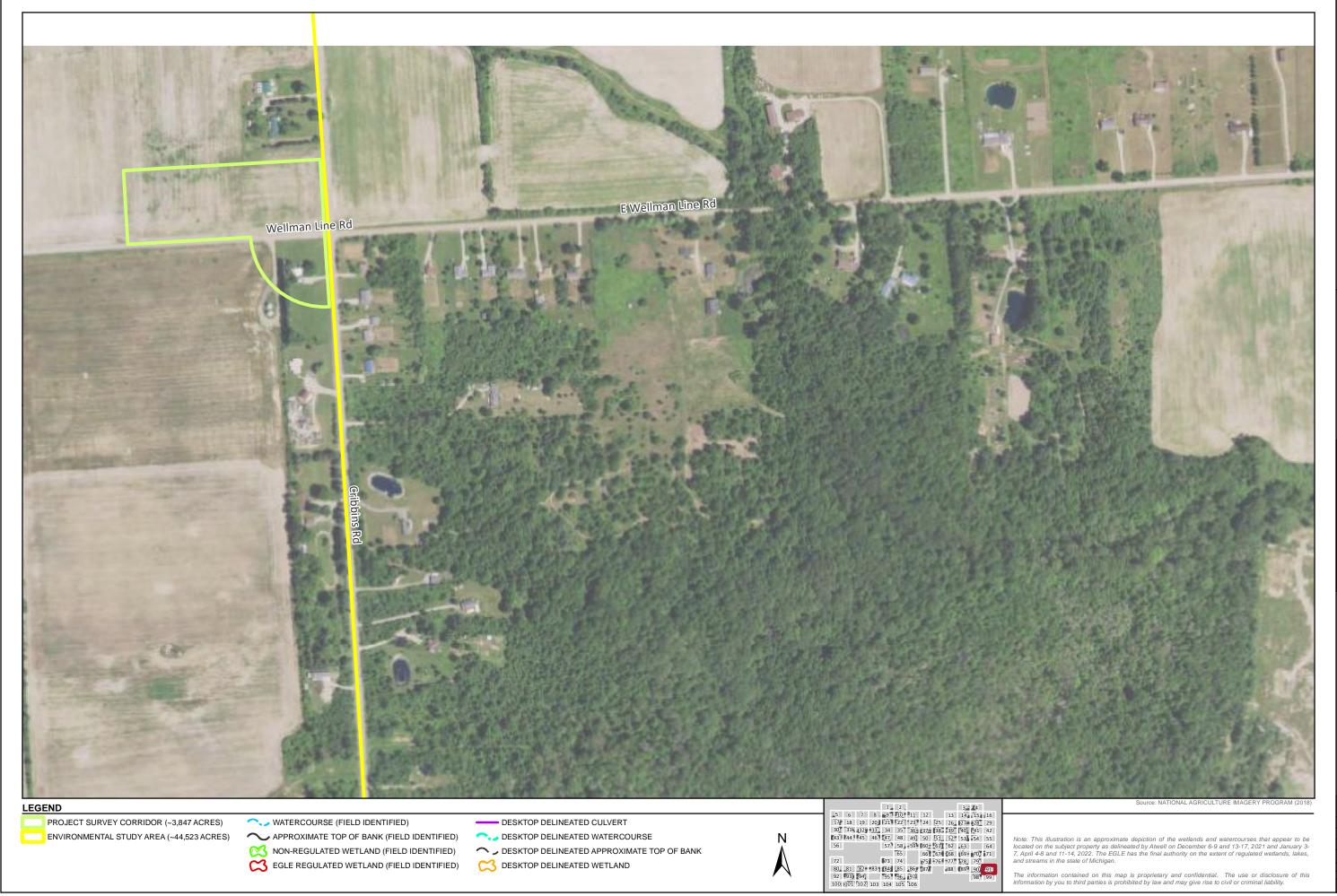


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21003645 HEET NO: 91 OF 106

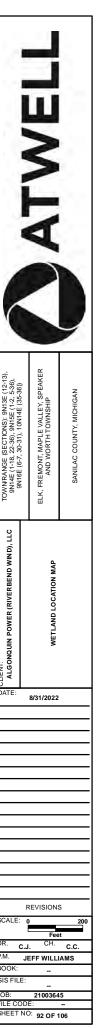
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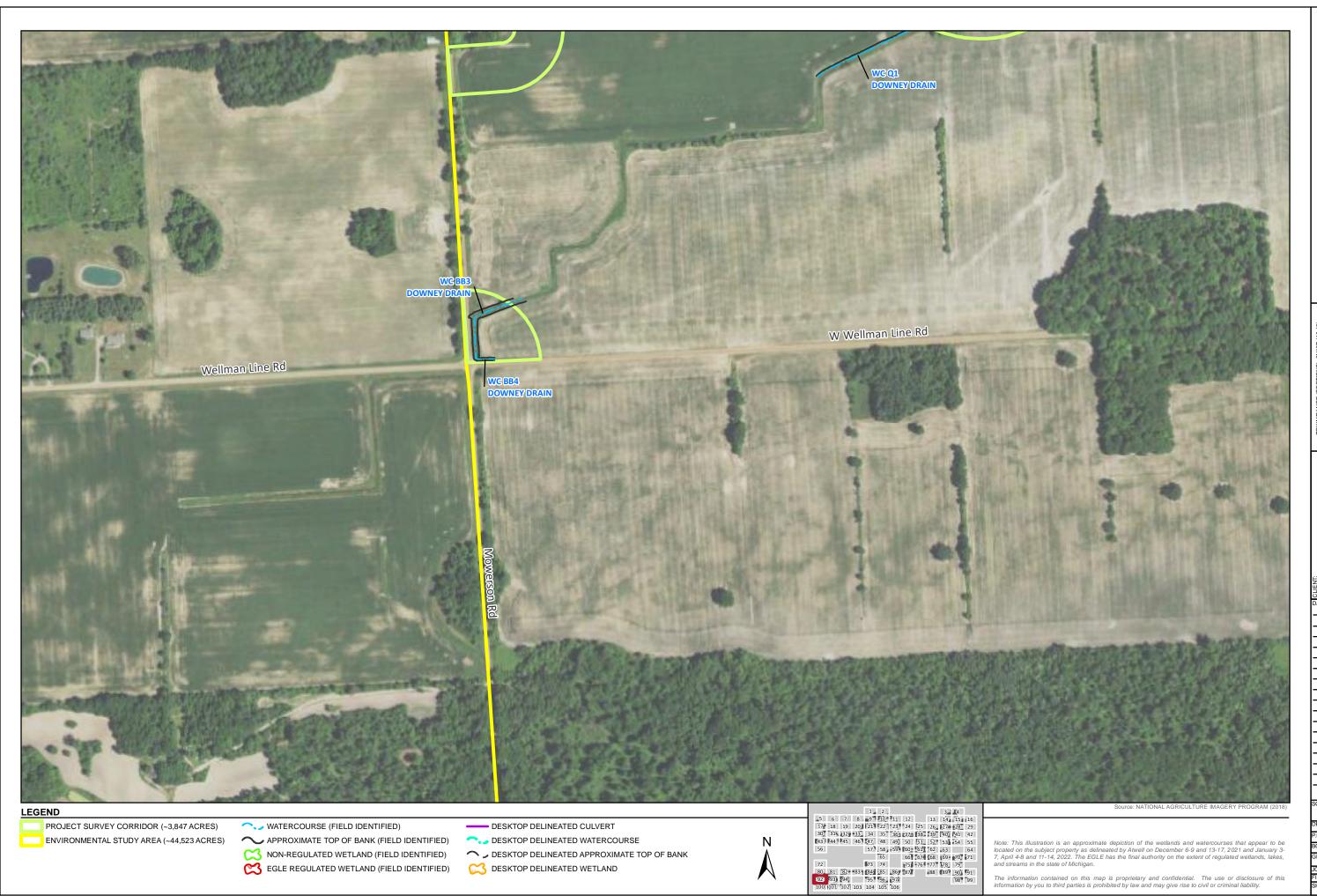
CC DESKTOP DELINEATED WETLAND

NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)



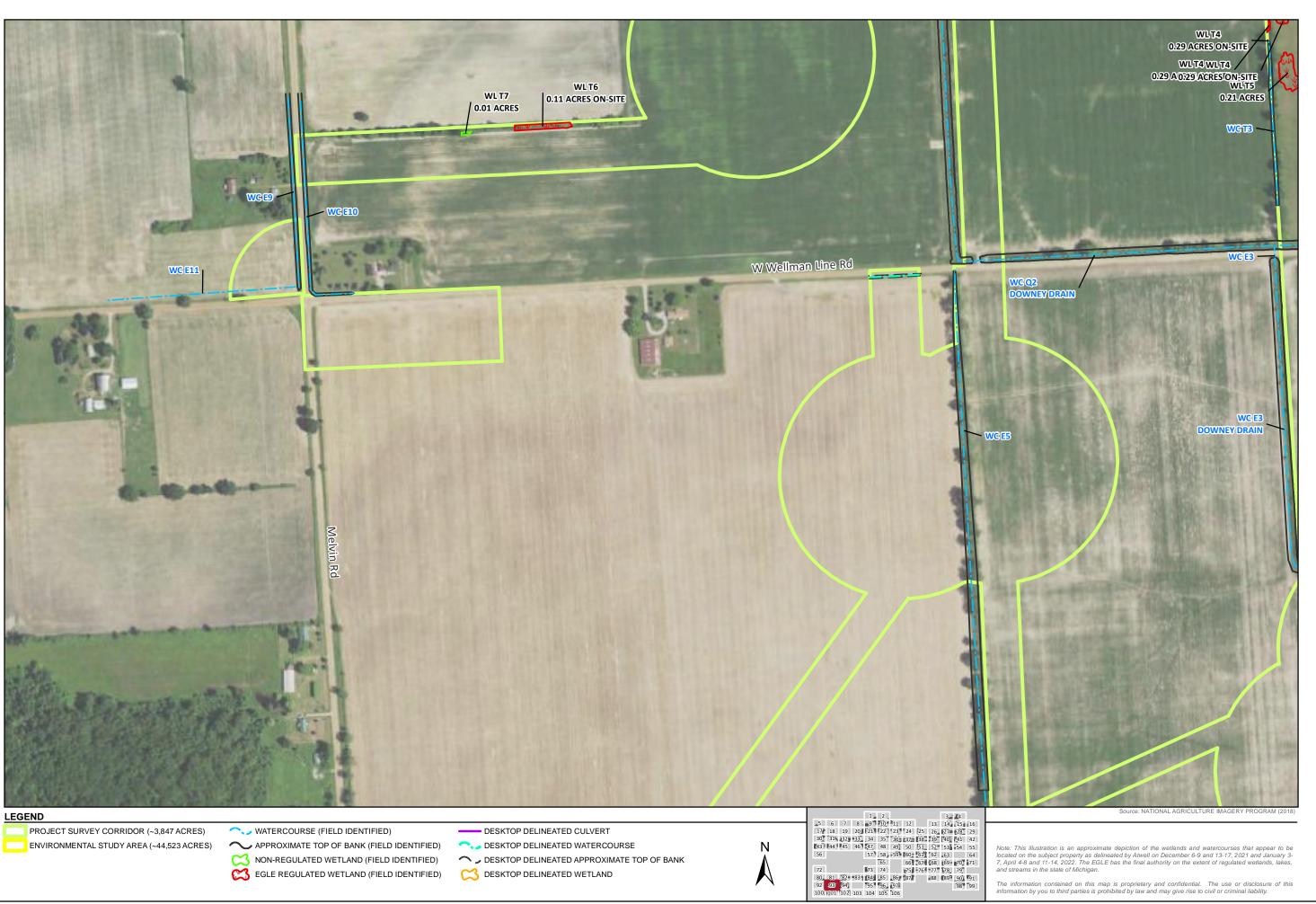
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EGLE REGULATED WETLAND (FIELD IDENTIFIED)

DESKTOP DELINEATED WETLAND



CC DESKTOP DELINEATED WETLAND

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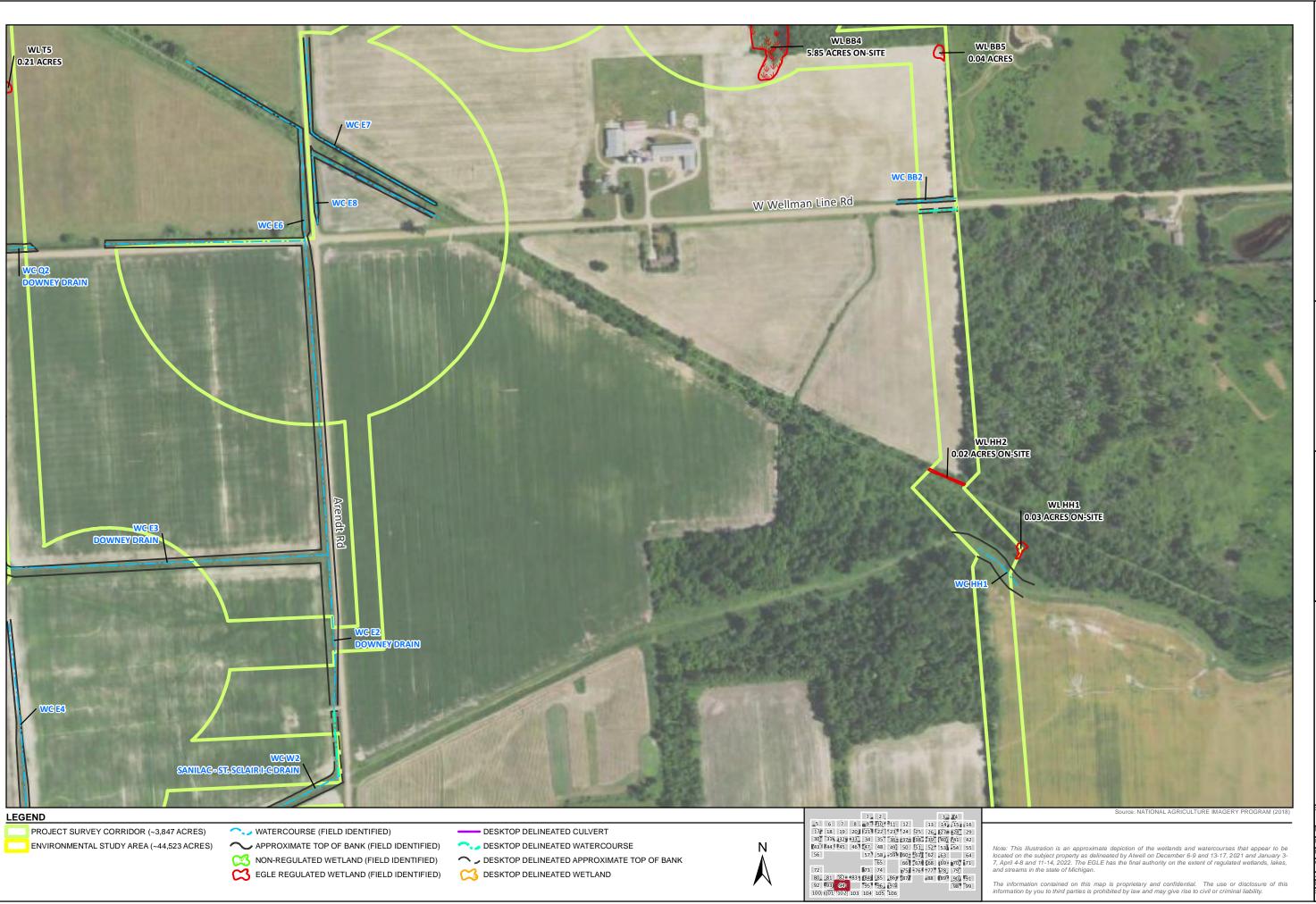
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NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)

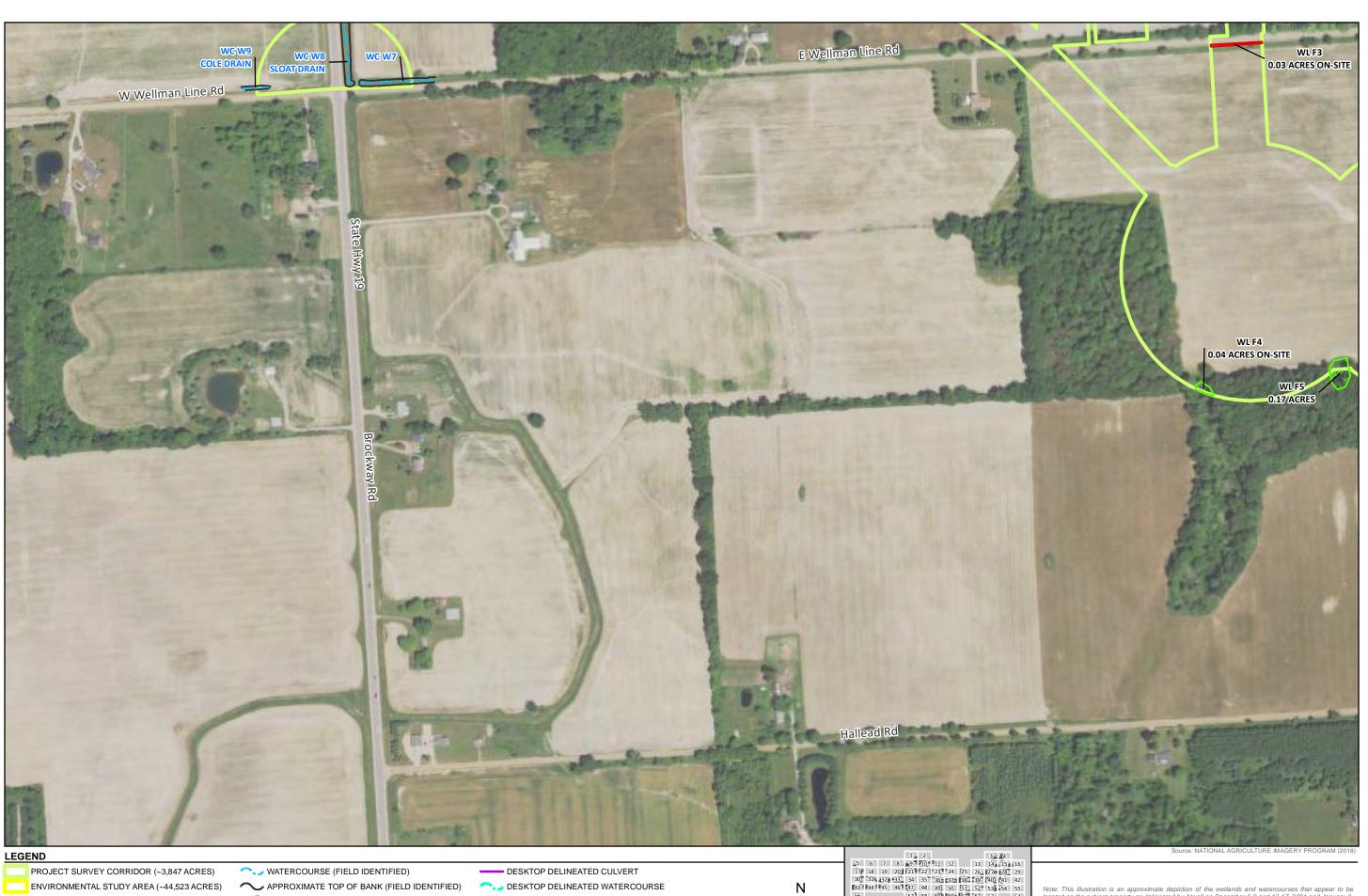
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HEET NO: 93 OF 106



8/31/2022 C.J. CH. C.C. JEFF WILLIAMS 21003645

HEET NO: 94 OF 106



8/31/2022

C.J. CH. C.C. JEFF WILLIAMS

21003645 HEET NO: 95 OF 106

NON-REGULATED WETLAND (FIELD IDENTIFIED) EGLE REGULATED WETLAND (FIELD IDENTIFIED) DESKTOP DELINEATED WETLAND

Note: This illustration is an approximate depiction of the wetlands and watercourses that appear to be located on the subject properly as delineated by Atwell on December 6-9 and 13-17, 2021 and January 3-7, April 4-8 and 11-14, 2022. The EGLE has the final authority on the extent of regulated wetlands, lakes, and streams in the state of Michigan. The information contained on this map is proprietary and confidential. The use or disclosure of this information by you to third parties is prohibited by law and may give rise to civil or criminal liability.



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8/31/2022

 $G: Vobs 2100 \ T21003645\_Riverbend\_Sanilac Co\_MI \ Projects \ Wetlands \ T21003645\_WLM.mxd$ 

ENVIRONMENTAL STUDY AREA (~44,523 ACRES)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)

DESKTOP DELINEATED CULVERT

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DESKTOP DELINEATED WETLAND

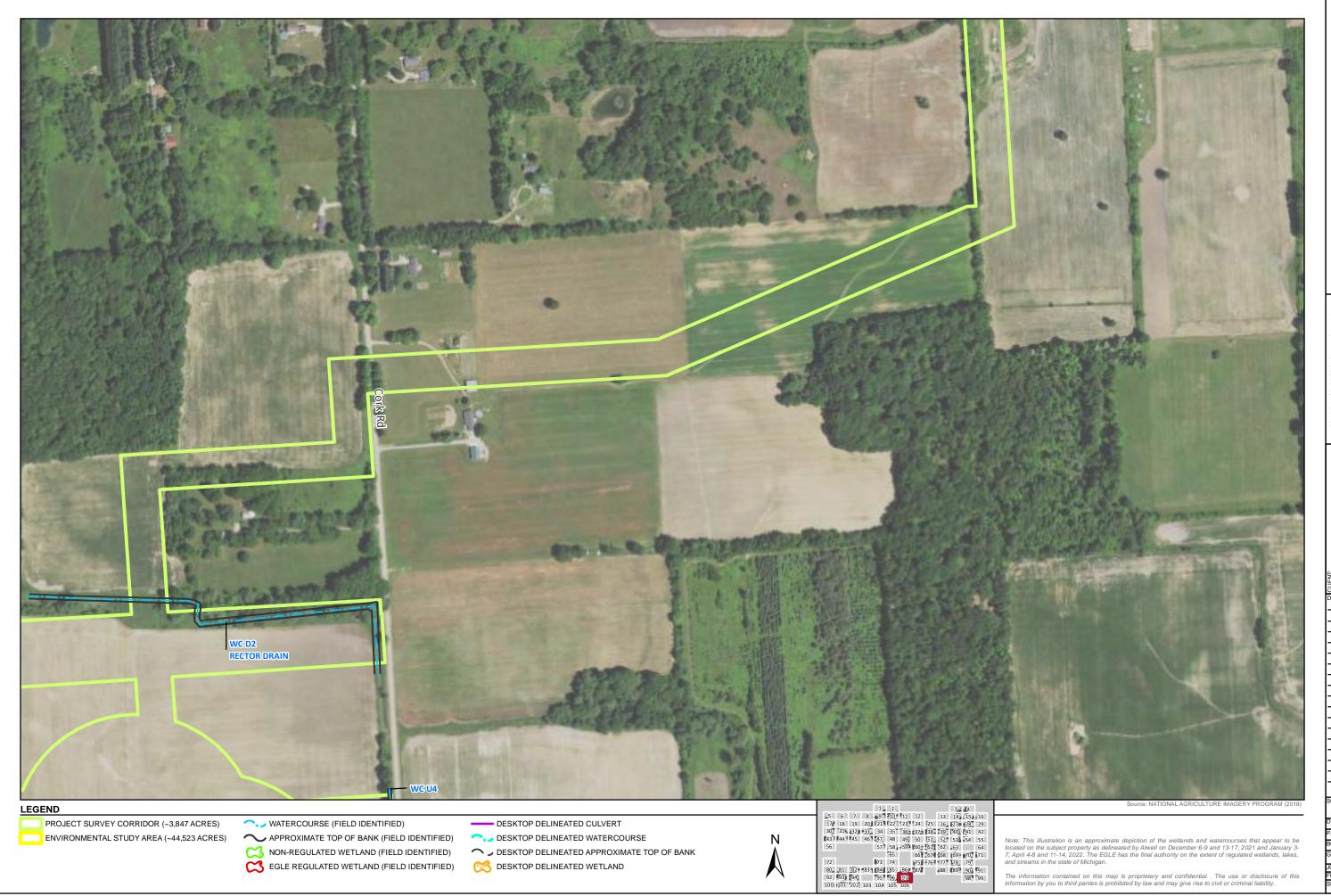
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HEET NO: 97 OF 106

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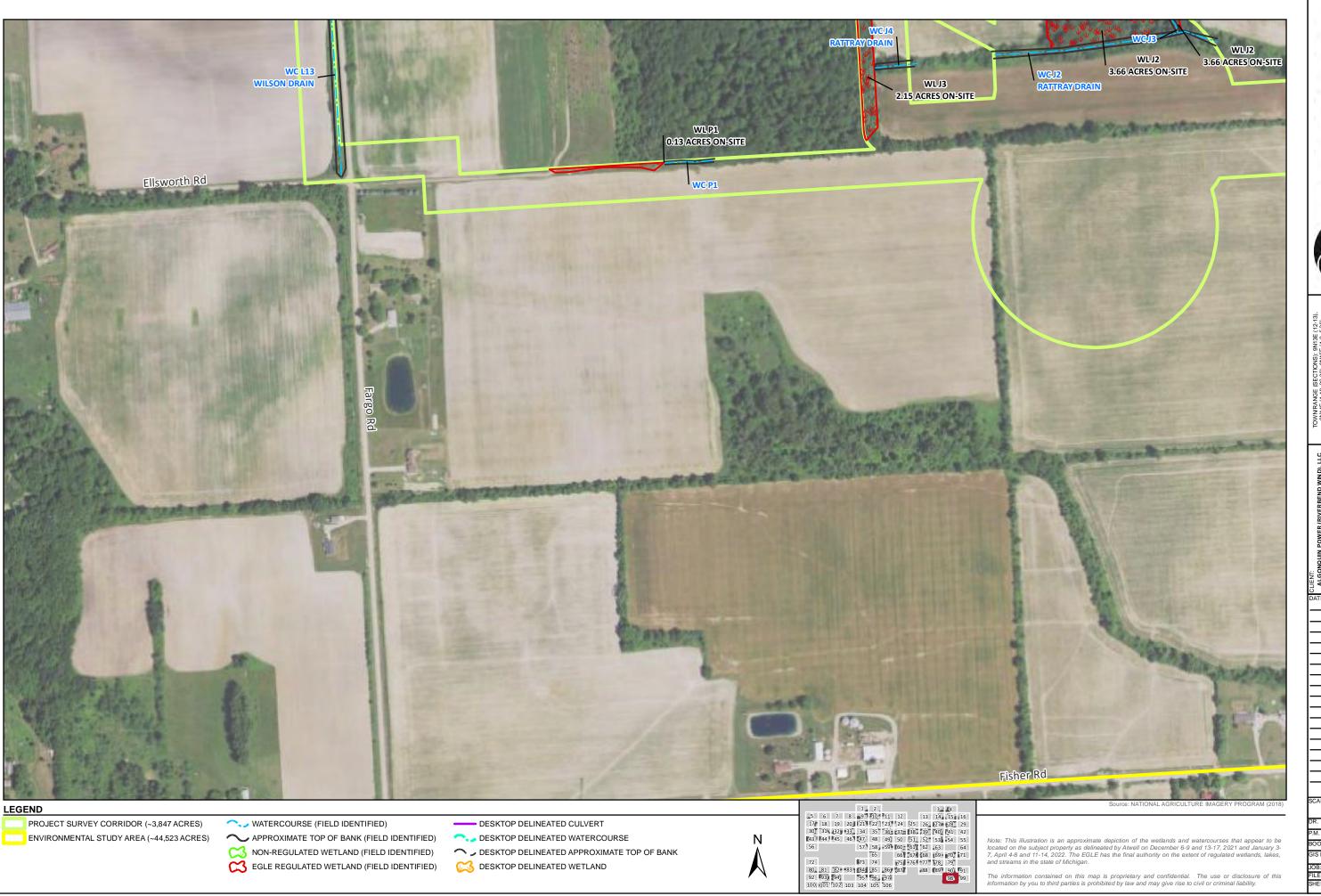


DESKTOP DELINEATED WETLAND

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NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)



8/31/2022

C.J. CH. C.C. JEFF WILLIAMS

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HEET NO: 98 OF 106

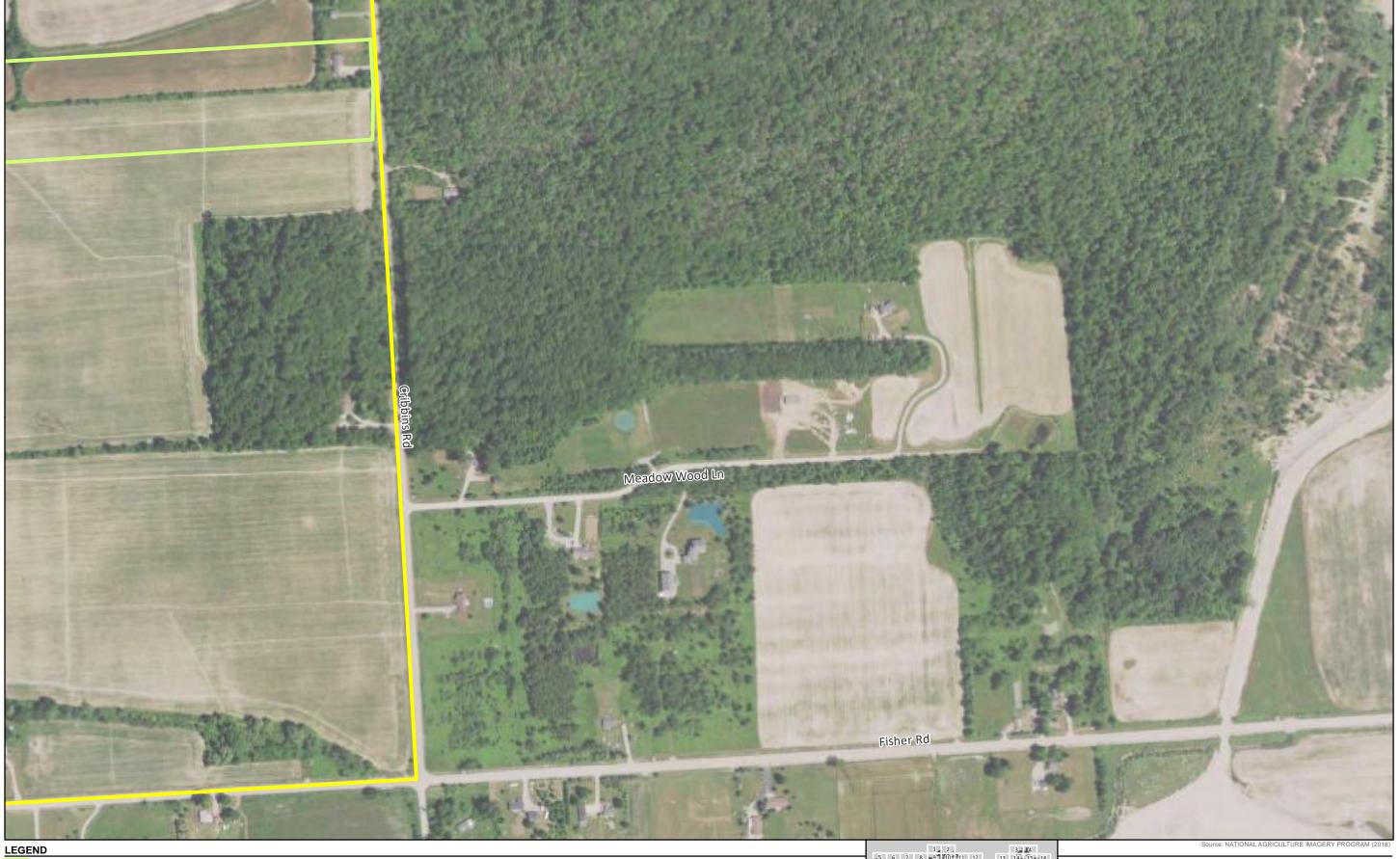
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21003645

HEET NO: 99 OF 106

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PROJECT SURVEY CORRIDOR (~3,847 ACRES) ENVIRONMENTAL STUDY AREA (~44,523 ACRES) ── WATERCOURSE (FIELD IDENTIFIED)

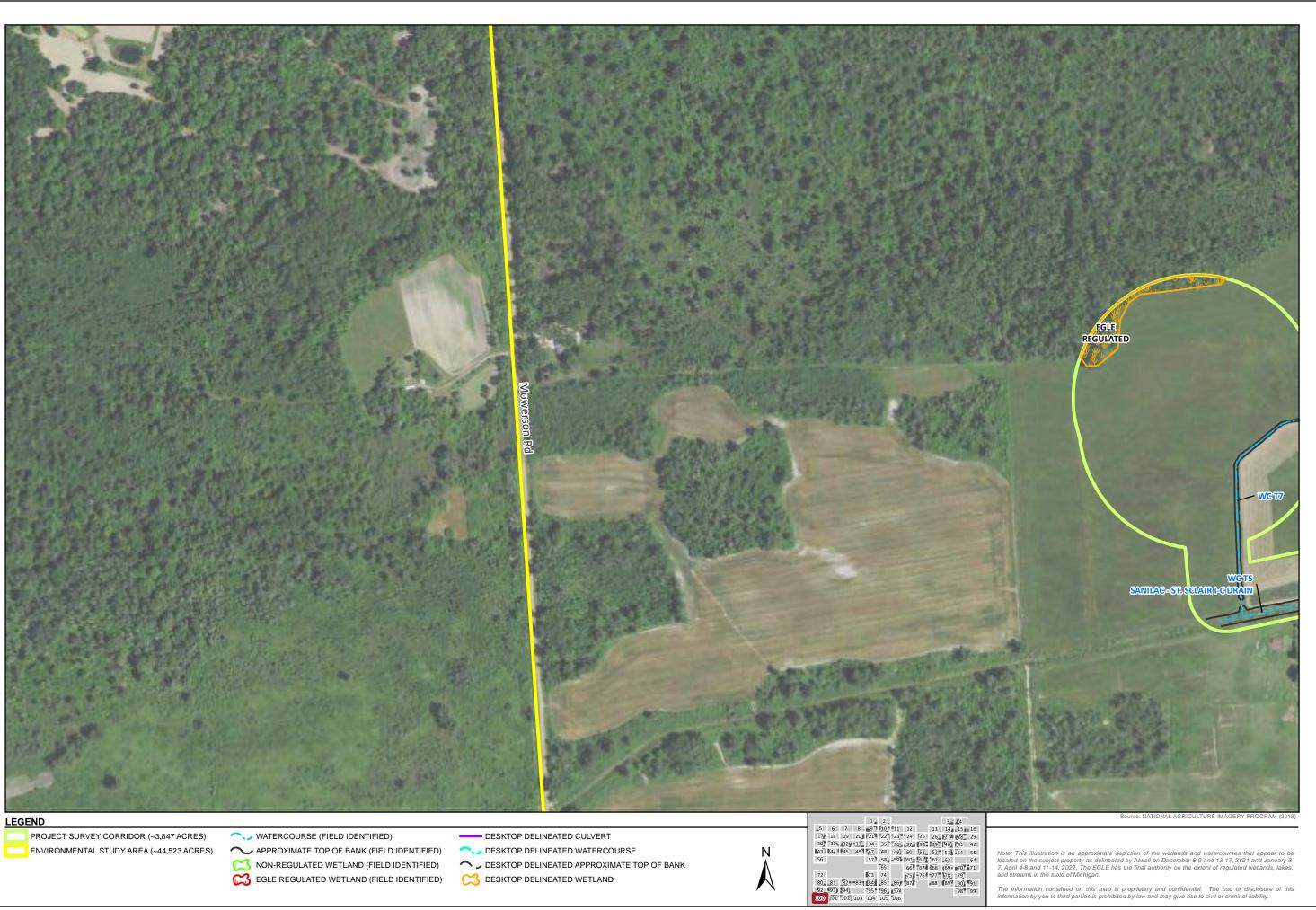
APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED) EGLE REGULATED WETLAND (FIELD IDENTIFIED) DESKTOP DELINEATED CULVERT

COURSE DESKTOP DELINEATED WATERCOURSE 

DESKTOP DELINEATED WETLAND

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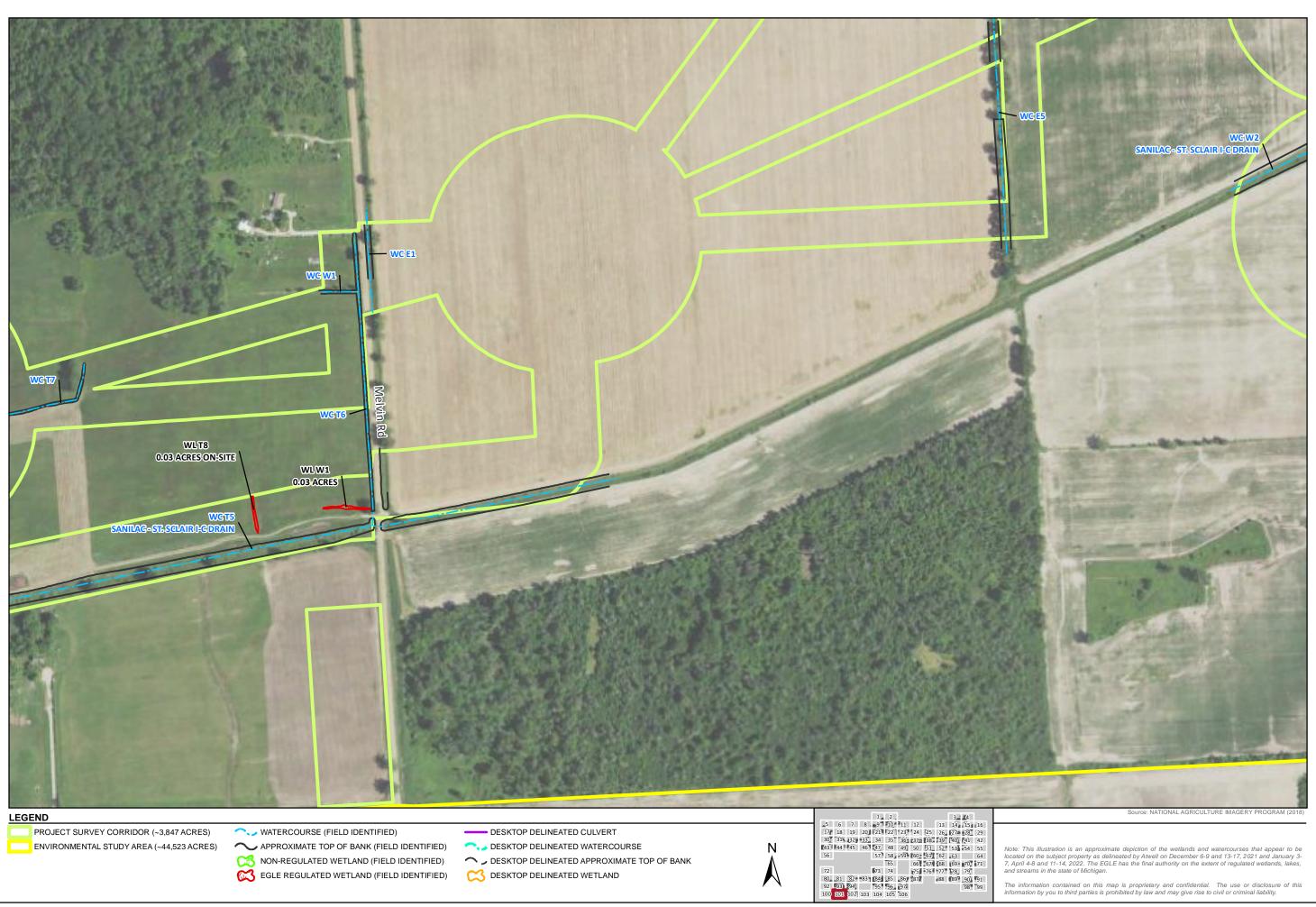
HEET NO: 100 OF 106

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EGLE REGULATED WETLAND (FIELD IDENTIFIED)

CS DESKTOP DELINEATED WETLAND

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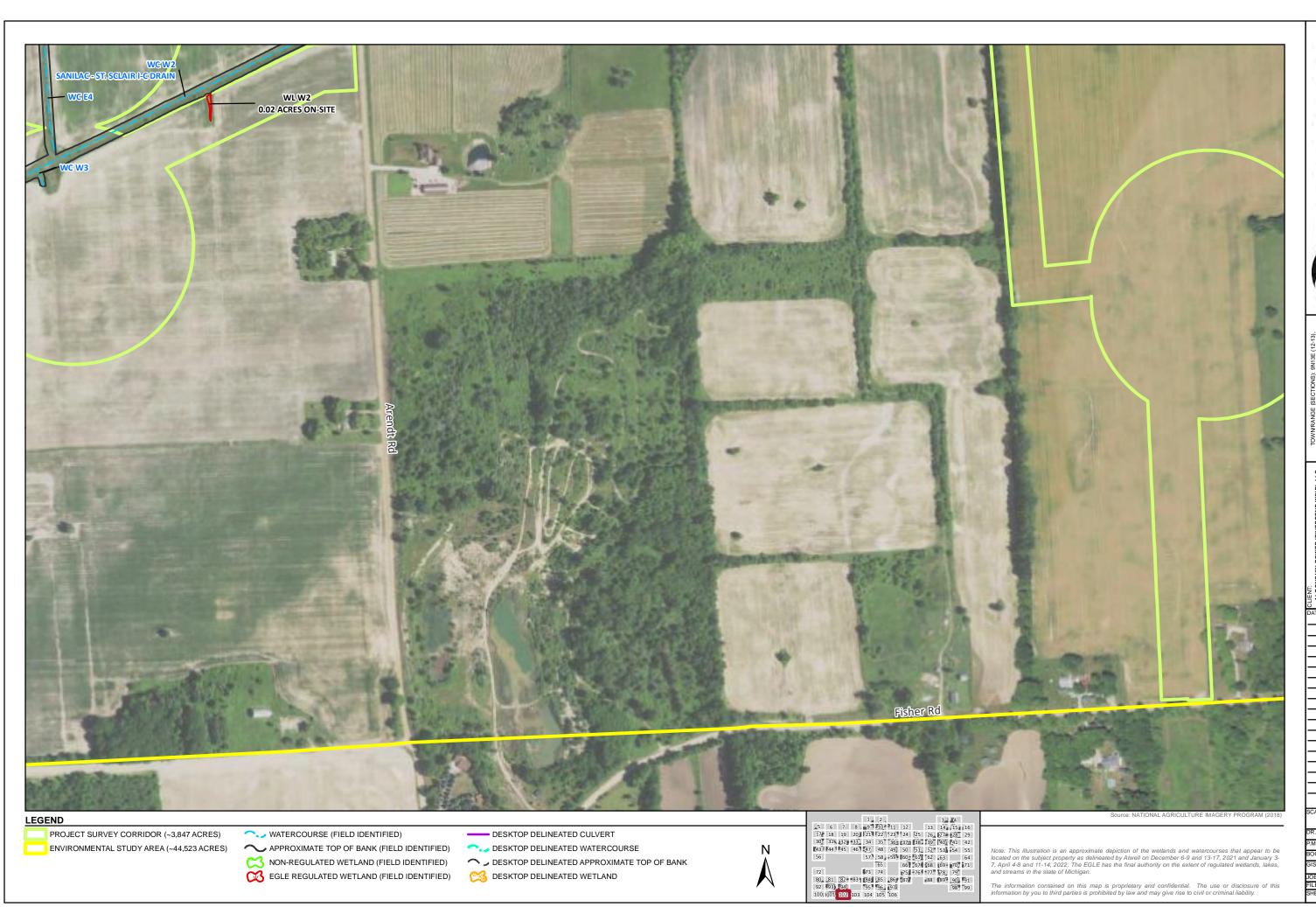
HEET NO: 101 OF 106

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NON-REGULATED WETLAND (FIELD IDENTIFIED)

EGLE REGULATED WETLAND (FIELD IDENTIFIED)



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C.J. CH. C.C.

JEFF WILLIAMS

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HEET NO: 102 OF 106

 $G: Vobs 2100 \ T21003645\_Riverbend\_Sanilac Co\_MI \ Projects \ Wetlands \ T21003645\_WLM.mxd$ 

C.J. CH. C.C. JEFF WILLIAMS

21003645

HEET NO: 103 OF 106

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LEGEND

PROJECT SURVEY CORRIDOR (~3,847 ACRES) ENVIRONMENTAL STUDY AREA (~44,523 ACRES) ── WATERCOURSE (FIELD IDENTIFIED)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED) EGLE REGULATED WETLAND (FIELD IDENTIFIED) DESKTOP DELINEATED CULVERT

Country Delineated Watercourse

CC DESKTOP DELINEATED WETLAND

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21003645 HEET NO: 104 OF 106

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LEGEND

PROJECT SURVEY CORRIDOR (~3,847 ACRES) ENVIRONMENTAL STUDY AREA (~44,523 ACRES) ── WATERCOURSE (FIELD IDENTIFIED)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED) EGLE REGULATED WETLAND (FIELD IDENTIFIED) DESKTOP DELINEATED CULVERT

Country Delineated Watercourse

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C.J. CH. C.C. JEFF WILLIAMS

21003645

HEET NO: 105 OF 106

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 $G: Vobs 2100 \ T21003645\_Riverbend\_Sanilac Co\_MI \ Projects \ Wetlands \ T21003645\_WLM.mxd$ 

# LEGEND PROJECT SURVEY CORRIDOR (~3,847 ACRES) ENVIRONMENTAL STUDY AREA (~44,523 ACRES)

── WATERCOURSE (FIELD IDENTIFIED)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

NON-REGULATED WETLAND (FIELD IDENTIFIED) EGLE REGULATED WETLAND (FIELD IDENTIFIED)



JEFF WILLIAMS

21003645

HEET NO: 106 OF 106



PROJECT SURVEY CORRIDOR (~3,847 ACRES) ENVIRONMENTAL STUDY AREA (~44,523 ACRES) ── WATERCOURSE (FIELD IDENTIFIED)

APPROXIMATE TOP OF BANK (FIELD IDENTIFIED)

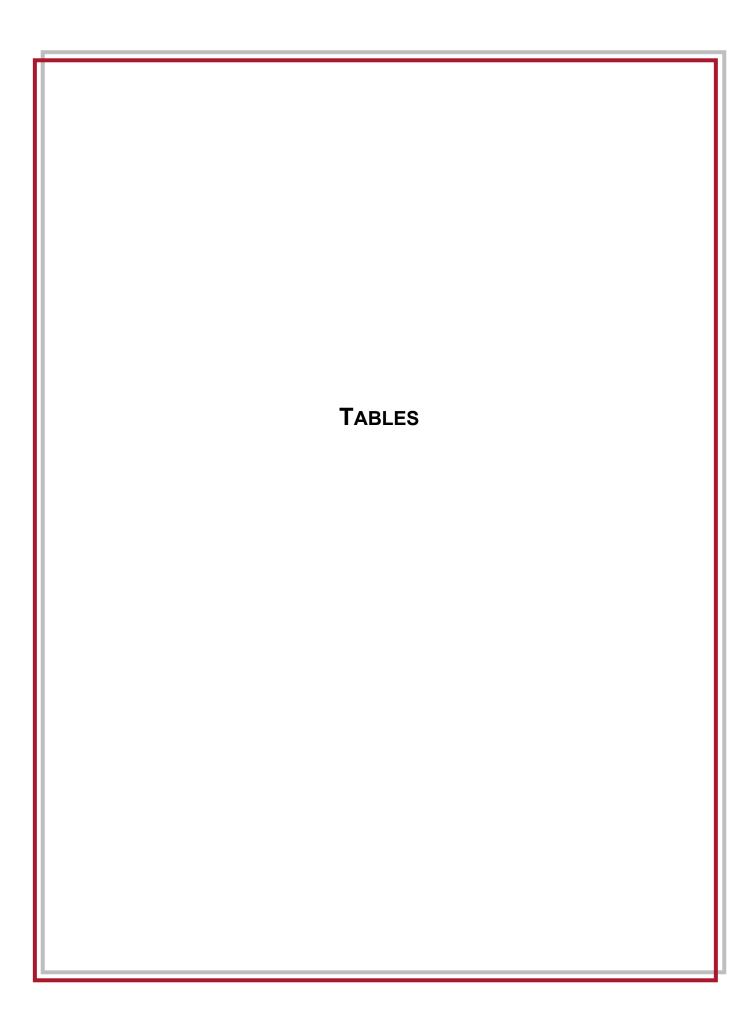
NON-REGULATED WETLAND (FIELD IDENTIFIED) EGLE REGULATED WETLAND (FIELD IDENTIFIED) DESKTOP DELINEATED CULVERT

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DESKTOP DELINEATED WETLAND

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#### Wetland and Watercourse Summary Table

Atwell Project No. 21003645										
Feature	Acres (On-Site)	Regulatory Status	Туре	Township	Range	Section				
Wetland A1	4.3	EGLE Regulated	Forested	09N	15E	1				
Wetland A2	2.00	EGLE Regulated	Forested	09N	15E	12				
Wetland B1	5.86	EGLE Regulated	Forested	09N	15E	14				
Wetland B2	1.27	Non-Regulated	Forested/Scrub-Shrub	09N	15E	14				
Wetland BB1	0.30	EGLE Regulated	Open Water/Emergent/Scrub-Shrub	09N	14E	28				
Wetland BB2	0.01	EGLE Regulated	Emergent/Scrub-Shrub	09N	14E	28				
Wetland BB3	0.01	EGLE Regulated	Emergent/Scrub-Shrub	09N	14E	28				
Wetland BB4	5.85	EGLE Regulated	Emergent/Scrub-Shrub/Forested	09N	14E	28				
Wetland BB5	0.04	EGLE Regulated	Emergent	09N	14E	28				
Wetland C1	1.64	EGLE Regulated	Forested	09N	15E	26				
Wetland C2	0.64	EGLE Regulated	Forested	09N	15E	26				
Wetland C3	0.02	EGLE Regulated	Emergent	09N	15E	26				
Wetland C4	0.18	EGLE Regulated	Forested	09N	15E	26				
Wetland CC1	0.47	EGLE Regulated	Forested	09N	15E	15				
Wetland DD1	0.11	Non-Regulated	Emergent	09N	14E	27				
Wetland DD2	0.07	EGLE Regulated	Emergent	09N	14E	27				
Wetland DD3	0.51	EGLE Regulated	Scrub-Shrub	09N	14E	27				
Wetland DD4	0.02	Non-Regulated	Forested	09N	14E	27				
Wetland DD5	0.09	Non-Regulated	Emergent	09N	14E	27				
Wetland DD6	0.01	Non-Regulated	Open Water	09N	14E	27				
Wetland DD7	0.18	Non-Regulated	Scrub-Shrub	09N	14E	27				
Wetland DD8	0.16	Non-Regulated	Open Water	09N	15E	6				
Wetland DD9	0.19	Non-Regulated	Open Water	09N	15E	7				
Wetland EE1	0.19	EGLE Regulated	Scrub-Shrub	09N	15E	6				
Wetland EE1 Wetland EE2	0.23	EGLE Regulated	Emergent	09N	14E	1				
Wetland F1	0.30		Emergent/Scrub-Shrub/Forested	09N	14E	26				
Wetland F2	1.05	EGLE Regulated		09N	14E	26				
	0.03	EGLE Regulated	Emergent/Forested		14E					
Wetland F4		EGLE Regulated	Emergent	09N		35				
Wetland F4	0.04	Non-Regulated	Emergent	09N	14E	35				
Wetland F5	0.17	Non-Regulated	Emergent/Scrub-Shrub	09N	14E	35				
Wetland FF1	1.71	EGLE Regulated	Forested	09N	15E	20				
Wetland FF2	0.05	EGLE Regulated	Forested	09N	14E	25				
Wetland FF3	0.20	EGLE Regulated	Open Water	09N	14E	23				
Wetland GG1	1.21	EGLE Regulated	Forested	09N	14E	14				
Wetland H1	1.80	EGLE Regulated	Emergent/Forested	09N	15E	29				
Wetland HH1	0.03	EGLE Regulated	Forested	09N	14E	33				
Wetland HH2	0.02	EGLE Regulated	Scrub-Shrub	09N	14E	33				
Wetland HH3	0.44	EGLE Regulated	Forested	09N	14E	15				
Wetland HH4	0.15	EGLE Regulated	Scrub-Shrub	09N	14E	15				
Wetland II1	0.01	Non-Regulated	Open Water	09N	14E	14				
Wetland II2	1.23	EGLE Regulated	Scrub-Shrub/Forested	09N	14E	14				
Wetland II3	0.46	EGLE Regulated	Emergent	09N	14E	14				
Wetland II4	5.88	EGLE Regulated	Forested	09N	14E	14				
Wetland J1	0.06	Non-Regulated	Forested	09N	15E	36				

#### Wetland and Watercourse Summary Table

Atwell Project No. 21003645									
Feature	Acres (On-Site)	Regulatory Status	Туре	Township	Range	Section			
Wetland J2	3.66	EGLE Regulated	Forested	09N	15E	36			
Wetland J3	2.15	EGLE Regulated	Forested	09N	15E	36			
Wetland K1	1.59	EGLE Regulated	Forested	09N	15E	21			
Wetland L1	1.83	EGLE Regulated	Emergent/Forested	09N	15E	35			
Wetland M1	2.39	EGLE Regulated	Emergent/Scrub-Shrub	09N	14E	8			
Wetland M2	1.52	EGLE Regulated	Forested	09N	14E	10			
Wetland N1	2.93	EGLE Regulated	Forested	09N	14E	11			
Wetland P1	0.13	EGLE Regulated	Emergent/Scrub-Shrub	09N	15E	36			
Wetland P2	0.16	EGLE Regulated	Scrub-Shrub	09N	15E	36			
Wetland P3	3.03	EGLE Regulated	Forested/Emergent	09N	15E	35			
Wetland R1	0.11	EGLE Regulated	Forested	09N	15E	23			
Wetland R2	1.00	EGLE Regulated	Forested	09N	15E	23			
Wetland S1	3.52	EGLE Regulated	Forested	09N	15E	15			
Wetland T1	0.03	EGLE Regulated	Emergent	09N	14E	29			
Wetland T2	0.29	EGLE Regulated	Emergent	09N	14E	29			
Wetland T3	0.09	EGLE Regulated	Emergent	09N	14E	29			
Wetland T4	0.29	EGLE Regulated	Emergent/Scrub-Shrub	09N	14E	29			
Wetland T5	0.21	EGLE Regulated	Emergent	09N	14E	29			
Wetland T6	0.11	EGLE Regulated	Scrub-Shrub/Emergent	09N	14E	29			
Wetland T7	0.01	Non-Regulated	Scrub-Shrub	09N	14E	29			
Wetland T8	0.03	EGLE Regulated	Emergent	09N	14E	31			
Wetland U1	1.35	EGLE Regulated	Forested	09N	14R	26			
Wetland W1	0.03	EGLE Regulated	Emergent	09N	14E	31			
Wetland W2	0.02	EGLE Regulated	Emergent	09N	14E	32			
Wetland W3	0.36	EGLE Regulated	-	09N	14E	28			
Wetland Y1	3.63	EGLE Regulated	Emergent Forested	09N	15E	27			
Watercourse A1 (Turner Drain)			Intermittent	USIN	120	27			
Watercourse A2		EGLE Regulated							
		EGLE Regulated	Perennial						
Watercourse A3		EGLE Regulated	Intermittent						
Watercourse A4		EGLE Regulated	Intermittent						
Watercourse A5		EGLE Regulated	Intermittent						
Watercourse AA1		EGLE Regulated	Intermittent						
Watercourse AA2 (McIntyre & Willing Drain)		EGLE Regulated	Perennial						
Watercourse AA3		EGLE Regulated	Perennial						
Watercourse AA4		EGLE Regulated	Intermittent						
Watercourse B1		EGLE Regulated	Intermittent						
Watercourse B2 (William Doan Drain)		EGLE Regulated	Intermittent						
Watercourse B3 (Sheridan Drain)		EGLE Regulated	Intermittent						
Watercourse B4 (Sheridan Drain)		EGLE Regulated	Intermittent						
Watercourse B5		EGLE Regulated	Perennial						
Watercourse B6 (Lawson Drain)		EGLE Regulated	Perennial						
Watercourse B7 (Lawson Drain)		EGLE Regulated	Perennial						
Watercourse B8		EGLE Regulated	Intermittent						
Watercourse BB1		EGLE Regulated	Intermittent	<u> </u>					

# Riverbend Wind Project Wetland and Watercourse Summary Table

Atwell Project No. 21003645									
Feature	Acres (On-Site)	Regulatory Status	Туре	Township	Range	Section			
Watercourse BB2		EGLE Regulated	Intermittent						
Watercourse BB3 (Downey Drain)		EGLE Regulated	Intermittent						
Watercourse BB4 (Downey Drain)		EGLE Regulated	Intermittent						
Watercourse BB5 (Seymore Creek)		EGLE Regulated	Perennial						
Watercourse BB6		EGLE Regulated	Intermittent						
Watercourse C1 (Conroy & Ferriby Drain)		EGLE Regulated	Perennial						
Watercourse C2		EGLE Regulated	Intermittent						
Watercourse C3 (Willey Drain)		EGLE Regulated	Perennial						
Watercourse C4		EGLE Regulated	Intermittent						
Watercourse C5 (Lavell Drain)		EGLE Regulated	Intermittent						
Watercourse C6 (Black Creek Drain)		EGLE Regulated	Perennial						
Watercourse CC1		EGLE Regulated	Perennial						
Watercourse CC2 (Seymore Creek)		EGLE Regulated	Perennial						
Watercourse D1 (McIntyre & Willing Drain)		EGLE Regulated	Perennial						
Watercourse D2 (Rector Drain)		EGLE Regulated	Perennial						
Watercourse DD1		EGLE Regulated	Ephemeral						
Watercourse DD3 (Sloat Drain)		EGLE Regulated	Intermittent						
Watercourse DD4		EGLE Regulated	Intermittent						
Watercourse E1		EGLE Regulated	Perennial						
Watercourse E2 (Downey Drain)		EGLE Regulated	Perennial						
Watercourse E3 (Downey Drain)		EGLE Regulated	Perennial						
Watercourse E4		EGLE Regulated	Perennial						
Watercourse E5		EGLE Regulated	Intermittent						
Watercourse E6		EGLE Regulated	Perennial						
Watercourse E7		EGLE Regulated	Intermittent						
Watercourse E8		EGLE Regulated	Intermittent						
Watercourse E9		EGLE Regulated	Intermittent						
Watercourse E10		EGLE Regulated	Intermittent						
Watercourse E12 (Sloat Drain)		EGLE Regulated	Perennial						
Watercourse EE1		EGLE Regulated	Intermittent						
Watercourse EE2 (Potts Drain)		EGLE Regulated	Intermittent						
Watercourse EE3		EGLE Regulated	Intermittent						
Watercourse EE4 (Potts Drain)		EGLE Regulated	Perennial						
Watercourse EE5		EGLE Regulated	Intermittent						
Watercourse EE6 (McIntyre & Willing Drain)		EGLE Regulated	Perennial						
Watercourse EE7		EGLE Regulated	Intermittent						
Watercourse F1 (Potts Drain)		EGLE Regulated	Perennial						
Watercourse F2 (Potts Drain)		EGLE Regulated	Perennial						
Watercourse FF1		EGLE Regulated	Intermittent	+		<del>                                     </del>			
Watercourse FF2		EGLE Regulated	Intermittent	+		<del>                                     </del>			
Watercourse FF3 (Lord Drain)		EGLE Regulated	Perennial			<del>                                     </del>			
Watercourse FF4 (Cline and Kerr Drain)		EGLE Regulated  EGLE Regulated	Perennial			<del>                                     </del>			
Watercourse FF5  Watercourse FF5		EGLE Regulated  EGLE Regulated	Intermittent			<del>                                     </del>			
Watercourse FF6		EGLE Regulated  EGLE Regulated	Intermittent			<del>                                     </del>			
Watercourse FFO		LOLE NEgulated	mtermittent						

#### Wetland and Watercourse Summary Table

		twell Project No. 21003645				Т
Feature	Acres (On-Site)	Regulatory Status	Туре	Township	Range	Secti
Watercourse FF7		EGLE Regulated	Intermittent			
Watercourse FF8		EGLE Regulated	Intermittent			
Watercourse G1 (Cork Drain)		EGLE Regulated	Perennial			
Watercourse G2 (Solan Drain)		EGLE Regulated	Perennial			
Watercourse G3 (Macklem Drain)		EGLE Regulated	Perennial			
Watercourse G6 (Turner Drain)		EGLE Regulated	Perennial			
Watercourse GG1 (Seymore Creek)		EGLE Regulated	Perennial			
Watercourse GG2		EGLE Regulated	Intermittent			
Watercourse H1		EGLE Regulated	Intermittent			
Watercourse H3 (East Branch Speaker & Maple Valley Drain)		EGLE Regulated	Perennial			
Watercourse H4		EGLE Regulated	Perennial			
Watercourse H6 (Solan Drain)		EGLE Regulated	Perennial			
Watercourse H8		EGLE Regulated	Intermittent			
Watercourse H12 (Lavell Drain)		EGLE Regulated	Perennial			1
Watercourse H13		EGLE Regulated	Intermittent			
Watercourse H16 (Black Creek Drain)		EGLE Regulated	Perennial			1
Watercourse HH1		EGLE Regulated	Perennial			+
Watercourse HH2		EGLE Regulated	Intermittent			<del>                                     </del>
Watercourse I1 (Seymore Creek)		EGLE Regulated	Perennial			1
Watercourse I3 (Seymore Creek)		EGLE Regulated	Perennial			<del>                                     </del>
Watercourse II1 (Cork Drain)		EGLE Regulated	Perennial			
Watercourse J1		EGLE Regulated	Ephemeral			-
Watercourse J2 (Rattray Drain)		EGLE Regulated	Intermittent			1
Watercourse J3		EGLE Regulated	Intermittent			1
Watercourse J4 (Rattray Drain)		EGLE Regulated	Intermittent			1
Watercourse K1		EGLE Regulated	Ephemeral			1
Watercourse K2		EGLE Regulated	Ephemeral			1
Watercourse K3		EGLE Regulated	Perennial			1
Watercourse K4		EGLE Regulated	Ephemeral			
Watercourse K5 (Lavell Drain)		EGLE Regulated	Perennial			
Watercourse K6		EGLE Regulated	Ephemeral			1
Watercourse K7		EGLE Regulated	Intermittent			1
Watercourse K8		EGLE Regulated	Intermittent			1
Watercourse K9		EGLE Regulated	Ephemeral			+
Watercourse K10		EGLE Regulated	Intermittent			
Watercourse L1		EGLE Regulated	Ephemeral			
Watercourse L2		EGLE Regulated	Ephemeral			1
Watercourse L3		EGLE Regulated  EGLE Regulated	Ephemeral			1
Watercourse L4		EGLE Regulated  EGLE Regulated	Epnemeral Intermittent	+		1
				+		1
Watercourse L5 (Willey Drain)		EGLE Regulated	Intermittent			+
Watercourse L7		EGLE Regulated	Perennial			-
Watercourse L9		EGLE Regulated	Ephemeral	+		-
Watercourse L8 Watercourse L9		EGLE Regulated EGLE Regulated	Intermittent Intermittent			

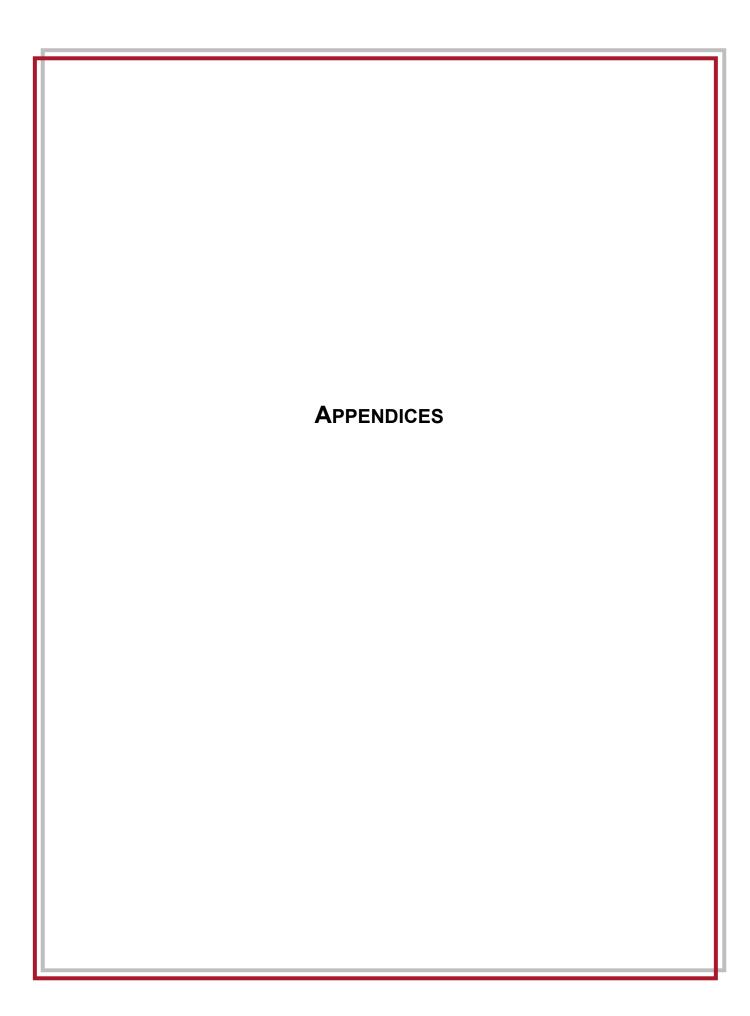
#### Wetland and Watercourse Summary Table

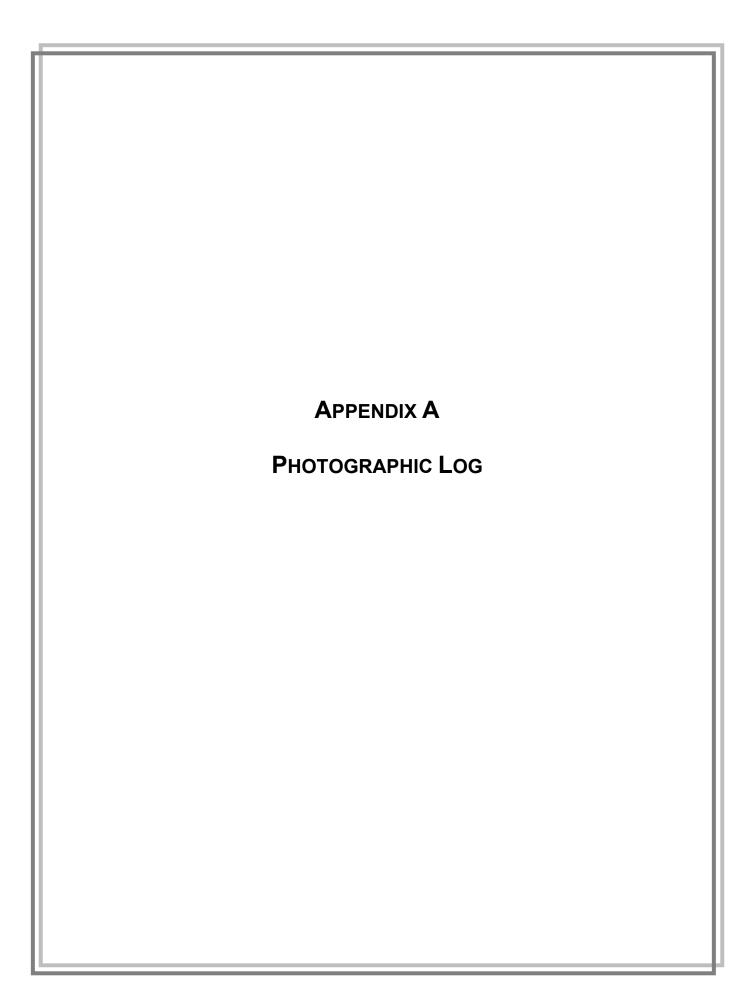
	Atwell Project No. 21003645									
Feature	Acres (On-Site)	Regulatory Status	Туре	Township	Range	Section				
Watercourse L10		EGLE Regulated	Intermittent							
Watercourse L11		EGLE Regulated	Perennial							
Watercourse L12		EGLE Regulated	Perennial							
Watercourse L13 (Wilson Drain)		EGLE Regulated	Intermittent							
Watercourse M1		EGLE Regulated	Intermittent							
Watercourse M2		EGLE Regulated	Intermittent							
Watercourse M3 (East Branch Speaker & Maple Valley Drain)		EGLE Regulated	Perennial							
Watercourse M4		EGLE Regulated	Intermittent							
Watercourse M5		EGLE Regulated	Intermittent							
Watercourse M6		EGLE Regulated	Intermittent							
Watercourse M7 (Spring Creek)		EGLE Regulated	Perennial							
Watercourse M8 (Spring Creek)		EGLE Regulated	Perennial							
Watercourse M9 (Hunt Drain)		EGLE Regulated	Intermittent							
Watercourse M10 (Hunt Drain)		EGLE Regulated	Ephemeral							
Watercourse N1 (Lord Drain)		EGLE Regulated	Intermittent							
Watercourse N2		EGLE Regulated	Intermittent							
Watercourse N3		EGLE Regulated	Intermittent							
Watercourse O1		EGLE Regulated	Intermittent							
Watercourse O2		EGLE Regulated	Intermittent							
Watercourse O3		EGLE Regulated	Perennial							
Watercourse O4		EGLE Regulated	Intermittent							
Watercourse O5		EGLE Regulated	Intermittent							
Watercourse O5  Watercourse O6 (Sheridan Drain)		EGLE Regulated	Perennial							
Watercourse O7		EGLE Regulated	Intermittent							
Watercourse O7  Watercourse O8 (Sheridan Drain)	+	EGLE Regulated	Intermittent							
Watercourse P1		EGLE Regulated	Ephemeral							
			Intermittent			<del> </del>				
Watercourse Q1 (Downey Drain)		EGLE Regulated								
Watercourse Q2 (Downey Drain)		EGLE Regulated	Perennial							
Watercourse R1 (Jackson Creek)		EGLE Regulated	Intermittent							
Watercourse R2		EGLE Regulated	Perennial							
Watercourse R3 (Willey Drain)		EGLE Regulated	Intermittent			<u> </u>				
Watercourse R4		EGLE Regulated	Intermittent			<u> </u>				
Watercourse R5		EGLE Regulated	Intermittent							
Watercourse R6 (Conroy & Ferriby Drain)		EGLE Regulated	Perennial							
Watercourse R7		EGLE Regulated	Intermittent							
Watercourse R8		EGLE Regulated	Intermittent							
Watercourse R9		EGLE Regulated	Intermittent							
Watercourse R10 (Jackson Creek)		EGLE Regulated	Perennial							
Watercourse R11		EGLE Regulated	Intermittent							
Watercourse S1 (Putney Drain)		EGLE Regulated	Perennial							
Watercourse S2 (Seymore Drain)		EGLE Regulated	Perennial							
Watercourse S3		EGLE Regulated	Intermittent							
Watercourse S4 (Crouse Drain)		EGLE Regulated	Perennial							
Watercourse S5		EGLE Regulated	Intermittent	T						

# Wetland and Watercourse Summary Table

Feature	Acres (On-Site)	Regulatory Status	Туре	Township	Range	Section
Watercourse S6 (Seymore Creek)		EGLE Regulated	Perennial	1000000		
Watercourse S7 (Seymore Creek)		EGLE Regulated	Perennial			
Watercourse S8 (Seymore Creek)		EGLE Regulated	Perennial			
Watercourse T1		EGLE Regulated	Intermittent			
Watercourse T2		EGLE Regulated	Intermittent			
Watercourse T3		EGLE Regulated	Intermittent			
Watercourse T4		EGLE Regulated	Intermittent			
Watercourse T5 (Sanilac and St. Clair Drain)		EGLE Regulated	Perennial			
Watercourse T6		EGLE Regulated	Intermittent			
Watercourse T7		EGLE Regulated	Intermittent			
Watercourse U1		EGLE Regulated	Intermittent			
Watercourse U2		EGLE Regulated	Intermittent			
Watercourse U3		EGLE Regulated	Intermittent			
Watercourse U4		EGLE Regulated	Intermittent			
Watercourse U5		EGLE Regulated	Intermittent			
Watercourse V1 (Jackson Creek)		EGLE Regulated	Perennial			
Watercourse W1		EGLE Regulated	Intermittent			
Watercourse W2 (Sanilac and St.Clair Drain)		EGLE Regulated	Perennial			
Watercourse W3		EGLE Regulated	Ephemeral			
Watercourse W4		EGLE Regulated	Intermittent			
Watercourse W5		EGLE Regulated	Intermittent			
Watercourse W6		EGLE Regulated	Intermittent			
Watercourse W7		EGLE Regulated	Intermittent			
Watercourse W8 (Sloat Drain)		EGLE Regulated	Intermittent			
Watercourse W9 (Cole Drain)		EGLE Regulated	Intermittent			
Watercourse X1 (Seymore Creek)		EGLE Regulated	Intermittent			
Watercourse X2		EGLE Regulated	Perennial			
Watercourse X3		EGLE Regulated	Intermittent			
Watercourse X4		EGLE Regulated	Intermittent			
Watercourse X5		EGLE Regulated	Intermittent			
Watercourse X6		EGLE Regulated	Intermittent			
Watercourse X7 (Potts Drain)		EGLE Regulated	Perennial			
Watercourse X8 (Potts Drain)		EGLE Regulated	Intermittent			
Watercourse X9		EGLE Regulated	Intermittent			
Watercourse X10 (Fletcher Drain)		EGLE Regulated	Intermittent			
Watercourse X11		EGLE Regulated	Intermittent			
Watercourse Y1		EGLE Regulated	Intermittent			
Watercourse Y2 (Seymore Drain)		EGLE Regulated	Perennial			
Watercourse Y3		EGLE Regulated	Intermittent			
Watercourse Y4		EGLE Regulated	Intermittent			
Watercourse Y5		EGLE Regulated	Intermittent			
Watercourse Y6		EGLE Regulated	Perennial			
Watercourse Y7		EGLE Regulated	Intermittent			
Watercourse Y8		EGLE Regulated	Intermittent			

Riverbend Wind Project										
	Wetland and Watercourse Summary Table									
	Atwell Project No. 21003645									
Feature	Acres (On-Site)	Regulatory Status	Туре	Township	Range	Section				
Watercourse Y9		EGLE Regulated	Ephemeral							
Watercourse Z1		EGLE Regulated	Intermittent							
Desktop Delineated Features										
27 Wetlands										
45 Watercourses										
Total	69.71									







# **PHOTOGRAPHIC LOG**

# **Riverbend Wind Energy Project**

# Sanilac County, MI



**Photo 1.** A northeast-facing view of a typical agricultural field within the Environmental Survey Area.



Photo 2. A north-facing view of a typical upland woodlot within the Environmental Survey Area.



**Photo 3.** A west-facing view of a typical upland pasture area within the Environmental Survey Area.



**Photo 4.** A south-facing view of a residential building with maintained lawn within the Environmental Survey Area.



**Photo 5.** An east-facing view of Wetland DD5, a typical palustrine emergent (PEM) wetland in the Environmental Survey Area.



**Photo 6.** A north-facing view of Wetland DD3, a palustrine scrub-shrub (PSS) wetland found within the Environmental Survey Area.



**Photo 7.** A south-facing view of Wetland II4, a palustrine forested (PFO) wetland found within the Environmental Survey Area.



**Photo 8.** A west-facing view of Wetland P3, a PEM/PFO wetland found within the Environmental Survey Area.



**Photo 9.** A north-facing view of Wetland T4, a PEM/PSS wetland found within the Environmental Survey Area.



**Photo 10.** An east-facing view of Wetland II2, a PSS/PFO wetland found within the Environmental Survey Area.

Atwell, LLC # 21003645 5



**Photo 11.** An east-facing view of Wetland BB4, a PEM/PSS/PFO wetland found within the Environmental Survey Area.



**Photo 12.** A north-facing view of Wetland FF3, an open water (OW) wetland found within the Environmental Survey Area.



**Photo 13.** A west-facing view of Wetland BB1, a PEM/PSS/OW wetland found within the Environmental Survey Area.



**Photo 14.** A southwest-facing view of Watercourse R10, Jackson Creek, a typical perennial watercourse found within the Environmental Survey Area.



**Photo 15.** A south-facing view of Watercourse T6, another typical perennial watercourse found within the Environmental Survey Area.



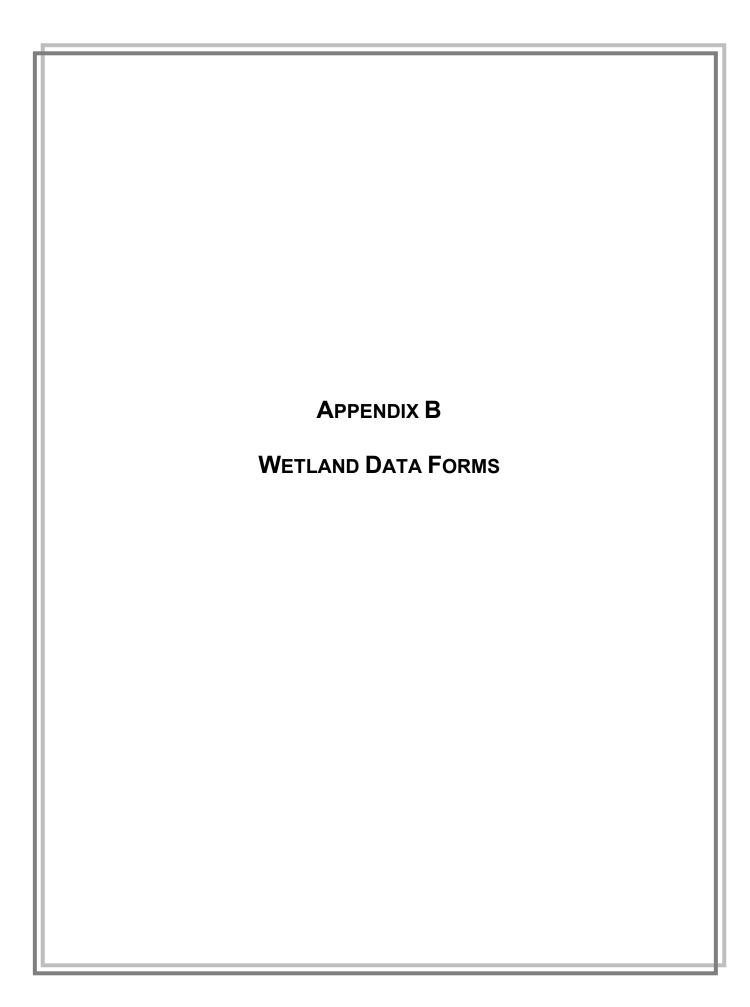
**Photo 16.** An east-facing view of Watercourse B8, a typical intermittent watercourse found within the Environmental Survey Area.



**Photo 17.** A west-facing view of Watercourse E5, another typical intermittent watercourse found within the Environmental Survey Area.



**Photo 18.** A north-facing view of Watercourse W3, a typical ephemeral watercourse found within the Environmental Survey Area.



#### WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Riverbend V	Vind	City/C	County: Sanilac	Sampling	Date: 2021-12-06
Applicant/Owner: Liberty F				State: Michigan Sampli	
•				sec 01 T009N R015E	
•				, none): <u>Concave</u>	
				-82.657782	
				NWI classification: PF	
		•	•	(If no, explain in Remarks.)	
				rmal Circumstances" present?	Yes ✓ No
				ed, explain any answers in Rema	
				ations, transects, import	
Hydrophytic Vegetation Prese		✓ No	Is the Sampled Ar within a Wetland?		
Hydric Soil Present? Wetland Hydrology Present?		✓ No		<del></del>	
Remarks: (Explain alternative			if yes, optional vvet	land Site ID:	
PFO wetland mosaid	0				
HYDROLOGY					
Wetland Hydrology Indicate	ors:			Secondary Indicators (minin	num of two required)
Primary Indicators (minimum	of one is required; of	check all that apply)		Surface Soil Cracks (B6	6)
Surface Water (A1)		✓ Water-Stained Leave	es (B9)	✓ Drainage Patterns (B10	))
High Water Table (A2)		Aquatic Fauna (B13)		Moss Trim Lines (B16)	
Saturation (A3)		Marl Deposits (B15)		Dry-Season Water Table	le (C2)
Water Marks (B1)		Hydrogen Sulfide Od		Crayfish Burrows (C8)	(OO)
Sediment Deposits (B2) Drift Deposits (B3)		<ul><li>Oxidized Rhizospher</li><li>Presence of Reduced</li></ul>			
Algal Mat or Crust (B4)		Recent Iron Reduction		<ul><li>Stunted or Stressed Pla</li><li>Geomorphic Position (E</li></ul>	
Iron Deposits (B5)		Thin Muck Surface (0		Shallow Aquitard (D3)	72)
Inundation Visible on Aer	rial Imagery (B7)	Other (Explain in Rer		Microtopographic Relief	f (D4)
Sparsely Vegetated Cond	,		,	✓ 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):	Wetlan	nd Hydrology Present? Yes _	✓ No
Describe Recorded Data (stre	eam gauge, monitor	ing well, aerial photos, pre	evious inspections), if	available:	
Remarks:					
rtomanto.					

To charten (District 20	Absolute		t Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 30		Species?		Number of Dominant Species
1. Acer rubrum			FAC	That Are OBL, FACW, or FAC:5(A)
2. Acer saccharinum			FACW	Total Number of Dominant
3. Populus tremuloides			FAC	Species Across All Strata:5(B)
4. Betula papyrifera				Percent of Dominant Species That Are OBL, FACW, or FAC:
5				That Are OBE, I ACW, OF I AC. 100.00 (A/B)
6				Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
	87	= Total Co	over	OBL species <u>0.00</u> x 1 = <u>0.00</u>
Sapling/Shrub Stratum (Plot size: 15 )				FACW species 33.00 x 2 = 66.00
1. Cornus racemosa				FAC species <u>95.00</u> x 3 = <u>285.00</u> FACU species <u>2.00</u> x 4 = <u>8.00</u>
2. Rubus hispidoides	_ 3	Y	FACW	UPL species 0.00 x 5 = 0.00
3			<u> </u>	Column Totals: 130.00 (A) 359.00 (B)
4			<u> </u>	
5				Prevalence Index = B/A = 2.76
6				Hydrophytic Vegetation Indicators:
7		·		1 - Rapid Test for Hydrophytic Vegetation
	13	= Total Co	ver	✓ 2 - Dominance Test is >50%
Herb Stratum (Plot size:5				3 - Prevalence Index is ≤3.0¹      A Manual Annual A
1 Symphyotrichum lanceolatum	15	Υ	FACW	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
2. Geum canadense		Υ	FAC	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
3. Onoclea sensibilis			FACW	
4.				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5.				
6.				Definitions of Vegetation Strata:
7.				<b>Tree</b> – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
8.				
				Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.
9			- <del> </del>	
10.				Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
11.		-		Woody vines – All woody vines greater than 3.28 ft in
12		= Total Co		height.
Was da Vina 24 at a 20		= Total Co	over	
Woody Vine Stratum (Plot size: 30 )				
1				
2				
3				Hydrophytic Vegetation
4		-	<del></del>	Present? Yes _ ✓ No
		= Total Co	over	
Remarks: (Include photo numbers here or on a separate	sneet.)			

Sampling Point: WL A1

Matrix Color (moist)	%	Color (n		x Features %	_Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
10YR 3/1	100	<u> </u>	10131)	70	Турс		SL	Kemano
		40VD	4/6					Draminant raday
								Prominent redox.
10YR 8/3		10YR	4/6			M	SL	Prominent redox.
oncentration D-Den	Jetion RM	-Paducad A	Aatriv MS	S-Maskad	Sand Gr	nine	<sup>2</sup> Location	n: PL=Pore Lining, M=Matrix.
Indicators:	iletion, rtivi	-reduced is	natrix, ivic	D-Maskeu	Sand Or	ali 13.	Indicators	s for Problematic Hydric Soils <sup>3</sup> :
ark Surface (A12) Mucky Mineral (S1) Gleyed Matrix (S4) Redox (S5) I Matrix (S6)		Loamy Loamy Deplet Redox Deplet Redox	Mucky Nowed In Matrix Dark Sulud	Mineral (F1 Matrix (F2) (F3) face (F6) Surface (F	) (LRR K )		Dark S Polyvi Thin I Iron-M Piedm Mesic Red F	Mucky Peat or Peat (S3) (LRR K, L, R) Surface (S7) (LRR K, L) alue Below Surface (S8) (LRR K, L) Dark Surface (S9) (LRR K, L) Manganese Masses (F12) (LRR K, L, R) nont Floodplain Soils (F19) (MLRA 1491 Expodic (TA6) (MLRA 144A, 145, 1498 Parent Material (F21) Shallow Dark Surface (TF12) (Explain in Remarks)
		etland hydro	logy mus	t be prese	nt, unless	disturbed of	or problemati	C.
Layer (if observed):								
							Uvdria Sai	I Present? Yes ✓ No
ches):							nyuric Soi	I Present? Yes No
	10YR 3/1 10YR 8/3 10Y	10YR 3/1 95  10YR 8/3 80  10YR	10YR 3/1 95 10YR  10YR 8/3 80 10YR  10YR 10YR  10YR 10YR  10YR 10YR  10Y	10YR 3/1 95 10YR 4/6  10YR 8/3 80 10YR 4/6  10YR 8/3 80 10YR 4/6  10YR 4/6	10YR 3/1 95 10YR 4/6 5 10YR 8/3 80 10YR 4/6 20  concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Indicators:  (A1)	10YR 3/1 95 10YR 4/6 5 C  10YR 8/3 80 10YR 4/6 20 C  10YR 8/3 80 10YR 4/6 20 C  10 C	noncentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.    Indicators:	noncentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.    All Continuous of the continu

#### WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Riverbend Wind	City/C	City/County: Sanilac Sampling Da						
Applicant/Owner: <u>Liberty Power</u>		State: Michig						
Investigator(s): David Nigro, Carl LaRiccia, Chris Kunkle Section, Township, Range: sec 12 T009N R015E								
Landform (hillslope, terrace, etc.): Depre								
Subregion (LRR or MLRA): LRR L, MLRA 99 Lat: 43.226803 Long: -82.655701 Datum: WG								
Soil Map Unit Name: Conover loam								
Are climatic / hydrologic conditions on the	site typical for this time of year? Y	es No (If no, explain in F	Remarks.)					
Are Vegetation, Soil, or Hy	drology significantly distur	bed? Are "Normal Circumstances"	present? Yes ✓ No					
Are Vegetation, Soil, or Hy	drology naturally problema	atic? (If needed, explain any answe	ers in Remarks.)					
SUMMARY OF FINDINGS - Atta	ach site map showing sam	pling point locations, transects	s, important features, etc.					
Hydrophytic Vegetation Present?	Yes _ ✓ No	Is the Sampled Area						
Hydric Soil Present?	Yes ✓ No		No					
Wetland Hydrology Present?	Yes ✓ No	If yes, optional Wetland Site ID:						
Remarks: (Explain alternative procedure								
HYDROLOGY								
Wetland Hydrology Indicators:		·	ators (minimum of two required)					
Primary Indicators (minimum of one is re-	quired; check all that apply)							
Surface Water (A1)								
High Water Table (A2)	Aquatic Fauna (B13)	Moss Trim L	Lines (B16)					
✓ Saturation (A3)	Marl Deposits (B15)		Water Table (C2)					
Water Marks (B1)	Hydrogen Sulfide Od		rrows (C8)					
Sediment Deposits (B2)	Oxidized Rhizosphere	es on Living Roots (C3) Saturation \	/isible on Aerial Imagery (C9)					
Drift Deposits (B3)	Presence of Reduced	I Iron (C4) Stunted or S	Stressed Plants (D1)					
Algal Mat or Crust (B4)	Recent Iron Reductio	n in Tilled Soils (C6) Geomorphic	c Position (D2)					
Iron Deposits (B5)	Thin Muck Surface (C	C7) Shallow Aqu	uitard (D3)					
Inundation Visible on Aerial Imagery	(B7) Other (Explain in Ren	narks) Microtopogr	pographic Relief (D4)					
Sparsely Vegetated Concave Surfac	e (B8)	FAC-Neutra	al Test (D5)					
Field Observations:								
Surface Water Present? Yes	_ No _✓ Depth (inches):							
Water Table Present? Yes	_ No _ ✓ Depth (inches):							
	No Depth (inches): <u>6</u>	Wetland Hydrology Prese	nt? Yes <u>√</u> No					
(includes capillary fringe)  Describe Recorded Data (stream gauge,	monitoring well aerial photos pre	vious inspections) if available:						
Describe Necorded Data (stream gauge,	monitoring well, aerial photos, pre	vious inspections), ii available.						
Remarks:								

Tree Stratum (Plot size: 30 )	Absolute % Cover	Dominant Species?		Dominance Test worksheet:
1. Acer rubrum		-		Number of Dominant Species That Are OBL, FACW, or FAC:5(A)
2. Populus tremuloides				
3				Total Number of Dominant Species Across All Strata: 5 (B)
4.				、,
5				Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)
6				
7				Prevalence Index worksheet:
		= Total Cov		
Sapling/Shrub Stratum (Plot size: 15 )		- Total Cov	/CI	FACW species 37.00 x 2 = 74.00
	5	V	EAC	FAC species 73.00 x 3 = 219.00
1. <u>Cornus racemosa</u>				FACU species 0.00 x 4 = 0.00
2				UPL species <u>0.00</u> x 5 = <u>0.00</u>
3				Column Totals: <u>110.00</u> (A) <u>293.00</u> (B)
4				Prevalence Index = B/A = 2.66
5				
6.				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50%
_	5	= Total Cov	/er	✓ 3 - Prevalence Index is ≤3.0¹
Herb Stratum (Plot size: 5				4 - Morphological Adaptations <sup>1</sup> (Provide supporting
1. <u>Phalaris arundinacea</u>		<u>Y</u>	<u>FACW</u>	data in Remarks or on a separate sheet)
2. <u>Solidago gigantea</u>			<u>FACW</u>	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
3. <u>Rumex crispus</u>	3	N	<u>FAC</u>	<sup>1</sup> Indicators of hydric soil and wetland hydrology must
4. Symphyotrichum lanceolatum	2	N	<u>FACW</u>	be present, unless disturbed or problematic.
5				Definitions of Vegetation Strata:
6				Tree – Woody plants 3 in. (7.6 cm) or more in diameter
7				at breast height (DBH), regardless of height.
8				Sapling/shrub – Woody plants less than 3 in. DBH
9				and greater than or equal to 3.28 ft (1 m) tall.
10				Herb – All herbaceous (non-woody) plants, regardless
11				of size, and woody plants less than 3.28 ft tall.
12				Woody vines – All woody vines greater than 3.28 ft in
	40	= Total Cov	/er	height.
Woody Vine Stratum (Plot size: 30 )				
1				
2.				
3				Hydrophytic
4				Vegetation
		= Total Cov	/er	Present? Yes No
Remarks: (Include photo numbers here or on a separate s				

Sampling Point: WL A2

Depth (inches)
6-12 10YR 2/1 85 10YR 5/6 15 C M SL Prominent redox.
1Types C=Concentration D=Depletion DM=Deduced Matrix MS=Macked Sand Crains 2 continue DI=Deva Lining M=Matrix
<sup>1</sup> Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. <sup>2</sup> Location: PL=Pore Lining, M=Matrix.  Indicators for Problematic Hydric Soils <sup>3</sup> :
Histosol (A1) Polyvalue Below Surface (S8) (LRR R, 2 cm Muck (A10) (LRR K, L, MLRA 149B)
Histic Epipedon (A2)
Black Histic (A3) Thin Dark Surface (S9) (LRR R, MLRA 149B) 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) Hydrogen Sulfide (A4) Loamy Mucky Mineral (F1) (LRR K, L) Dark Surface (S7) (LRR K, L)
Stratified Layers (A5) Loamy Gleyed Matrix (F2) Polyvalue Below Surface (S8) (LRR K, L)
Depleted Below Dark Surface (A11) Depleted Matrix (F3) Thin Dark Surface (S9) (LRR K, L)
Thick Dark Surface (A12) Redox Dark Surface (F6) Iron-Manganese Masses (F12) (LRR K, L, R) Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Piedmont Floodplain Soils (F19) (MLRA 149B)
Sandy Gleyed Matrix (S4)  Redox Depressions (F8)  Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
Sandy Redox (S5) Red Parent Material (F21)
Stripped Matrix (S6) Very Shallow Dark Surface (TF12) Dark Surface (S7) (LRR R, MLRA 149B) Other (Explain in Remarks)
<sup>3</sup> 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
Depth (inches): No Remarks:
Remarks.

Project/Site: Riverbend W	/ind	City/C	County: <u>Sar</u>	nilac	Sar	mpling Date: <u>2021-12-07</u>	
Applicant/Owner: Liberty P					Sampling Point: WL B1		
Investigator(s): David Nigr	o. Carl LaRiccia	on, Township	, Range: Sec	14 T009N R	015E		
Landform (hillslope, terrace, etc	•						
Subregion (LRR or MLRA): LR							
Soil Map Unit Name: Parkhi							
Are climatic / hydrologic condition	ons on the site typical f	or this time of year? Y	′es <u>√</u> N	No (If no	o, explain in Rema	rks.)	
Are Vegetation, Soil	, or Hydrology	significantly distur	bed?	Are "Normal Circ	cumstances" prese	ent? Yes <u>√</u> No	
Are Vegetation, Soil	, or Hydrology	naturally problema	atic? (	If needed, expla	nin any answers in	Remarks.)	
SUMMARY OF FINDING	S - Attach site n	nap showing sam	npling poir	nt locations,	transects, im	portant features, etc.	
Hydrophytic Vegetation Prese	nt? Yes ✓	No	Is the Sam	pled Area			
Hydric Soil Present?		No	within a We	etland?	Yes <u>√</u>	No	
Wetland Hydrology Present?		No	If yes, option	nal Wetland Site	e ID:		
Remarks: (Explain alternative	procedures here or in	a separate report.)			·		
HYDROLOGY							
Wetland Hydrology Indicato	rs:			Sec	condary Indicators	(minimum of two required)	
Primary Indicators (minimum o	of one is required; chec	ck all that apply)			Surface Soil Crad	cks (B6)	
Surface Water (A1)	·	Water-Stained Leave	es (B9)	<b>✓</b>	Drainage Pattern	s (B10)	
High Water Table (A2)		Aquatic Fauna (B13)			Moss Trim Lines		
Saturation (A3)		Marl Deposits (B15)			Dry-Season Wate		
Water Marks (B1)		Hydrogen Sulfide Od	or (C1)		Crayfish Burrows	i i	
Sediment Deposits (B2)		Oxidized Rhizosphere		Roots (C3)	-	e on Aerial Imagery (C9)	
Drift Deposits (B3)		Presence of Reduced			Stunted or Stress		
Algal Mat or Crust (B4)		Recent Iron Reductio	, ,	ils (C6)		· ·	
Iron Deposits (B5)		Thin Muck Surface (C		. ,			
Inundation Visible on Aeri		Other (Explain in Rer					
Sparsely Vegetated Conc		Other (Explain in Itel	marks) Microtopographic Relief (D4) FAC-Neutral Test (D5)				
Field Observations:	ave Surface (DO)		1		1 AC-Neutral Tes	(03)	
Surface Water Present?	Yes No ✓	_ Depth (inches):					
Water Table Present?		_ Depth (inches):					
Saturation Present?	· · · · · · · · · · · · · · · · · · ·	_ Depth (inches):		Wetland Hydr	ology Present?	Yes No	
(includes capillary fringe)		_ , ,		-	-		
Describe Recorded Data (stre	am gauge, monitoring	well, aerial photos, pre	evious inspect	ions), if availabl	e:		
Remarks:							
itemarks.							

Sapling/Shrub Stratum (Plot size: 15 )

Herb Stratum (Plot size: 5

1. Quercus bicolor 20 Y FACW

2. Acer rubrum 20 Y FAC

3. <u>Acer saccharinum 10 N FACW</u>

4. <u>Ailanthus altissima 5 N UPL</u>

1. Cornus racemosa 15 Y FAC

2. Rubus pubescens 5 Y FACW

3. \_\_\_\_\_\_ \_\_\_\_ \_\_\_\_

4. \_\_\_\_\_\_ \_\_\_ \_\_\_\_ \_\_\_\_ \_\_\_\_\_

6. \_\_\_\_\_\_ \_\_\_ \_\_\_\_ \_\_\_\_ \_\_\_\_\_

1. <u>Typha angustifolia</u> 10 Y OBL

2. <u>Solidago gigantea</u> <u>10</u> <u>Y</u> <u>FACW</u> 3. <u>Carex sp.</u> <u>10</u> <u>Y</u> \_\_\_

4. <u>Phalaris arundinacea 5 N FACW</u>

8. \_\_\_\_\_ \_\_\_ \_\_\_ \_\_\_\_ \_\_\_\_

9. \_\_\_\_\_\_ \_\_\_ \_\_\_\_ \_\_\_\_\_

11. \_\_\_\_\_ \_\_\_ \_\_\_ \_\_\_ \_\_\_\_

3. \_\_\_\_ \_\_\_\_ \_\_\_\_ \_\_\_\_\_

5. \_\_\_\_\_\_ \_\_\_ \_\_\_ \_\_\_\_ \_\_\_\_ 6. \_\_\_\_\_ \_\_\_ \_\_\_ \_\_\_

7. \_\_\_\_\_\_ \_\_\_ \_\_\_\_ \_\_\_\_\_

Tree Stratum (Plot size: 30 )

Absolute Dominant Indicator

% Cover Species? Status

\_\_55\_\_ = Total Cover

\_\_\_\_\_\_ = Total Cover

\_\_\_\_\_

35 = Total Cover

= Total Cover

0 . II D :								
Sampling Point: WL B1								
Dominance Test worksheet:								
Number of Dominant Species That Are OBL, FACW, or FAC: (A)								
Total Number of Dominant Species Across All Strata: 7 (B)								
Percent of Dominant Species That Are OBL, FACW, or FAC:								
Prevalence Index worksheet:								
Total % Cover of: Multiply by:								
OBL species <u>20.00</u> x 1 = <u>20.00</u>								
FACW species <u>50.00</u> x 2 = <u>100.00</u>								
FAC species <u>35.00</u> x 3 = <u>105.00</u>								
FACU species <u>0.00</u> x 4 = <u>0.00</u>								
UPL species <u>5.00</u> x 5 = <u>25.00</u>								
Column Totals: <u>110.00</u> (A) <u>250.00</u> (B)								
Prevalence Index = B/A = 2.27								
Hydrophytic Vegetation Indicators:								
1 - Rapid Test for Hydrophytic Vegetation								
∠ 2 - Dominance Test is >50%								
3 - Prevalence Index is ≤3.0¹								
4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)								
Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)								
<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.								
Definitions of Vegetation Strata:								
<b>Tree</b> – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.								
Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.								
<b>Herb</b> – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.								
<b>Woody vines</b> – All woody vines greater than 3.28 ft in height.								
Hadron bad								
Hydrophytic Vegetation Present? Yes ✓ No								

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

Woody Vine Stratum (Plot size: 30

Sampling Point: WL B1

SOIL

	cription: (Describ		oth needed				or confirm	the absence	e of indicators.)		
Depth (inches)	Matrix Color (moist)	%	Color (n		x Features  %	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks		
0-3	10YR 3/1	100						SL			
3-12	10YR 3/1	 85	10YR	5/6	15			SL	Prominent redox.		
12-18		80	10YR		20	C	M	SL	Distinct redox.		
_12-10_	10111 3/1			<u> </u>					DISTINCT TCGOX.		
17				A - Andre - NAC		0 1 0		21	DI Dans Lining M Matrix		
Hydric Soil	oncentration, D=De Indicators:	epietion, Rivi	=Reduced IV	viatrix, ivis	5=Masked	Sand Gra	ains.		n: PL=Pore Lining, M=Matrix. s for Problematic Hydric Soils <sup>3</sup> :		
Histosol			Polyva	lue Belov	w Surface	(S8) ( <b>LRF</b>	RR,		Muck (A10) ( <b>LRR K, L, MLRA 149B</b> )		
	pipedon (A2)			RA 149B)					Prairie Redox (A16) (LRR K, L, R)		
	istic (A3) en Sulfide (A4)				ıce (S9) ( <b>L</b> ⁄lineral (F1		.RA 149B)		Mucky Peat or Peat (S3) (LRR K, L, R) Surface (S7) (LRR K, L)		
	d Layers (A5)				Matrix (F2)		, <del>-</del> ,		alue Below Surface (S8) ( <b>LRR K, L</b> )		
	d Below Dark Surfa	ace (A11)		ed Matrix					Dark Surface (S9) (LRR K, L)		
	ark Surface (A12) ⁄lucky Mineral (S1)		/ Redox		nace (F6) Surface (F	7)			Manganese Masses (F12) ( <b>LRR K, L, R</b> ) nont Floodplain Soils (F19) ( <b>MLRA 149B</b> )		
-	Gleyed Matrix (S4)				ions (F8)	' )		Mesic Spodic (TA6) (MLRA 144A, 145, 149B)			
	Redox (S5)								Parent Material (F21)		
	l Matrix (S6) rface (S7) ( <b>LRR R</b>	MI DA 140	B)						Shallow Dark Surface (TF12) (Explain in Remarks)		
Dark Su	mace (S7) (LKK K	, WILKA 145	ь)					Other	(Explain in Remarks)		
	f hydrophytic vege		etland hydro	logy mus	t be prese	nt, unless	disturbed	or problemati	C.		
	Layer (if observed	d):									
Type:								Hudria Cai	I Dresount 2 Von / No		
Depth (in	ches):							Hydric Soi	I Present? Yes No		
Remarks:											

Project/Site: Riverbend Wind	City/C	City/County: Sanilac Sampling Date: 2021-					
Applicant/Owner: Liberty Power		Michigan Sampling Point: WL B2					
Investigator(s): David Nigro, Carl LaRic			hip, Range: sec 16 T009N R015E				
Landform (hillslope, terrace, etc.): Depression							
Subregion (LRR or MLRA): LRR L, MLRA 99							
Soil Map Unit Name: Parkhill loam, 0 to 1							
Are climatic / hydrologic conditions on the site typic							
Are Vegetation, Soil, or Hydrology _							
Are Vegetation, Soil, or Hydrology _							
SUMMARY OF FINDINGS - Attach site							
		Is the Sampled Area	, ,				
	✓ No ✓ No		s No				
	✓ No						
Remarks: (Explain alternative procedures here of		If yes, optional Wetland Site ID: _					
(27) praint alternative pressure in the second seco	a soparato roporti,						
HYDROLOGY							
Wetland Hydrology Indicators:		<u>Seconda</u>	ry Indicators (minimum of two required)				
Primary Indicators (minimum of one is required; c	heck all that apply)	Surfa	ace Soil Cracks (B6)				
Surface Water (A1)	✓ Water-Stained Leave	ater-Stained Leaves (B9) Drainage Patterns (B10)					
High Water Table (A2)	Aquatic Fauna (B13)	Mos	Moss Trim Lines (B16)				
Saturation (A3)	Marl Deposits (B15)	Dry-	Dry-Season Water Table (C2)				
Water Marks (B1)	Hydrogen Sulfide Od	or (C1) Cray	fish Burrows (C8)				
	Oxidized Rhizosphere		ration Visible on Aerial Imagery (C9)				
	Presence of Reduced		ited or Stressed Plants (D1)				
	Recent Iron Reductio						
	Thin Muck Surface (0						
	Other (Explain in Rer						
	Other (Explain in Net	marks) Microtopographic Relief (D4) FAC-Neutral Test (D5)					
Sparsely Vegetated Concave Surface (B8) Field Observations:		<u></u>	-iveutial Test (D3)				
	✓ Depth (inches):						
	✓ Depth (inches):						
	✓ Depth (inches):		y Present? Yes No				
(includes capillary fringe)							
Describe Recorded Data (stream gauge, monitori	ng well, aerial photos, pre	vious inspections), if available:					
Remarks:							

<b>VEGETATION</b> – Use scientific names of plants.				Sampling Point: WL B2
Tree Stratum (Plot size:30)	Absolute % Cover	Dominant Species?		Dominance Test worksheet:
1. Populus deltoides				Number of Dominant Species That Are OBL, FACW, or FAC:5(A)
2. Quercus bicolor			FACW	
3. Populus tremuloides				Total Number of Dominant Species Across All Strata:  6 (B)
4				Percent of Dominant Species
5				That Are OBL, FACW, or FAC: 83.33 (A/B)
6.				Prevalence Index worksheet:
7				Total % Cover of:Multiply by:
	45	= Total Cov	ver .	OBL species <u>10.00</u> x 1 = <u>10.00</u>
Sapling/Shrub Stratum (Plot size: 15 )				FACW species <u>35.00</u> x 2 = <u>70.00</u>
1. <u>Cornus alba</u>	15	Y	<u>FACW</u>	FAC species 40.00 x 3 = 120.00
2				FACU species 0.00 x 4 = 0.00 UPL species 0.00 x 5 = 0.00
3				Column Totals: 85.00 (A) 200.00 (B)
4				
5				Prevalence Index = B/A = 2.35
6				Hydrophytic Vegetation Indicators:
7				<ul><li>1 - Rapid Test for Hydrophytic Vegetation</li><li>2 - Dominance Test is &gt;50%</li></ul>
	15	= Total Cov	er er	✓ 2 - Dominance rest is >50%  ✓ 3 - Prevalence Index is ≤3.0¹
Herb Stratum (Plot size: 5				4 - Morphological Adaptations <sup>1</sup> (Provide supporting
1. Carex vulpinoidea			OBL	data in Remarks or on a separate sheet)
2. <u>Symphyotrichum lanceolatum</u>			FACW	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
3. <u>Solidago gigantea</u>			<u>FACW</u>	<sup>1</sup> Indicators of hydric soil and wetland hydrology must
4				be present, unless disturbed or problematic.
5				Definitions of Vegetation Strata:
6				Tree – Woody plants 3 in. (7.6 cm) or more in diameter
7				at breast height (DBH), regardless of height.
8				Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.
9				
10				Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
11	·			Woody vines – All woody vines greater than 3.28 ft in
12	25	= Total Cov	/er	height.
Woody Vine Stratum (Plot size:30)		- Total Gov	Ci	
1. Vitis sp.	10	Y		
2				
3				Hydrophytic
4				Vegetation
		= Total Cov	/er	Present? Yes No
Remarks: (Include photo numbers here or on a separate s				<u> </u>

Sampling Point: WL B2

SOIL

	cription: (Describe t	to the dep	oth needed		nent the in x Features		or confirm	the absence	e of indicators.)		
Depth (inches)	Matrix Color (moist)	%	Color (n		<u>%</u>	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks		
0-2	10YR 2/1	100						SL			
2-9	10YR 3/2	90	10YR	5/6	10	С	М	SCL	Prominent redox.		
9-16	10YR 5/1		10YR		35	С	M		Prominent redox.		
	<u></u>		10111	0,0							
	-								<del></del>		
					-						
1Type: C=C	concentration, D=Depl	otion PM	-Poducod N	Antrix MS		Sand Gr		<sup>2</sup> L ocation	n: PL=Pore Lining, M=Matrix.		
Hydric Soil		elion, Rivi	-Reduced N	naunx, ivic	-iviaskeu	Sanu Gi	aii 15.		s for Problematic Hydric Soils <sup>3</sup> :		
Histoso	I (A1)				v Surface	(S8) ( <b>LRI</b>	RR,	2 cm	Muck (A10) ( <b>LRR K, L, MLRA 149B</b> )		
	pipedon (A2)			RA 149B)		DD D 14	D. 4.40D)		Prairie Redox (A16) (LRR K, L, R)		
	listic (A3) en Sulfide (A4)				ce (S9) ( <b>L</b> ⁄lineral (F1		LRA 149B) . L)		Mucky Peat or Peat (S3) ( <b>LRR K, L, R</b> ) Surface (S7) ( <b>LRR K, L</b> )		
	d Layers (A5)				Matrix (F2)		, –,		alue Below Surface (S8) ( <b>LRR K, L</b> )		
	d Below Dark Surface	e (A11)		ed Matrix					Dark Surface (S9) ( <b>LRR K, L</b> )		
	ark Surface (A12) Mucky Mineral (S1)		✓ Redox		face (F6) Surface (F	7)		<ul><li>Iron-Manganese Masses (F12) (LRR K, L, R)</li><li>Piedmont Floodplain Soils (F19) (MLRA 149B)</li></ul>			
-	Gleyed Matrix (S4)			Depress		")		Pledmont Floodplain Solis (F19) (MLRA 149B) Mesic Spodic (TA6) (MLRA 144A, 145, 149B)			
	Redox (S5)		_	•	( /				Parent Material (F21)		
	d Matrix (S6)		_,						Shallow Dark Surface (TF12)		
Dark Su	ırface (S7) (LRR R, N	ILRA 149	В)					Other	(Explain in Remarks)		
	of hydrophytic vegetat		etland hydro	logy mus	t be prese	nt, unles	s disturbed	or problemati	ic.		
Restrictive	Layer (if observed):										
Type:											
Depth (in	nches):							Hydric Soi	I Present? Yes No		
Remarks:											

Project/Site: Riverbend Wi	ind	City/C	County: Sanila	ac County	Sam	npling Date: 2	<u> 2022-04-08</u>	
Applicant/Owner: Liberty Po				•	e: <u>Michigan</u> Sa			
Investigator(s): Ernest Sche					3 T009N RC	)14E		
Landform (hillslope, terrace, etc.)								
Subregion (LRR or MLRA): LRF								
Soil Map Unit Name: McBride sa								
Are climatic / hydrologic condition				<u> </u>				
Are Vegetation, Soil							No	
Are Vegetation, Soil								
							.troo oto	
SUMMARY OF FINDINGS	- Attach site	map snowing sam	ipling point i	locations, tr	ransects, imp	portant fea	tures, etc.	
Hydrophytic Vegetation Present		No	Is the Sample		V	Na /		
Hydric Soil Present?		No	within a Wetla		Yes			
Wetland Hydrology Present?		No	If yes, optional	Wetland Site ID	D:			
Remarks: (Explain alternative p								
Open water depression	on with mixed	PEM/PSS fring	е					
HYDROLOGY								
Wetland Hydrology Indicators	<b>S</b> :			Secon	ndary Indicators (	minimum of to	vo required)	
Primary Indicators (minimum of	one is required; che	eck all that apply)		Sı	urface Soil Crack	ks (B6)		
✓ Surface Water (A1)	_	_ Water-Stained Leave	es (B9)	D	rainage Patterns	(B10)		
✓ High Water Table (A2)	_	_ Aquatic Fauna (B13)		Moss Trim Lines (B16)				
✓ Saturation (A3)		_ Marl Deposits (B15)		Dry-Season Water Table (C2)				
Water Marks (B1)		_ Hydrogen Sulfide Ode			rayfish Burrows (			
Sediment Deposits (B2)			_	on Living Roots (C3) Saturation Visible on Aerial Imagery (C9)				
Drift Deposits (B3) Algal Mat or Crust (B4)		<ul><li>Presence of Reduced</li><li>Recent Iron Reductio</li></ul>			tunted or Stresse Seomorphic Positi			
Iron Deposits (B5)		_ Thin Muck Surface (C						
✓ Inundation Visible on Aeria		Other (Explain in Ren	•					
Sparsely Vegetated Conca			,	·	AC-Neutral Test	, ,		
Field Observations:	. ,					,		
Surface Water Present?	Yes <u>√</u> No	Depth (inches): <u>24</u>						
		Depth (inches): 0						
	Yes No	Depth (inches): 0	W	etland Hydrolo	ogy Present? `	Yes <u>√</u>	No	
(includes capillary fringe)  Describe Recorded Data (streat	m gauge monitoring	well aerial nhotos pre	vious inspections	s) if available				
Describe Recorded Data (stream	in gauge, monitoring	y well, acrial priolos, pre	wood mapeenon	3), ii availabic.				
Remarks:								
Likely groundwater fe	:a							

**VEGETATION –** Use scientific names of plants.

<b>/EGETATION –</b> Use scientific names of plants				Sampling Point: Wetland BB1
Tree Stratum (Plot size:30)	Absolute % Cover	Dominant	t Indicator	Dominance Test worksheet:
1				Number of Dominant Species That Are OBL, FACW, or FAC:4 (A)
2				Total Number of Dominant Species Across All Strata: 4 (B)
4.				Percent of Dominant Species
5				That Are OBL, FACW, or FAC:
6 7				Prevalence Index worksheet:  Total % Cover of: Multiply by:
		= Total Co		OBL species <u>45.00</u> x1 = <u>45.00</u>
Sapling/Shrub Stratum (Plot size:)				FACW species <u>25.00</u> x 2 = <u>50.00</u>
1. Saix spp.	20	Y	<u>FACW</u>	FAC species
2. <u>Cornus racemosa</u>				FACU species <u>0.00</u> x 4 = <u>0.00</u>
3.				UPL species $0.00 \times 5 = 0.00$
4				Column Totals: <u>80,00</u> (A) <u>125,00</u> (B)
5				Prevalence Index = B/A = 1.56
6.				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
		= Total Co	ver	∠ 2 - Dominance Test is >50%
Herb Stratum (Plot size:5)		10101 00	VOI	3 - Prevalence Index is ≤3.0¹
1. Typha latifolia	30	Y	OBL	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
2. Juncus effusus			OBL	✓ Problematic Hydrophytic Vegetation¹ (Explain)
Onoclea sensibilis		N	FACW	— · · · · · · · · · · · · · · · · · · ·
			OBL	<sup>1</sup> Indicators of hydric soil and wetland hydrology must
4. <u>Scirpus cyperinus</u>				be present, unless disturbed or problematic.
5				Definitions of Vegetation Strata:
6				<b>Tree</b> – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
8				Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.
9				
10 11				<b>Herb</b> – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
12				Woody vines – All woody vines greater than 3.28 ft in
	50	= Total Co	ver	height.
Woody Vine Stratum (Plot size: 30 )				
1				
2				
3				Hydrophytic
4			-	Vegetation
		= Total Co	ver	Present? Yes ✓ No
Remarks: (Include photo numbers here or on a separate Out of growing season, open water ap		% of we	tland	

SOIL Sampling Point: Wetland BB1

Profile Desc	cription: (Describe	to the dept	h needed to docur	nent the i	ndicator	or confirm	the absence of in	dicators.)
Depth (inches)	Matrix Color (moist)	<u></u> %	Redo Color (moist)	x Features %	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
			Coloi (Illoist)		туре	LUC		Nemans
_0-18_	10YR 2/1	<u> 100</u> .					<u>_MMI_</u>	
	-							
		· ——						
		· ——						
	oncentration, D=Dep	letion, RM=	Reduced Matrix, MS	S=Masked	Sand Gra	ains.	<sup>2</sup> Location: PL:	Problematic Hydric Soils <sup>3</sup> :
Hydric Soil Histosol			Polyvalue Belov	v Surface	(S9) (I <b>D</b> I	D D		(A10) (LRR K, L, MLRA 149B)
	pipedon (A2)	-	MLRA 149B		(50) (EIXI	<b>.</b> 1 <b>.</b> ,		e Redox (A16) ( <b>LRR K, L, R</b> )
l ——	istic (A3)	-	Thin Dark Surfa				5 cm Mucky	Peat or Peat (S3) (LRR K, L, R)
	en Sulfide (A4)	-	✓ Loamy Mucky N			, <b>L</b> )		e (S7) (LRR K, L)
	d Layers (A5) d Below Dark Surface	e (A11)	Loamy Gleyed Depleted Matrix		)			elow Surface (S8) ( <b>LRR K, L</b> ) surface (S9) ( <b>LRR K, L</b> )
	ark Surface (A12)		Redox Dark Su					nese Masses (F12) ( <b>LRR K, L, R</b> )
	Mucky Mineral (S1)	-	Depleted Dark		7)			loodplain Soils (F19) ( <b>MLRA 149B</b> )
	Gleyed Matrix (S4)	-	Redox Depress	ions (F8)				ic (TA6) (MLRA 144A, 145, 149B)
	Redox (S5) I Matrix (S6)							Material (F21) w Dark Surface (TF12)
	rface (S7) ( <b>LRR R, N</b>	ILRA 149B	)				-	ain in Remarks)
31 11 1								
	f hydrophytic vegetat Layer (if observed):		liand nydrology mus	st be prese	ent, uniess	aisturbea	or problematic.	
Type:	_ayo: ( oboo: vou).							
· · ·	ches):						Hydric Soil Pres	ent? Yes <u>√</u> No
Remarks:								

Project/Site: Riverbend Wind		City/C	County: Sanila	ac County	Sar	npling Date: <u>2022-0</u> 4	4-08	
Applicant/Owner: Liberty Powe				•		Sampling Point: Wetland		
Investigator(s): Ernest Schenk								
Landform (hillslope, terrace, etc.): D							 2	
Subregion (LRR or MLRA): LRR L,								
Soil Map Unit Name: McBride sandy								
Are climatic / hydrologic conditions or	າ the site typical fo	or this time of year? Y	′es <u>√</u> No _	(If no,	explain in Rema	rks.)		
Are Vegetation, Soil,								
Are Vegetation, Soil,								
SUMMARY OF FINDINGS –							etc.	
			Is the Sample		<u> </u>	<u> </u>		
Hydrophytic Vegetation Present? Hydric Soil Present?		No No	within a Wetla		Yes	No <u>√</u>		
Wetland Hydrology Present?		No	If ves ontional		D:			
Remarks: (Explain alternative proce			ii yee, optional	TVOIIGITG OILO I	D		=	
PEM/PSS								
HYDROLOGY								
Wetland Hydrology Indicators:	-	-		Seco	ndary Indicators	(minimum of two require	<u>d)</u>	
Primary Indicators (minimum of one	is required; checl	k all that apply)		8	Surface Soil Crac	cks (B6)		
Surface Water (A1)		Water-Stained Leave	es (B9)	Drainage Patterns (B10)				
High Water Table (A2)		Aquatic Fauna (B13)		Moss Trim Lines (B16)				
✓ Saturation (A3)		Marl Deposits (B15)		Dry-Season Water Table (C2)				
Water Marks (B1)		Hydrogen Sulfide Od			Crayfish Burrows			
Sediment Deposits (B2)			_	s on Living Roots (C3) Saturation Visible on Aerial Imagery (C9)				
Drift Deposits (B3)		Presence of Reduced			Stunted or Stress			
Algal Mat or Crust (B4)		Recent Iron Reductio			Geomorphic Posi			
Iron Deposits (B5) Inundation Visible on Aerial Ima		Thin Muck Surface (C Other (Explain in Rer	,		Shallow Aquitard Microtopographic			
Sparsely Vegetated Concave S		Other (Explain in Rei	narks)		FAC-Neutral Test			
Field Observations:	unace (Bo)				AC-Neutral Test	I (D3)		
	No ✓	Depth (inches):						
		Depth (inches):						
		Depth (inches): 0		etland Hydrol	ogy Present?	Yes <u>√</u> No	_	
Describe Recorded Data (stream ga	auge, monitoring v	vell, aerial photos, pre	evious inspection	s), if available:				
Remarks:								
Nemarks.								

**VEGETATION –** Use scientific names of plants.

rksheet: Species /, or FAC:6 (A)
/, or FAC:6 (A)
inant
trata: <u>        6         (</u> B)
Species
/, or FAC: 100.00 (A/B)
orksheet:
: Multiply by:
5.00 x1 = 35.00
0.00 x 2 = 100.00
0.00 x 3 = 120.00
.00 x 4 = <u>0.00</u>
$0.00 \times 5 = 0.00$ $0.00 \times 5 = 0.00$ $0.00 \times 5 = 0.00$ $0.00 \times 5 = 0.00$
= B/A = 2.04
tion Indicators:
r Hydrophytic Vegetation
est is >50%
idex is ≤3.0 <sup>1</sup> I Adaptations¹ (Provide supporting
rks or on a separate sheet)
rophytic Vegetation <sup>1</sup> (Explain)
soil and wetland hydrology must sturbed or problematic.
ation Strata:
3 in. (7.6 cm) or more in diameter
f), regardless of height.
ody plants less than 3 in. DBH
qual to 3.28 ft (1 m) tall.
s (non-woody) plants, regardless
ants less than 3.28 ft tall.
oody vines greater than 3.28 ft in
∕es √ No
Y

SOIL Sampling Point: Wetland BB2

Profile Desc	cription: (Describe t	o the dep	th needed	to docun	nent the i	ndicator	or confirm	the absence of indicators.)	
Depth	Matrix (mailet)	0/	0.1/		x Features		1 2	Testano	
(inches) 0-3	Color (moist) 10YR 4/1		Color (m	<u>noist)</u>	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture Remarks	
3-18	101R 4/1 10YR 4/2		10VD	5/6	20				
3-10	101K 4/2	_00_		5/0					_
									_
					·				_
	oncentration, D=Depl	etion, RM	=Reduced M	Matrix, MS	S=Masked	Sand Gra	ains.	<sup>2</sup> Location: PL=Pore Lining, M=Matrix.	
Hydric Soil			Dobaco	lua Balay	u Curfoso	(CO) /I DE	. D	Indicators for Problematic Hydric Soils <sup>3</sup> :	
Histosol Histic E	pipedon (A2)			ra 149B)	v Surface	(30) ( <b>LKF</b>	κκ,	2 cm Muck (A10) (LRR K, L, MLRA 149B) Coast Prairie Redox (A16) (LRR K, L, R)	
	istic (A3)						RA 149B)		2)
	en Sulfide (A4) d Layers (A5)		-		/lineral (F1 Matrix (F2		, L)	Dark Surface (S7) (LRR K, L) Polyvalue Below Surface (S8) (LRR K, L)	
Deplete	d Below Dark Surface	(A11)	Deplet	ed Matrix	(F3)	,		Thin Dark Surface (S9) (LRR K, L)	
	ark Surface (A12) Mucky Mineral (S1)				rface (F6) Surface (F	7)		Iron-Manganese Masses (F12) (LRR K, L, F Piedmont Floodplain Soils (F19) (MLRA 149)	
-	Gleyed Matrix (S4)				ions (F8)	')		Mesic Spodic (TA6) (MLRA 144A, 145, 149	
-	Redox (S5)							Red Parent Material (F21)	
	d Matrix (S6) urface (S7) ( <b>LRR R, M</b>	ILRA 149I	3)					Very Shallow Dark Surface (TF12) Other (Explain in Remarks)	
	of hydrophytic vegetat	on and we	etland hydro	logy mus	t be prese	nt, unless	disturbed	or problematic.	
	Layer (if observed):								
Type:	ale a a V							Hydric Soil Present? Yes ✓ No	
Remarks:	iches):							Trydric doi: 1 resent: 1 res No	
Remarks.									

Project/Site: Riverbend W	/ind	City/C	County: Sanilac C	ountv	Sampling Date: 2022-04-08		
Applicant/Owner: Liberty Po				•	n Sampling Point: Wetland BB3		
Investigator(s): Ernest Sch							
					Slope (%): <u>0-2</u>		
	•				Datum: WGS84		
Soil Map Unit Name: McBride s							
Are climatic / hydrologic condition	ons on the site typi	cal for this time of year? Y	′es <u>√</u> No	_ (If no, explain in Re	emarks.)		
Are Vegetation, Soil	, or Hydrology	significantly distur	bed? Are "Norn	nal Circumstances" pr	resent? Yes No		
Are Vegetation, Soil							
					important features, etc.		
			Is the Sampled Area		· · ·		
Hydrophytic Vegetation Presel Hydric Soil Present?		✓ No ✓ No	within a Wetland?		No <u></u> ✓		
Wetland Hydrology Present?		✓ No	If ves. optional Wetla	and Site ID:			
Remarks: (Explain alternative			,,				
PEM/PSS							
HYDROLOGY							
Wetland Hydrology Indicator	rs:			Secondary Indicate	ors (minimum of two required)		
Primary Indicators (minimum o	of one is required; of	check all that apply)		Surface Soil C			
Surface Water (A1)		Water-Stained Leave		Drainage Patterns (B10)			
High Water Table (A2)		Aquatic Fauna (B13)		Moss Trim Lines (B16)			
✓ Saturation (A3)		Marl Deposits (B15)		Dry-Season Water Table (C2)			
Water Marks (B1)		Hydrogen Sulfide Od		Crayfish Burro			
Sediment Deposits (B2)		Oxidized Rhizosphere	-	•	sible on Aerial Imagery (C9)		
Drift Deposits (B3)		Presence of Reduced			ressed Plants (D1)		
Algal Mat or Crust (B4) Iron Deposits (B5)		Recent Iron Reductio Thin Muck Surface (0		✓ Geomorphic P  — Shallow Aquita			
Inundation Visible on Aeri	al Imagery (B7)	Other (Explain in Rer	•		phic Relief (D4)		
Sparsely Vegetated Conc	• • • •	Other (Explain in reci	nano)	FAC-Neutral 1			
Field Observations:				<u> </u>	1001 (20)		
Surface Water Present?	Yes No	✓ Depth (inches):					
Water Table Present?		✓ Depth (inches):					
Saturation Present? (includes capillary fringe)	Yes _ ✓ No _	Depth (inches): 0	Wetland		? Yes/ No		
Describe Recorded Data (stre	am gauge, monitor	ing well, aerial photos, pre	evious inspections), if a	available:			
Remarks:							

**VEGETATION –** Use scientific names of plants.

			Sampling Point: Wetland BB3
Absolute % Cover	Dominant Species?		Dominance Test worksheet:
			Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)
			Total Number of Dominant Species Across All Strata:  (B)
			Percent of Dominant Species
			That Are OBL, FACW, or FAC: 100.00 (A/B)
			Prevalence Index worksheet:
			Total % Cover of: Multiply by:
5	= Total Co	ver .	OBL species <u>35.00</u> x 1 = <u>35.00</u>
			FACW species <u>50.00</u> x 2 = <u>100.00</u>
_20_	Y	_FAC_	FAC species <u>40.00</u> x 3 = <u>120.00</u>
10	Y	<u>FACW</u>	FACU species <u>0.00</u> x 4 = <u>0.00</u>
5	N	<u>FACW</u>	UPL species $0.00 \times 5 = 0.00$ Column Totals: $125.00 \times 5 = 0.00$ (B)
			Prevalence Index = B/A = 2.04
			Hydrophytic Vegetation Indicators:
			1 - Rapid Test for Hydrophytic Vegetation
_35_	= Total Co	ver .	✓ 2 - Dominance Test is >50%
			3 - Prevalence Index is ≤3.0¹     4 - Morphological Adaptations¹ (Provide supporting)
30	Y	<u>FACW</u>	data in Remarks or on a separate sheet)
20	Y	<u>FAC</u>	
_20_	Y	OBL_	<sup>1</sup> Indicators of hydric soil and wetland hydrology must
10	N	OBL	be present, unless disturbed or problematic.
5	N	<u>FACW</u>	Definitions of Vegetation Strata:
			Tree – Woody plants 3 in. (7.6 cm) or more in diameter
			at breast height (DBH), regardless of height.
			Sapling/shrub – Woody plants less than 3 in. DBH
			and greater than or equal to 3.28 ft (1 m) tall.
			Herb – All herbaceous (non-woody) plants, regardless
			of size, and woody plants less than 3.28 ft tall.
			Woody vines – All woody vines greater than 3.28 ft in height.
<u>85</u>	= Total Co	ver	noight.
			Hydrophytic
			Vegetation
			Present? Yes <u>√</u> No

SOIL Sampling Point: Wetland BB3

Profile Desc	cription: (Describe t	o the dep	th needed	to docun	nent the i	ndicator	or confirm	the absence of indicators.)	
Depth	Matrix (mailet)	0/	0.1/		x Features		1 2	Testano	
(inches) 0-3	Color (moist) 10YR 4/1		Color (m	<u>noist)</u>	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture Remarks	
3-18	101R 4/1 10YR 4/2		10VD	5/6	20				
3-10	101K 4/2	_00_		5/0					_
									_
					· ——				
	oncentration, D=Depl	etion, RM	=Reduced M	Matrix, MS	S=Masked	Sand Gra	ains.	<sup>2</sup> Location: PL=Pore Lining, M=Matrix.	
Hydric Soil			Dobaco	lua Balay	u Curfoso	(CO) /I DE	. D	Indicators for Problematic Hydric Soils <sup>3</sup> :	
Histosol Histic E	pipedon (A2)			ra 149B)	v Surface	(30) ( <b>LK</b> F	κκ,	2 cm Muck (A10) (LRR K, L, MLRA 149B) Coast Prairie Redox (A16) (LRR K, L, R)	
	istic (A3)						RA 149B)		2)
	en Sulfide (A4) d Layers (A5)		-		/lineral (F1 Matrix (F2		, L)	Dark Surface (S7) (LRR K, L) Polyvalue Below Surface (S8) (LRR K, L)	
Deplete	d Below Dark Surface	(A11)	Deplet	ed Matrix	(F3)	,		Thin Dark Surface (S9) (LRR K, L)	
	ark Surface (A12) Mucky Mineral (S1)				rface (F6) Surface (F	7)		Iron-Manganese Masses (F12) (LRR K, L, F Piedmont Floodplain Soils (F19) (MLRA 149)	
-	Gleyed Matrix (S4)				ions (F8)	')		Mesic Spodic (TA6) (MLRA 144A, 145, 149	
-	Redox (S5)							Red Parent Material (F21)	
	d Matrix (S6) urface (S7) ( <b>LRR R, M</b>	ILRA 149I	3)					Very Shallow Dark Surface (TF12) Other (Explain in Remarks)	
	of hydrophytic vegetat	on and we	etland hydro	logy mus	t be prese	nt, unless	disturbed	or problematic.	
	Layer (if observed):								
Type:	ale a a V							Hydric Soil Present? Yes ✓ No	
Remarks:	iches):							Trydric doi: 1 resent: 1 res No	
Remarks.									

Project/Site: Riverbend Wind	City/County: Sanila	ac County s	Sampling Date: 2022-04-08				
<u>_</u>	, , <u></u>	•	Sampling Point: Wetland BB4				
Investigator(s): Ernest Schenk , Eric Rademac							
Landform (hillslope, terrace, etc.): Depression							
Subregion (LRR or MLRA): LRR L, MLRA 98 Lat: 43.							
Soil Map Unit Name: Parkhill loam, 0 to 1 perce	•						
Are climatic / hydrologic conditions on the site typical for this	time of year? Yes No	(If no, explain in Rer	marks.)				
Are Vegetation, Soil, or Hydrology sig	gnificantly disturbed? Are	e "Normal Circumstances" pre	esent? Yes/ No				
Are Vegetation, Soil, or Hydrology na	aturally problematic? (If r	needed, explain any answers	in Remarks.)				
SUMMARY OF FINDINGS - Attach site map s	howing sampling point	locations, transects, i	important features, etc.				
Hydrophytic Vegetation Present? Yes No	Is the Sample	ed Area					
Hydric Soil Present? Yes No							
Wetland Hydrology Present? Yes ✓ No		l Wetland Site ID:					
Remarks: (Explain alternative procedures here or in a sepa	' '	T WORLAND ONE ID:	-				
PEM/PSS/PFO	,						
1 21/1/1 30/1 1 3							
HYDROLOGY							
Wetland Hydrology Indicators:		Secondary Indicato	ors (minimum of two required)				
Primary Indicators (minimum of one is required; check all the	at apply)	Surface Soil Cr	racks (B6)				
Surface Water (A1) Water	r-Stained Leaves (B9)	d Leaves (B9) <u>✓</u> Drainage Patterns (B10)					
High Water Table (A2) Aquat	tic Fauna (B13)	Moss Trim Line	es (B16)				
	Deposits (B15)	Dry-Season W	Dry-Season Water Table (C2)				
	ogen Sulfide Odor (C1)	Crayfish Burrov					
	-	Roots (C3) Saturation Visible on Aerial Imagery (C9)					
, , ,	ence of Reduced Iron (C4)						
	nt Iron Reduction in Tilled Soils						
	Muck Surface (C7)						
	(Explain in Remarks)						
Sparsely Vegetated Concave Surface (B8)  Field Observations:		FAC-Neutral To	est (D5)				
	th (inches): 6						
Surface Water Present? Yes _ ✓ No Dept Water Table Present? Yes No ✓ Dept							
Saturation Present? Yes No Dept	,	Vetland Hydrology Present?	) Van ( Na				
(includes capillary fringe)	in (inches). <u>U</u>	retialità riyurology Present?	? Yes/_ No				
Describe Recorded Data (stream gauge, monitoring well, as	erial photos, previous inspection	ns), if available:					
Remarks:							
Inundated from recent rain							

**VEGETATION –** Use scientific names of plants.

Species? Y Y N N  Total Co Y Y N	FAC FAC FAC FAC ONE	Dominance Test worksheet:           Number of Dominant Species         6         (A)           Total Number of Dominant         6         (B)           Percent of Dominant Species         6         (B)           Percent of Dominant Species         100.00         (A/B)           Prevalence Index worksheet:         Multiply by:         0           OBL species         60.00         x 1 = 60.00           FACW species         55.00         x 2 = 110.00           FAC species         40.00         x 3 = 120.00           FACU species         0.00         x 4 = 0.00           UPL species         0.00         x 5 = 0.00           Column Totals:         155.00         (A)         290.00         (B)
Y Y N N = Total Co	FAC FAC FAC FAC ONE	That Are OBL, FACW, or FAC:
Y N	FACW FAC FAC FACW OBL	Total Number of Dominant Species Across All Strata:
= Total Co Y Y N	FAC FAC OBL	Species Across All Strata:
= Total Co Y Y N	FAC OBL	That Are OBL, FACW, or FAC:
- Total Co	FAC OBL	That Are OBL, FACW, or FAC:
Total Co	FAC FACW OBL	
F Total Co	FAC OBL	
Y Y N	FAC FACW OBL	OBL species $60.00$ $\times$ 1 = $60.00$ FACW species $55.00$ $\times$ 2 = $110.00$ FAC species $40.00$ $\times$ 3 = $120.00$ FACU species $0.00$ $\times$ 4 = $0.00$ UPL species $0.00$ $\times$ 5 = $0.00$ Column Totals: $155.00$ (A) $290.00$ (B)
Y N	FACW OBL	FACW species $\underline{55.00}$ x 2 = $\underline{110.00}$ FAC species $\underline{40.00}$ x 3 = $\underline{120.00}$ FACU species $\underline{0.00}$ x 4 = $\underline{0.00}$ UPL species $\underline{0.00}$ x 5 = $\underline{0.00}$ Column Totals: $\underline{155.00}$ (A) $\underline{290.00}$ (B)
Y N	FACW OBL	FACU species $0.00 \times 4 = 0.00$ UPL species $0.00 \times 5 = 0.00$ Column Totals: $155.00 \times 5 = 0.00 \times 5 = 0.00 \times 5 = 0.00 \times 5 = 0.00 \times 5 \times$
Y N	FACW OBL	UPL species x 5 = Column Totals: (A)
N	OBL 	Column Totals: <u>155.00</u> (A) <u>290.00</u> (B)
		Prevalence Index = B/A = <u>1.87</u>
		Hydrophytic Vegetation Indicators:
		1 - Rapid Test for Hydrophytic Vegetation
Total Co	over	∠ 2 - Dominance Test is >50%
10101 00	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	3 - Prevalence Index is ≤3.0¹
Υ	FACW	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
Y		✓ Problematic Hydrophytic Vegetation¹ (Explain)
NI		
		¹Indicators of hydric soil and wetland hydrology must
		be present, unless disturbed or problematic.
		Definitions of Vegetation Strata:
		<b>Tree</b> – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
		Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.
		<b>Herb</b> – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
		Woody vines – All woody vines greater than 3.28 ft in
- Total Co		height.
- Total Oc	) v e i	
		Hardwards to
		Hydrophytic Vegetation
		Present? Yes No
- Total CC	)vei	
	: Total Co	N FAC N FACW N OBL

SOIL Sampling Point: Wetland BB4

Profile Desc	cription: (Describe t	o the dep	th needed	to docun	nent the i	ndicator	or confirm	the absence of indicators.)	
Depth	Matrix (mailet)	0/	0.1/		x Features		1 2	Testano	
(inches) 0-3	Color (moist) 10YR 4/1		Color (m	<u>noist)</u>	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture Remarks	
3-18	101R 4/1 10YR 4/2		10VD	5/6	20				
3-10	101K 4/2	_00_		5/0					_
									_
					· ——				_
	oncentration, D=Depl	etion, RM	=Reduced M	Matrix, MS	S=Masked	Sand Gra	ains.	<sup>2</sup> Location: PL=Pore Lining, M=Matrix.	
Hydric Soil			Dobaco	lua Balay	u Curfoso	(CO) /I DE	. D	Indicators for Problematic Hydric Soils <sup>3</sup> :	
Histosol Histic E	pipedon (A2)			ra 149B)	v Surface	(30) ( <b>LK</b> F	κκ,	2 cm Muck (A10) (LRR K, L, MLRA 149B) Coast Prairie Redox (A16) (LRR K, L, R)	
	istic (A3)						RA 149B)		2)
	en Sulfide (A4) d Layers (A5)		-		/lineral (F1 Matrix (F2		, L)	Dark Surface (S7) (LRR K, L) Polyvalue Below Surface (S8) (LRR K, L)	
Deplete	d Below Dark Surface	(A11)	Deplet	ed Matrix	(F3)	,		Thin Dark Surface (S9) (LRR K, L)	
	ark Surface (A12) Mucky Mineral (S1)				rface (F6) Surface (F	7)		Iron-Manganese Masses (F12) (LRR K, L, F Piedmont Floodplain Soils (F19) (MLRA 149)	
-	Gleyed Matrix (S4)				ions (F8)	')		Mesic Spodic (TA6) (MLRA 144A, 145, 149	
-	Redox (S5)							Red Parent Material (F21)	
	d Matrix (S6) urface (S7) ( <b>LRR R, M</b>	ILRA 149I	3)					Very Shallow Dark Surface (TF12) Other (Explain in Remarks)	
	of hydrophytic vegetat	on and we	etland hydro	logy mus	t be prese	nt, unless	disturbed	or problematic.	
	Layer (if observed):								
Type:	ale a a V							Hydric Soil Present? Yes No	
Remarks:	iches):							Trydric doi: 1 resent: 1 res No	
Remarks.									

Project/Site: Riverbend Wind	City/County: Sanilac County Sampling Date: 2022-04-08
	State: Michigan Sampling Point: Wetland BB5
•	er Section, Township, Range: <u>Sec 28 T009N R014E</u>
	Local relief (concave, convex, none): Concave Slope (%): 0-2
•	
	74561 Long: <u>-82.831375</u> Datum: <u>WGS84</u>
•	t slopes, slightly eroded NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time	ne of year? Yes ✓ No (If no, explain in Remarks.)
Are Vegetation, Soil, or Hydrology signi	ificantly disturbed? Are "Normal Circumstances" present? Yes No
Are Vegetation, Soil, or Hydrology nature	rally problematic? (If needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS - Attach site map sho	owing sampling point locations, transects, important features, etc.
Hudranbutia Vagatatian Bragant2 Vag. / No.	Is the Sampled Area
Hydrophytic Vegetation Present? Yes ✓ No Hydric Soil Present? Yes ✓ No	within a Watland? Yes No. /
Wetland Hydrology Present? Yes _ ✓ No _	
Remarks: (Explain alternative procedures here or in a separa	
PEM	• •
HYDROLOGY	
Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that	
	Stained Leaves (B9) Drainage Patterns (B10)
	Fauna (B13) Moss Trim Lines (B16)
	posits (B15) Dry-Season Water Table (C2)
	en Sulfide Odor (C1) Crayfish Burrows (C8) d Rhizospheres on Living Roots (C3) Saturation Visible on Aerial Imagery (C9)
	d Rhizospheres on Living Roots (C3) Saturation Visible on Aerial Imagery (C9) ce of Reduced Iron (C4) Stunted or Stressed Plants (D1)
	Iron Reduction in Tilled Soils (C6)  Geomorphic Position (D2)
	uck Surface (C7) Shallow Aquitard (D3)
	Explain in Remarks) Microtopographic Relief (D4)
✓ Sparsely Vegetated Concave Surface (B8)	FAC-Neutral Test (D5)
Field Observations:	
Surface Water Present? Yes _ ✓ No Depth	(inches): <u>6</u>
Water Table Present? Yes No ✓ _ Depth	
Saturation Present? Yes _ ✓ No Depth	(inches): 0 Wetland Hydrology Present? Yes No
(includes capillary fringe)  Describe Recorded Data (stream gauge, monitoring well, aeria	al photos, provinus inapagions), if available:
Describe Necorded Data (Stream gauge, monitoring well, aena	ai priotos, previous irispections), ii available.
Remarks:	
Inundated from recent rain	

**VEGETATION –** Use scientific names of plants.

Tree Stratum (Plot size: 30 )	Absolute	Dominant Indicator	Dominance Test worksheet:
		Species? Status	Number of Dominant Species
1			That Are OBL, FACW, or FAC:(A)
2			Total Number of Dominant Species Across All Strata:  (B)
3			Species Across All Strata:(B)
4			Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)
5			That Are OBL, FACW, OF FAC. 100.00 (A/B)
6			Prevalence Index worksheet:
7			Total % Cover of: Multiply by:
	0	= Total Cover	OBL species <u>2.00</u> x 1 = <u>2.00</u>
Sapling/Shrub Stratum (Plot size:)			FACW species <u>0.00</u> x 2 = <u>0.00</u>
1			FAC species <u>0.00</u> x 3 = <u>0.00</u>
2			FACU species 0.00 x 4 = 0.00
3			UPL species <u>0.00</u> x 5 = <u>0.00</u> (B)
4	_		Column Totals. <u>Z.00</u> (A) <u>Z.00</u> (B)
5			Prevalence Index = B/A = 1.0
6			Hydrophytic Vegetation Indicators:
7.			1 - Rapid Test for Hydrophytic Vegetation
		= Total Cover	2 - Dominance Test is >50%
Herb Stratum (Plot size:5)			3 - Prevalence Index is ≤3.0 <sup>1</sup>
1. Ranunculus sceleratus	2	N OBL	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
2.			✓ Problematic Hydrophytic Vegetation¹ (Explain)
3			1
4			<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5			·
6			Definitions of Vegetation Strata:
7			<b>Tree</b> – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
8			Sapling/shrub – Woody plants less than 3 in. DBH
9			and greater than or equal to 3.28 ft (1 m) tall.
10			Herb – All herbaceous (non-woody) plants, regardless
11	_		of size, and woody plants less than 3.28 ft tall.
12			Woody vines – All woody vines greater than 3.28 ft in
	2	= Total Cover	height.
Woody Vine Stratum (Plot size: 30 )			
1			
2			
3			Hydrophytia
4			Hydrophytic Vegetation
T		= Total Cover	Present?
Remarks: (Include photo numbers here or on a separate		- Total Cover	
Out of growing season, open water app		% of wetland	

Sampling Point: Wetland BB5

SOIL Sampling Point: Wetland BB5

Depth   Mattrix   Color (moist)   %   Tope   Loc*   Texture   Remarks		ription: (Describe	e to the de <sub>l</sub>	th needed				or confirm	n the absence	of indicators.)
0-3 10YR 4/1 100 3-18 10YR 4/2 80 10YR 5/6 20	Depth (inches)		<u>%</u>	Color (n				l oc²	Texture	Remarks
Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.   *Location: PL=Pore Lining, M=Matrix.   Hydric Soil Indicators:   Histosol (A1)					ilolot)		1,00		<u> </u>	romano
¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.  hydric Soil Indicators:  Historic Soil Indicators (Pt=Pore Lining, M=Matrix).    Historic Soil Indicators (Pt=Pore Lining, M=Matrix).   Lining (At)				40)/D	<b>5</b> /0					
Hydric Soil Indicators:    Histosol (A1)	3-18	10YR 4/2	_ <u>_ 80_</u>	<u>10YR</u>	5/6	_20_				
Hydric Soil Indicators:    Histosol (A1)										
Hydric Soil Indicators:    Histosol (A1)										
Hydric Soil Indicators:    Histosol (A1)							'			
Hydric Soil Indicators:    Histosol (A1)				-						
Hydric Soil Indicators:    Histosol (A1)										
Hydric Soil Indicators:    Histosol (A1)							-			
Hydric Soil Indicators:    Histosol (A1)										
Hydric Soil Indicators:    Histosol (A1)							'			
Hydric Soil Indicators:    Histosol (A1)				-				·		
Hydric Soil Indicators:    Histosol (A1)										
Hydric Soil Indicators:    Histosol (A1)										
Hydric Soil Indicators:    Histosol (A1)										
Hydric Soil Indicators:    Histosol (A1)	<sup>1</sup> Type: C=Co	oncentration, D=De	epletion, RM	=Reduced N	∕atrix, MS	======================================	Sand Gr	ains.	<sup>2</sup> Location	: PL=Pore Lining, M=Matrix.
Histic Epipedon (A2)  Black Histic (A3)  Thin Dark Surface (S9) (LRR R, MLRA 149B)  Stratified Layers (A5)  Loamy Mucky Mineral (F1) (LRR K, L)  Depleted Below Dark Surface (A11)  Beleted Below Dark Surface (A11)  Beleted Dark Surface (F6)  Sandy Mucky Mineral (S1)  Sandy Gleyed Matrix (S4)  Sandy Redox (S5)  Stripped Matrix (S6)  Dark Surface (S7) (LRR K, L)  Find Dark Surface (S9) (LRR K, L)  Iron-Manganese Masses (F12) (LRR K, L, R)  Piedmont Floodplain Soils (F19) (MLRA 149B)  Redox Depressions (F8)  Mesic Spodic (TA6) (MLRA 144A, 145, 149B)  Sandy Redox (S5)  Red Parent Material (F21)  Very Shallow Dark Surface (TF12)  Other (Explain in Remarks)  Pindicators 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 —			•							
Black Histic (A3)							(S8) ( <b>LR</b>	R R,		
Hydrogen Sulfide (A4) Loamy Mucky Mineral (F1) (LRR K, L) Dark Surface (S7) (LRR K, L) Stratified Layers (A5) Loamy Gleyed Matrix (F2) Polyvalue Below Surface (S8) (LRR K, L) Polyvalue Below Surface (S8) (LRR K, L) Thick Dark Surface (A11) Depleted Matrix (F3) Thin Dark Surface (S9) (LRR K, L) Thin Dark Surface (A12) Redox Dark Surface (F6) Iron-Manganese Masses (F12) (LRR K, L, R) Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Piedmont Floodplain Soils (F19) (MLRA 149B) Sandy Gleyed Matrix (S4) Redox Depressions (F8) Mesic Spodic (TA6) (MLRA 144A, 145, 149B) Sandy Redox (S5) Red Parent Material (F21) Very Shallow Dark Surface (TF12) Very Shallow Dark Surface (TF12) Other (Explain in Remarks) Stripped Matrix (S6) Very Shallow Dark Surface (TF12) Other (Explain in Remarks) Hydric Soil Present? Yes No Hydric Soil Present? Yes No					,		DD D M	L DA 440D		
Stratified Layers (A5) Loamy Gleyed Matrix (F2) Polyvalue Below Surface (S8) (LRR K, L)  Depleted Below Dark Surface (A11) Depleted Matrix (F3) Thin Dark Surface (S9) (LRR K, L)  Thick Dark Surface (A12) Redox Dark Surface (F6) Iron-Manganese Masses (F12) (LRR K, L, R)  Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Piedmont Floodplain Soils (F19) (MLRA 149B)  Sandy Gleyed Matrix (S4) Redox Depressions (F8) Mesic Spodic (TA6) (MLRA 144A, 145, 149B)  Sandy Redox (S5) Red Parent Material (F21)  Stripped Matrix (S6) Very Shallow Dark Surface (TF12)  Dark Surface (S7) (LRR R, MLRA 149B) Other (Explain in Remarks)  Sandy Redox (S7) Very Shallow Dark Surface (TF12)  Other (Explain in Remarks)  Hydric Soil Present? Yes No										
Thick Dark Surface (A12)				-	-			-, -,		
Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Piedmont Floodplain Soils (F19) (MLRA 149B) Sandy Gleyed Matrix (S4) Redox Depressions (F8) Mesic Spodic (TA6) (MLRA 144A, 145, 149B) Sandy Redox (S5) Red Parent Material (F21) Stripped Matrix (S6) Very Shallow Dark Surface (TF12) Dark Surface (S7) (LRR R, MLRA 149B) Other (Explain in Remarks)  3Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Restrictive Layer (if observed):			ice (A11)							
Sandy Gleyed Matrix (S4) Redox Depressions (F8) Mesic Spodic (TA6) (MLRA 144A, 145, 149B) Sandy Redox (S5) Red Parent Material (F21) Stripped Matrix (S6) Very Shallow Dark Surface (TF12) Dark Surface (S7) (LRR R, MLRA 149B) Other (Explain in Remarks)  3Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Restrictive Layer (if observed):										
Sandy Redox (S5) Red Parent Material (F21) Very Shallow Dark Surface (TF12) Dark Surface (S7) (LRR R, MLRA 149B) Other (Explain in Remarks)  3Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Restrictive Layer (if observed):  Type: Depth (inches): Hydric Soil Present? Yes No	-						.7)			
Stripped Matrix (S6) Very Shallow Dark Surface (TF12) Other (Explain in Remarks)  3Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Restrictive Layer (if observed):  Type: Depth (inches): Hydric Soil Present? Yes ✓ No				11000	Бергезз	10113 (1 0)				
³Indicators 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	-									
Restrictive Layer (if observed):           Type:            Depth (inches):         Hydric Soil Present? Yes✓ No	Dark Su	rface (S7) ( <b>LRR R</b> ,	MLRA 149	В)					Other	(Explain in Remarks)
Restrictive Layer (if observed):           Type:            Depth (inches):         Hydric Soil Present? Yes✓ No	3Indicators of	f bydrophytio yogot	ation and w	otland bydra	logy mus	t ha prose	ent unloc	a diaturbad	l or problematic	
Type:  Depth (inches):				elianu nyuru	nogy mus	t be prese	ent, unies	s distuibed		J.
Depth (inches): No			.,-							
= -p ··· (······		chee).							Hydric Soil	Present? Yes ✓ No
									'	
	itemarks.									

Project/Site: Riverbend \	Vind	City/0	County: Sanilac	Sampling Date: <u>2021-12-08</u>				
Applicant/Owner: Liberty F	ower			State: Michigan Sampling Point: WL C1				
•								
Investigator(s): <u>David Nigro, Carl LaRiccia</u> Section, Township, Range: <u>sec 26 T009N R015E</u> Landform (hillslope, terrace, etc.): <u>Depression</u> Local relief (concave, convex, none): <u>Concave</u> Slope (%								
	•			678982 Datum: WGS84				
				NWI classification: PFO				
Are climatic / hydrologic condit								
				Circumstances" present? Yes ✓ No				
				plain any answers in Remarks.)				
SUMMART OF FINDING	35 - Allach Sil	te map snowing san		ns, transects, important features, etc.				
Hydrophytic Vegetation Pres		✓ No	Is the Sampled Area	V ( N-				
Hydric Soil Present?		✓ No	within a Wetland?	Yes ✓ No				
Wetland Hydrology Present?		✓ No	If yes, optional Wetland	Site ID:				
Remarks: (Explain alternativ	e procedures here o	or in a separate report.)						
HYDROLOGY								
Wetland Hydrology Indicate	ors:		<u> </u>	Secondary Indicators (minimum of two required)				
Primary Indicators (minimum	of one is required;	check all that apply)		Surface Soil Cracks (B6)				
Surface Water (A1)		✓ Water-Stained Leave	es (B9)	✓ Drainage Patterns (B10)				
High Water Table (A2)		Aquatic Fauna (B13)		Moss Trim Lines (B16)				
Saturation (A3)		Marl Deposits (B15)						
Water Marks (B1)		Hydrogen Sulfide Od						
Sediment Deposits (B2)		Oxidized Rhizospher	ed Rhizospheres on Living Roots (C3) Saturation Visible on Aerial Imagery (C9)					
Drift Deposits (B3)		Presence of Reduced	sence of Reduced Iron (C4) Stunted or Stressed Plants (D1)					
Algal Mat or Crust (B4)		Recent Iron Reduction	cent Iron Reduction in Tilled Soils (C6) Geomorphic Position (D2)					
Iron Deposits (B5)		Thin Muck Surface (0						
Inundation Visible on Ae	rial Imagery (B7)	Other (Explain in Rer	r (Explain in Remarks) Microtopographic Relief (D4)					
Sparsely Vegetated Con	cave Surface (B8)		FAC-Neutral Test (D5)					
Field Observations:								
Surface Water Present?	Yes No _	✓ Depth (inches):						
Water Table Present?	Yes No _	✓ Depth (inches):						
Saturation Present?	Yes No _	✓ Depth (inches):	Wetland Hy	vdrology Present? Yes/ No				
(includes capillary fringe)  Describe Recorded Data (stre	am gauga manita	ring well carial photos pro	vieus inspections) if sucil	able:				
Describe Recorded Data (Str	am gauge, monitor	ing well, aerial priolos, pre	evious inspections), ii avail	able.				
Remarks:								
rtomante.								

Trace Charles (Diet size)	Absolute		t Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 30 )		-	Status	Number of Dominant Species
1. Acer rubrum			<u>FAC</u>	That Are OBL, FACW, or FAC:5 (A)
2. Quercus palustris				Total Number of Dominant
3. <u>Populus grandidentata</u>				Species Across All Strata: (B)
4. Quercus muehlenbergii				Percent of Dominant Species That Are OBL, FACW, or FAC: 71.43 (A/B)
5				That Are OBL, FACW, or FAC:
6				Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
	_50	= Total Co	over	OBL species <u>0.00</u> x 1 = <u>0.00</u>
Sapling/Shrub Stratum (Plot size: 15 )				FACW species 30.00 x 2 = 60.00
1. Cornus racemosa	_25	Y	FAC	FAC species <u>45.00</u> x 3 = <u>135.00</u>
2. Rubus pubescens			FACW	FACU species <u>15.00</u> x 4 = <u>60.00</u>
3				UPL species 0.00 x 5 = 0.00
4.				Column Totals: <u>90.00</u> (A) <u>255.00</u> (B)
5.				Prevalence Index = B/A = 2.83
6.				Hydrophytic Vegetation Indicators:
				1 - Rapid Test for Hydrophytic Vegetation
7		=	<del></del>	∠ 2 - Dominance Test is >50%
_	30	= Total Co	over	3 - Prevalence Index is ≤3.0¹
Herb Stratum (Plot size: 5	_			4 - Morphological Adaptations <sup>1</sup> (Provide supporting
1. <u>Solidago gigantea</u>			FACW	data in Remarks or on a separate sheet)
2. Symphyotrichum lanceolatum	5	<u>Y</u>	FACW	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
3				<sup>1</sup> Indicators of hydric soil and wetland hydrology must
4				be present, unless disturbed or problematic.
5	_			Definitions of Vegetation Strata:
6				_
7				<b>Tree</b> – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
8				Sanling/abruh Woody plants loss than 2 in DBH
9.				Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.
10.				Herb – All herbaceous (non-woody) plants, regardless
11.				of size, and woody plants less than 3.28 ft tall.
				Woody vines – All woody vines greater than 3.28 ft in
12.		= Total Co		height.
20		= Total Co	over	
Woody Vine Stratum (Plot size: 30 )	_			
1. <u>Vitis sp.</u>				
2				
3				Hydrophytic
4				Vegetation   Present?   Yes ✓ _ No
	5	= Total Co	over	
Remarks: (Include photo numbers here or on a separate	sheet.)			

Sampling Point: WL C1

SOIL

nches) Col 0-6 10Y 6-10 10Y 10-18 10Y  Type: C=Concentrate ydric Soil Indicate Histosol (A1) Histic Epipedon Black Histic (A3 Hydrogen Sulfid	TR 3/1 TR 6/2 ation, D=Dep	98 60	10YR 10YR 10YR	5/4 5/6 3/1		C C C		SCL SCL SCL	Distinct redox.  Prominent redox.
6-10 10Y 10-18 10Y  Type: C=Concentra ydric Soil Indicate Histosol (A1) Histic Epipedon Black Histic (A3	TR 3/1 TR 6/2 ation, D=Dep	98 60	10YR	5/6		С	M	SCL	
Type: C=Concentra ydric Soil Indicate Histosol (A1) Histic Epipedon Black Histic (A3	R 6/2	60	10YR	5/6		С	M		
Type: C=Concentrate ydric Soil Indicate _ Histosol (A1) _ Histic Epipedon _ Black Histic (A3	ation, D=Dep							SCL	Prominent redox.
ydric Soil Indicato  Histosol (A1)  Histic Epipedon Black Histic (A3		letion, RM	10YR	3/1			_M .		
ydric Soil Indicato  Histosol (A1)  Histic Epipedon Black Histic (A3							·		
ydric Soil Indicato  Histosol (A1)  Histic Epipedon Black Histic (A3		letion, RM					·		
ydric Soil Indicato  Histosol (A1)  Histic Epipedon Black Histic (A3		letion, RM							
ydric Soil Indicato Histosol (A1) Histic Epipedon Black Histic (A3									
ydric Soil Indicato Histosol (A1) Histic Epipedon Black Histic (A3		letion, RM							
ydric Soil Indicato Histosol (A1) Histic Epipedon Black Histic (A3		letion, RM							
rdric Soil Indicato Histosol (A1) Histic Epipedon Black Histic (A3		letion, RM							
ydric Soil Indicato Histosol (A1) Histic Epipedon Black Histic (A3		letion, RM	-						
ydric Soil Indicato Histosol (A1) Histic Epipedon Black Histic (A3		letion, RM							· <del></del>
Histosol (A1) Histic Epipedon Black Histic (A3	015.		=Reduced M	latrix, MS	S=Masked	Sand Gra	ains.		n: PL=Pore Lining, M=Matrix. s for Problematic Hydric Soils <sup>3</sup> :
<ul><li>Histic Epipedon</li><li>Black Histic (A3</li></ul>			Polyva	lue Belov	v Surface	(S8) (I <b>R</b> E	R R		Muck (A10) (LRR K, L, MLRA 149B)
	(A2)			RA 149B)		(00) (EI	,		t Prairie Redox (A16) ( <b>LRR K, L, R</b> )
Hydrogen Sulfid							RA 149B)		Mucky Peat or Peat (S3) (LRR K, L, R)
Stratified Layers				-	lineral (F1 Matrix (F2)		, <b>L</b> )		Surface (S7) ( <b>LRR K, L</b> ) ralue Below Surface (S8) ( <b>LRR K, L</b> )
_ Depleted Below		e (A11)	-	ed Matrix				-	Dark Surface (S9) (LRR K, L)
_     . _ Thick Dark Surfa		,	Redox						Manganese Masses (F12) (LRR K, L, R
_ Sandy Mucky M					Surface (F	7)			nont Floodplain Soils (F19) ( <b>MLRA 149</b> I
_ Sandy Gleyed N			Redox	Depressi	ions (F8)				C Spodic (TA6) (MLRA 144A, 145, 149E
<ul><li>Sandy Redox (S</li><li>Stripped Matrix</li></ul>									Parent Material (F21) Shallow Dark Surface (TF12)
_ Dark Surface (S		/ILRA 149I	3)						(Explain in Remarks)
ndicators of hydrop	ohytic vegeta	tion and we	etland hydro	logy mus	t be prese	nt, unless	s disturbed o	or problemat	ic.
estrictive Layer (i					· ·			•	
Type:									
Depth (inches): _								Hydric So	il Present? Yes <u>√</u> No
emarks:							l		

Project/Site: Riverbend	Wind	City/C	County: Sanilac	Sampling Date: 2021-12-0		
Applicant/Owner: Liberty F	ower			State: Michigan Sampling Point: WL C2		
Investigator(s): David Nig						
				e): <u>Concave</u> Slope (%): <u>0-2</u>		
	•			678783 Datum: WGS84		
				NWI classification: PFO		
Are climatic / hydrologic condit						
				Circumstances" present? Yes✓ No		
=		-		plain any answers in Remarks.)		
				ns, transects, important features, etc		
JOWNART OF THE DIRE	- Allacii si	te map showing san		is, transects, important leatures, etc		
Hydrophytic Vegetation Pres		✓ No	Is the Sampled Area	Vaa / Na		
Hydric Soil Present?		✓ No		Yes No		
Wetland Hydrology Present?		No	If yes, optional Wetland S	Site ID:		
Remarks: (Explain alternative	e procedures nere	or in a separate report.)				
HYDROLOGY						
Wetland Hydrology Indicat	ors:		<u> </u>	Secondary Indicators (minimum of two required)		
Primary Indicators (minimum	of one is required;	check all that apply)		Surface Soil Cracks (B6)		
Surface Water (A1)		Water-Stained Leave		✓ Drainage Patterns (B10)		
High Water Table (A2)		Aquatic Fauna (B13)		Moss Trim Lines (B16)		
Saturation (A3)		Marl Deposits (B15)		Dry-Season Water Table (C2)		
Water Marks (B1)		Hydrogen Sulfide Od		Crayfish Burrows (C8)		
Sediment Deposits (B2)		Oxidized Rhizospher		Saturation Visible on Aerial Imagery (C9)		
Drift Deposits (B3)		Presence of Reduce		Stunted or Stressed Plants (D1)		
Algal Mat or Crust (B4)		Recent Iron Reduction	. ,	Geomorphic Position (D2)		
Iron Deposits (B5)		Thin Muck Surface (0		Shallow Aquitard (D3)		
Inundation Visible on Ae	rial Imagery (B7)	Other (Explain in Rer		Microtopographic Relief (D4)		
Sparsely Vegetated Con	• • • •	Outer (Explain in 10)		✓ FAC-Neutral Test (D5)		
Field Observations:	eave editace (Bo)			Y 1 AO-Nedital Test (Bo)		
Surface Water Present?	Yes No	✓ Depth (inches):				
Water Table Present?		✓ Depth (inches):				
Saturation Present?		✓ Depth (inches):		drology Present? Yes ✓ No		
(includes capillary fringe)				<del></del>		
Describe Recorded Data (str	eam gauge, monito	oring well, aerial photos, pre	evious inspections), if availa	able:		
Remarks:						

Sampling Point:	W/I	C2
Sambinu Funt.	v v L	. 02

<del>`</del> <del>`</del>	Absolute	Dominant	Indicator	
Tree Stratum (Plot size: 30 )		Species?		Dominance Test worksheet:
1. Quercus palustris	_25_	Y	<u>FACW</u>	Number of Dominant Species That Are OBL, FACW, or FAC:7 (A)
2. Acer saccharinum	10	Y	FACW	
3. Acer rubrum		Υ	FAC	Total Number of Dominant Species Across All Strata:  (B)
4. <u>Ulmus americana</u>				Dercent of Deminent Charles
5				Percent of Dominant Species That Are OBL, FACW, or FAC: 87.50 (A/B)
6				Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
45	50	= Total Co	ver	OBL species <u>0.00</u> x 1 = <u>0.00</u>
Sapling/Shrub Stratum (Plot size: 15 )				FACW species 80.00 x 2 = 160.00
1. Cornus racemosa			FAC	FAC species <u>20.00</u> x 3 = <u>60.00</u> FACU species <u>5.00</u> x 4 = <u>20.00</u>
2. Rubus pubescens	10	Y	<u>FACW</u>	UPL species 0.00 x5 = 0.00
3				Column Totals: 105.00 (A) 240.00 (B)
4				
5				Prevalence Index = B/A = 2.29
6				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
		= Total Co	ver	∠ 2 - Dominance Test is >50%
Herb Stratum (Plot size:5				3 - Prevalence Index is ≤3.0¹
1. Elymus virginicus	10	Υ	FACW	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
2. Symphyotrichum lanceolatum		Y	FACW	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
3. <u>Phalaris arundinacea</u>		N	FACW	
			FACW	<sup>1</sup> Indicators of hydric soil and wetland hydrology must
				be present, unless disturbed or problematic.
5. <u>Erigeron canadensis</u>			<u>FACU</u>	Definitions of Vegetation Strata:
6				Tree – Woody plants 3 in. (7.6 cm) or more in diameter
7				at breast height (DBH), regardless of height.
8	<del>-</del>		·	Sapling/shrub – Woody plants less than 3 in. DBH
9				and greater than or equal to 3.28 ft (1 m) tall.
10	<u> </u>			Herb – All herbaceous (non-woody) plants, regardless
11				of size, and woody plants less than 3.28 ft tall.
12				<b>Woody vines</b> – All woody vines greater than 3.28 ft in
	35	= Total Co	ver	height.
Woody Vine Stratum (Plot size: 30 )				
1. Vitis sp	10	Y		
2				
3.				Hydrophytic
4			·	Vegetation
T		= Total Co	· · · · · · · · · · · · · · · · · · ·	Present? Yes <u>√</u> No
Remarks: (Include photo numbers here or on a separate s		- Total Co	vei	
Tremains. (include prioto numbers here of our a separate s	sileet.)			

Sampling Point: WL C2

	cription: (Describe	to the dep	oth needed				or confirm	the absence	e of indicators.)	
Depth (inches)	Matrix Color (moist)	%	Color (n		x Features %	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks	
0-6	10YR 3/2	100						SCL		
6-10	10YR 3/2	95	10YR	4/6	5		M	SCL	Prominent redox.	
10-18		70	10YR		30	C	M	SCL	Prominent redox.	
10-10	10111 3/2	_/	1011	3/0			IVI	JOL	FTOTIIITETIC TEGOX.	
	-	. ——							<del></del> -	
	-				-		-			
	-									
17		Latina DM	Dodoo da	A - Audio - NAC		0 1 0		21 4:	DI Dana Lining M Matrix	
Hydric Soil	oncentration, D=Dep Indicators:	letion, Rivi	=Reduced IV	natrix, ivis	=iviasked	Sand Gr	ains.		n: PL=Pore Lining, M=Matrix. s for Problematic Hydric Soils <sup>3</sup> :	
Histosol			Polyva	lue Belov	v Surface	(S8) ( <b>LRI</b>	RR,		Muck (A10) ( <b>LRR K, L, MLRA 149B</b> )	
	pipedon (A2)			RA 149B)					Prairie Redox (A16) (LRR K, L, R)	
	istic (A3) en Sulfide (A4)				ce (S9) ( <b>L</b> ⁄lineral (F1		LRA 149B)		Mucky Peat or Peat (S3) ( <b>LRR K, L, R</b> ) Surface (S7) ( <b>LRR K, L</b> )	
	d Layers (A5)				Matrix (F2)		, –,		alue Below Surface (S8) ( <b>LRR K, L</b> )	
	d Below Dark Surface	e (A11)		ed Matrix					Dark Surface (S9) (LRR K, L)	
	ark Surface (A12) /lucky Mineral (S1)		_✓ Redox Deplet		Tace (F6) Surface (F	7)			Manganese Masses (F12) ( <b>LRR K, L, R</b> ) nont Floodplain Soils (F19) ( <b>MLRA 149B</b> )	
-	Gleyed Matrix (S4)			Depress		. /		Mesic Spodic (TA6) (MLRA 144A, 145, 149B)		
	Redox (S5)								Parent Material (F21)	
	l Matrix (S6) rface (S7) ( <b>LRR R, N</b>	ILRA 149	В)						Shallow Dark Surface (TF12) (Explain in Remarks)	
									,	
	f hydrophytic vegetat		etland hydro	logy mus	t be prese	nt, unless	s disturbed	or problemati	ic.	
	Layer (if observed):									
Type:	choo):							Hydric Soi	I Present? Yes No	
Depth (in Remarks:	cnes)							nyuno co.		
Remarks.										

Project/Site: Riverbend V	Vind	City/C	County: Sanilac	Sampling Date:	2021-12-08	
Applicant/Owner: Libert Po	ower	•	-	State: Michigan Sampling Poi	nt: WL C3	
Investigator(s): David Nig					_	
ū	•			e): <u>Concave</u> Sid	ne (%)· <b>0-2</b>	
				.673319 Datu		
				NWI classification: PEM		
Are climatic / hydrologic condit						
· · · · ·		-		Circumstances" present? Yes	/ No	
-		-			<u>v</u> NO	
				xplain any answers in Remarks.)		
SUMMARY OF FINDING	3S – Attach sit	te map showing san	npling point location	ns, transects, important f	eatures, etc.	
Hydrophytic Vegetation Prese	ent? Yes	√ No	Is the Sampled Area			
Hydric Soil Present?		✓ No	within a Wetland?	Yes	-	
Wetland Hydrology Present?		✓ No	If yes, optional Wetland	Site ID:		
Remarks: (Explain alternativ		or in a separate report.)		<del></del>		
HYDROLOGY						
Wetland Hydrology Indicate	ors:		<u> </u>	Secondary Indicators (minimum o	f two required)	
Primary Indicators (minimum	of one is required;	check all that apply)		Surface Soil Cracks (B6)		
Surface Water (A1)		Water-Stained Leave		✓ Drainage Patterns (B10)		
High Water Table (A2)		Aquatic Fauna (B13)		Moss Trim Lines (B16)		
Saturation (A3)		Marl Deposits (B15)		Dry-Season Water Table (C2)	)	
Water Marks (B1)		Hydrogen Sulfide Od		Crayfish Burrows (C8)		
Sediment Deposits (B2)		Oxidized Rhizospher		Saturation Visible on Aerial In		
Drift Deposits (B3)		Presence of Reduce	• •	Stunted or Stressed Plants (D	11)	
Algal Mat or Crust (B4)		Recent Iron Reduction		✓ Geomorphic Position (D2)		
Iron Deposits (B5)		Thin Muck Surface (0		Shallow Aquitard (D3)		
Inundation Visible on Ae		Other (Explain in Re		Microtopographic Relief (D4)		
Sparsely Vegetated Con	cave Surface (B8)		-	✓ FAC-Neutral Test (D5)		
Field Observations:	V N	( D ( ( ) )				
Surface Water Present?		✓ Depth (inches):				
Water Table Present?		✓ Depth (inches):		udualamu Duaaant2 Vaa (	Na	
Saturation Present? (includes capillary fringe)	Yes No _	✓ Depth (inches):	wetland Hy	drology Present? Yes✓	_ NO	
Describe Recorded Data (stre	eam gauge, monitor	ring well, aerial photos, pre	evious inspections), if avail	able:		
Remarks:						

Samplin	g Point: <u>W</u>	_ C3
heet:		
ecies FAC:	2	(A)

Tree Stratum (Plot size:)	Absolute % Cover		t Indicator Status	Dominance Test worksheet:
1				Number of Dominant Species That Are OBL, FACW, or FAC: (A)
2	<u> </u>			Total Number of Dominant
3				Species Across All Strata: 2 (B)
4				Percent of Dominant Species
5				That Are OBL, FACW, or FAC: 100.00 (A/B)
6				Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
		= Total Co		OBL species x1 =
Sapling/Shrub Stratum (Plot size: 15 )				FACW species 20.00 x 2 = 40.00
1				FAC species 30.00 x 3 = 90.00
				FACU species <u>0.00</u> x 4 = <u>0.00</u>
2				UPL species <u>10.00</u> x 5 = <u>50.00</u>
3				Column Totals: <u>60.00</u> (A) <u>180.00</u> (B)
4				Prevalence Index = B/A = 3.0
5		-		
6	<del></del>			Hydrophytic Vegetation Indicators:
7	<u> </u>			1 - Rapid Test for Hydrophytic Vegetation
		= Total Co	over	2 - Dominance Test is >50%
Herb Stratum (Plot size:)				3 - Prevalence Index is ≤3.0¹
1. <u>Agrostis stolonifera</u>	20	Υ	FACW	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
2. Panicum capillare		Υ	FAC	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
3. Rumex crispus		N	FAC	
4. Beta vulgaris		N	UPL	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5. <u>Setaria pumila</u>		N	FAC	Definitions of Vegetation Strata:
6				
7				<b>Tree</b> – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
8.				Sapling/shrub – Woody plants less than 3 in. DBH
9.				and greater than or equal to 3.28 ft (1 m) tall.
10.				Herb – All herbaceous (non-woody) plants, regardless
11.				of size, and woody plants less than 3.28 ft tall.
12.	-		-	Woody vines – All woody vines greater than 3.28 ft in
12.	60	= Total Co		height.
W 1 1/2 20 1 (D) 1 20		- Total Co	over	
Woody Vine Stratum (Plot size:30)				
1				
2.				
3				Hydrophytic
4				Vegetation Present? Yes ✓ No
		= Total Co	ver	
Remarks: (Include photo numbers here or on a separate s	sheet.)			

Sampling Point: WL C3

SOIL

	cription: (Describe	to the dep	oth needed				or confirm	the absence	e of indicators.)	
Depth (inches)	Matrix Color (moist)	%	Color (n		x Features %	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks	
0-2	10YR 3/1	100						SCL		
2-8	10YR 3/1	90	10YR	5/6	10	С	М	SCL	Prominent redox.	
8-16	10YR 4/2	80	10YR		20	С	M		Prominent redox.	
	10111 1/2		10111	0,0				OOL	<u> </u>	
									· · · · · · · · · · · · · · · · · · ·	
		. ———								
		-							· <del></del>	
		·			· <del></del>					
		·								
¹Type: C=C	concentration, D=Dep	letion, RM	=Reduced N	/latrix, MS	S=Masked	Sand Gr	ains.	<sup>2</sup> Locatio	n: PL=Pore Lining, M=Matrix.	
Hydric Soil									s for Problematic Hydric Soils <sup>3</sup> :	
Histoso	l (A1) pipedon (A2)			ilue Belov <b>RA 149B</b> )	v Surface	(S8) ( <b>LRI</b>	RR,		Muck (A10) ( <b>LRR K, L, MLRA 149B</b> ) t Prairie Redox (A16) ( <b>LRR K, L, R</b> )	
	listic (A3)			,		RR R, M	LRA 149B)		Mucky Peat or Peat (S3) (LRR K, L, R)	
	en Sulfide (A4)				/lineral (F1		, L)		Surface (S7) (LRR K, L)	
	d Layers (A5) d Below Dark Surface	e (A11)		<sup>,</sup> Gleyed I ed Matrix	Matrix (F2)	)			alue Below Surface (S8) ( <b>LRR K, L</b> )  Dark Surface (S9) ( <b>LRR K, L</b> )	
	ark Surface (A12)	c (ATT)	✓ Beplet						Manganese Masses (F12) ( <b>LRR K, L, R</b> )	
-	Mucky Mineral (S1)				Surface (F	7)			nont Floodplain Soils (F19) (MLRA 149B)	
	Gleyed Matrix (S4) Redox (S5)		Redox	Depress	ions (F8)			Mesic Spodic (TA6) ( <b>MLRA 144A, 145, 149B</b> ) Red Parent Material (F21)		
-	d Matrix (S6)								Shallow Dark Surface (TF12)	
Dark Su	urface (S7) (LRR R, N	/ILRA 149	<b>B</b> )					Other	(Explain in Remarks)	
<sup>3</sup> Indicators o	of hydrophytic vegetat	tion and w	etland hvdro	loav mus	t be prese	nt. unles	s disturbed	or problemat	ic.	
	Layer (if observed):		,	- 57	<u>'</u>	<u>,                                      </u>				
Type:										
Depth (in	nches):							Hydric Soi	I Present? Yes No	
Remarks:										

Project/Site: Riverbend V	Vind	City/0	County: Sanilac	Sampling Date: <u>2021-12-08</u>		
Applicant/Owner: Liberty F	ower			State: Michigan Sampling Point: WL C4		
•				sec 26 T009N R015E		
•				one): <u>Concave</u> Slope (%): <u>0-2</u>		
	•			32.673429 Datum: WGS84		
				NWI classification: PFO		
Are climatic / hydrologic condit	•					
				al Circumstances" present? Yes ✓ No		
-		-		, explain any answers in Remarks.)		
				ions, transects, important features, etc.		
	70 Attaon on	to map snowing san				
Hydrophytic Vegetation Prese		✓ No	Is the Sampled Area within a Wetland?			
Hydric Soil Present?		✓ No				
Wetland Hydrology Present?  Remarks: (Explain alternativ		✓ No	If yes, optional Wetla	nd Site ID:		
Terriarks. (Explain alternativ	s procedures riere (	or in a separate report.)				
HYDROLOGY				Coopeday Indicators (minimum of two required)		
Wetland Hydrology Indicate				Secondary Indicators (minimum of two required)		
Primary Indicators (minimum	or one is required;			` ,		
Surface Water (A1)		Water-Stained Leave		✓ Drainage Patterns (B10)		
High Water Table (A2)		Aquatic Fauna (B13)		Moss Trim Lines (B16)		
Saturation (A3)		Marl Deposits (B15)		Dry-Season Water Table (C2)		
Water Marks (B1)		Hydrogen Sulfide Oc		Crayfish Burrows (C8)		
Sediment Deposits (B2)		Oxidized Rhizospher	es on Living Roots (C3	) Saturation Visible on Aerial Imagery (C9)		
Drift Deposits (B3)		Presence of Reduce	d Iron (C4)	Stunted or Stressed Plants (D1)		
Algal Mat or Crust (B4)		Recent Iron Reduction	on in Tilled Soils (C6)	✓ Geomorphic Position (D2)		
Iron Deposits (B5)		Thin Muck Surface (	C7)	Shallow Aquitard (D3)		
Inundation Visible on Ae	rial Imagery (B7)	Other (Explain in Re	marks)	Microtopographic Relief (D4)		
Sparsely Vegetated Con	cave Surface (B8)			✓ FAC-Neutral Test (D5)		
Field Observations:						
Surface Water Present?	Yes No _	✓ Depth (inches):				
Water Table Present?	Yes No _	✓ Depth (inches):				
Saturation Present?	Yes No _	✓ Depth (inches):	Wetland	I Hydrology Present? Yes No		
(includes capillary fringe)  Describe Recorded Data (stre	eam gauge monito	ring well aerial photos pre	evious inspections) if a	vailable:		
Describe recorded Data (Sire	zam gaage, monto	ing won, donar priotos, pro	rious inspections), ii a	valiable.		
Remarks:						

<b>EGETATION</b> – Use scientific names of plants	i.			Sampling Point: WL C4
ree Stratum (Plot size:30)		Dominant Species?		Dominance Test worksheet:
Populus deltoides			FAC	Number of Dominant Species That Are OBL, FACW, or FAC:5(A)
Quercus macrocarpa		N	FACU	
Acer saccharinum				Total Number of Dominant Species Across All Strata: 5 (B)
				Percent of Dominant Species
				That Are OBL, FACW, or FAC: 100.00 (A/B
				Prevalence Index worksheet:
				Total % Cover of:Multiply by:
		= Total Cov	/er	OBL species x1 =
apling/Shrub Stratum (Plot size:15)				FACW species 45.00 x 2 = 90.00
Cornus racemosa	10_	Y	FAC	FAC species <u>55.00</u> x 3 = <u>165.00</u>
Rubus pubescens				FACU species 10.00 x 4 = 40.00
				UPL species $0.00 \times 5 = 0.00$
				Column Totals: <u>110.00</u> (A) <u>295.00</u> (B)
				Prevalence Index = B/A = 2.68
				Hydrophytic Vegetation Indicators:
				1 - Rapid Test for Hydrophytic Vegetation
	20	= Total Cov	/er	∠ 2 - Dominance Test is >50%
erb Stratum (Plot size:5				✓ 3 - Prevalence Index is ≤3.0 <sup>1</sup>
Solidago gigantea	15	Y	<b>FACW</b>	4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
Symphyotrichum lanceolatum	10	Y	<b>FACW</b>	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
Poa palustris	5	N	<b>FACW</b>	
				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
				Definitions of Vegetation Strata:
				<b>Tree</b> – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
				Sapling/shrub – Woody plants less than 3 in. DBH
				and greater than or equal to 3.28 ft (1 m) tall.
0				Herb – All herbaceous (non-woody) plants, regardless
1				of size, and woody plants less than 3.28 ft tall.
2.				Woody vines – All woody vines greater than 3.28 ft in
		= Total Cov	/er	height.
oody Vine Stratum (Plot size:)				
				Hydrophytic
				Vegetation Present? Yes ✓ No
		= Total Cov		165 Y NU

Sampling Point: WL C4

nches)	Matrix Color (moist)	%	Color (n		x Features	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Domorko	
-	-		COIOI (II	ioist)	%	туре	LOC		Remarks	
0-6	10YR 2/2	100		4.10				SCL		
<u>6-12</u>	10YR 2/2	95	<u>10YR</u>		5	<u> </u>	_M_	SCL	Prominent redox.	
12-18	10YR 6/1	80	10YR	5/6		C	_M_ 	SCL	Prominent redox.	
		- ————————————————————————————————————								
				Antoire NAC				21	Di Donalisian M Matrix	
	oncentration, D=Dep Indicators:	letion, RM	=Reduced N	latrix, MS	S=Masked	Sand Gra	ains.		n: PL=Pore Lining, M=Matrix. s for Problematic Hydric Soils <sup>3</sup> :	
Histic Epipedon (A2)  Black Histic (A3)  Hydrogen Sulfide (A4)  Stratified Layers (A5)  Depleted Below Dark Surface (A11)  Thick Dark Surface (A12)  Sandy Mucky Mineral (S1)  Sandy Gleyed Matrix (S4)  Sandy Redox (S5)  Stripped Matrix (S6)  Dark Surface (S7) (LRR R, MLRA 149)			MLRA 149B)  Thin Dark Surface (S9) (LRR R, MLRA 149B)  Loamy Mucky Mineral (F1) (LRR K, L)  Loamy Gleyed Matrix (F2)  Depleted Matrix (F3)  ✓ Redox Dark Surface (F6)  Depleted Dark Surface (F7)  Redox Depressions (F8)					<ul> <li>Coast Prairie Redox (A16) (LRR K, L, R)</li> <li>5 cm Mucky Peat or Peat (S3) (LRR K, L, R)</li> <li>Dark Surface (S7) (LRR K, L)</li> <li>Polyvalue Below Surface (S8) (LRR K, L)</li> <li>Thin Dark Surface (S9) (LRR K, L)</li> <li>Iron-Manganese Masses (F12) (LRR K, L, R)</li> <li>Piedmont Floodplain Soils (F19) (MLRA 149E</li> <li>Mesic Spodic (TA6) (MLRA 144A, 145, 149B</li> <li>Red Parent Material (F21)</li> <li>Very Shallow Dark Surface (TF12)</li> <li>Other (Explain in Remarks)</li> </ul>		
	f hydrophytic vegetat		etland hydro	logy mus	t be prese	nt, unless	disturbed	or problemat	ic.	
	Layer (if observed):									
Type:			<del></del>					Hydric Soil Present? Yes No		
Depth (in	ches):							Hyaric Soi	I Present? Yes No	
emarks:										

Project/Site: Riverbend V	Vind	City/C	City/County: Sanilac County Sampling Date: 2022-04-08						
			State: Michigan Sampling Point: WL CC1						
•			Section, Township, Range: Sec 15 T009N R015E						
•			relief (concave, convex, none): Concave Slope (%): 0-2						
	•		43.218371 Long: <u>-82.706000</u> Datum: <u>WGS</u>						
Soil Map Unit Name: Parkhi									
Are climatic / hydrologic conditi	•								
					esent? Yes <u>√</u> No				
Are Vegetation, Soil									
SUMMARY OF FINDING	S – Attach si	te map showing sam	pling point locat	ions, transects, i	mportant features, etc.				
Hydrophytic Vegetation Prese	ent? Yes	Is the Sampled Area	ed Area						
Hydric Soil Present?			within a Wetland?						
Wetland Hydrology Present?		✓ No	If yes, optional Wetlan	nd Site ID:					
Remarks: (Explain alternative	procedures here	or in a separate report.)							
LIVEROLOGY									
HYDROLOGY				Casandami Indiaata	ma (maining of the manufact)				
Wetland Hydrology Indicato		-1- all that apply)	Secondary Indicators (minimum of two required)						
Primary Indicators (minimum of Surface Water (A1)	of one is required,								
✓ Surface Water (A1) — High Water Table (A2)		<ul><li>✓ water-Stained Leave</li><li>Aquatic Fauna (B13)</li></ul>	ater-Stained Leaves (B9)  uatic Fauna (B13)  Drainage Patterns (B10)  Moss Trim Lines (B16)						
Saturation (A3)		Marl Deposits (B15)		Dry-Season Water Table (C2)					
Water Marks (B1)		Hydrogen Sulfide Ode							
Sediment Deposits (B2)			Oxidized Rhizospheres on Living Roots (C3) Saturation Visible on Aerial Imagery (C						
Drift Deposits (B3)		Presence of Reduced	d Iron (C4)	Stunted or Stre					
Algal Mat or Crust (B4)		Recent Iron Reductio		Geomorphic Po					
Iron Deposits (B5)	(5-)	Thin Muck Surface (C		Shallow Aquitard (D3)					
Inundation Visible on Aer	,	Other (Explain in Ren	narks)	Microtopographic Relief (D4)					
✓ Sparsely Vegetated Cond Field Observations:	ave Surface (Bb)		T	FAC-Neutral Te	est (D5)				
Surface Water Present?	Yes ✓ No	Depth (inches): 2							
Water Table Present?		✓ Depth (inches):							
Saturation Present?		✓ Depth (inches):		Wetland Hydrology Present? Yes No					
(includes capillary fringe)  Describe Recorded Data (stre	esm gauge monito	ring well perial photos pre	vious inspections) if a	voilable:					
Describe Recorded Data (site	am gauge, momo	ring well, aerial priolos, pre	Wious irispections), ir a	valiable.					
Remarks:									

Sampling Point:	\/\/I	CC1
Sambinu Font.	vv	

Tree Stratum (Plot size: 30 )	Absolute % Cover		Indicator Status	Dominance Test worksheet:
1. <u>Ulmus americana</u>				Number of Dominant Species That Are OBL, FACW, or FAC:4 (A)
Quercus alba		Y	FACU	
3. Carya ovata		Y		Total Number of Dominant Species Across All Strata: 6 (B)
4				
5.				Percent of Dominant Species That Are OBL, FACW, or FAC: 66.67 (A/B)
6				Prevalence Index worksheet:
7				
2 11 (2) 1 2 1 (2) 1 (2)		= Total Co	ver	OBL species <u>2.00</u> x 1 = <u>2.00</u> FACW species <u>35.00</u> x 2 = <u>70.00</u>
Sapling/Shrub Stratum (Plot size: 15 )	_		- A O. A.	FAC species <u>0.00</u> x 3 = <u>0.00</u>
1. <u>Ulmus americana</u>				FACU species 10.00 x 4 = 40.00
2	<u> </u>			UPL species
3	<del></del>			Column Totals: <u>47.00</u> (A) <u>112.00</u> (B)
4				
5				Prevalence Index = B/A = 2.38
6				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
	5	= Total Co	ver	∠ 2 - Dominance Test is >50%
Herb Stratum (Plot size: 5 )				3 - Prevalence Index is ≤3.0¹
1. <u>Carex grayi</u>	10	Υ	FACW	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
2. Onoclea sensibilis		Y	FACW	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
3. Juncus effusus		N	OBL	
4			· · ·	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5				Definitions of Vegetation Strata:
6				_
7				<b>Tree</b> – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
8				Sapling/shrub – Woody plants less than 3 in. DBH
9				and greater than or equal to 3.28 ft (1 m) tall.
10				Herb – All herbaceous (non-woody) plants, regardless
11.				of size, and woody plants less than 3.28 ft tall.
12.				Woody vines – All woody vines greater than 3.28 ft in
12.	17	= Total Co	vor	height.
Woody Vine Stratum (Plot size:30)		- Total Co	VEI	
1			· ——	
2				
3	·			Hydrophytic Vegetation
4		-	·	Present? Yes No
		= Total Co	ver	
Remarks: (Include photo numbers here or on a separate s	sheet.)			

Depth (inches)	Matrix			Redo	x Features	3			
	Color (moist)	%	Color (n		%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
0-3	10YR 3/2	100						SCL	
3-9	10YR 3/2	_80_	<u>10YR</u>	4/6	_20_	C	_M_	SCL	Prominent redox.
9-18	10YR 3/2	75	10YR	6/2	25	D	_M_	CL	
9-18	10YR 3/2	50	10YR	4/6	25	С	_M_	SCL	Prominent redox.
<sup>1</sup> Type: C=C <b>Hydric Soil</b>	oncentration, D=De	bletion, RM	=Reduced N	1atrix, MS	S=Masked	Sand Gra	ains.		n: PL=Pore Lining, M=Matrix. s for Problematic Hydric Soils³:
Black H Hydroge Stratifiee Depletee Thick De Sandy N Sandy F Stripped	pipedon (A2) pipedon (A2) pistic (A3) en Sulfide (A4) d Layers (A5) d Below Dark Surface ark Surface (A12) Mucky Mineral (S1) Gleyed Matrix (S4) Redox (S5) d Matrix (S6) urface (S7) (LRR R,		MLF Thin D Loamy Loamy Deplet _ Redox Deplet _ Redox	RA 149B) ark Surfa Mucky M Gleyed I ed Matrix Dark Sur ed Dark S	ce (S9) ( <b>L</b> lineral (F1 Matrix (F2) (F3)	.RR R, MI ) (LRR K	RA 149B)	Coasi 5 cm Dark Polyv Thin I Iron-N Piedn Mesic Red F	Muck (A10) (LRR K, L, MLRA 149B) t Prairie Redox (A16) (LRR K, L, R) Mucky Peat or Peat (S3) (LRR K, L, R) Surface (S7) (LRR K, L) alue Below Surface (S8) (LRR K, L) Dark Surface (S9) (LRR K, L) Manganese Masses (F12) (LRR K, L, R) nont Floodplain Soils (F19) (MLRA 149B) Spodic (TA6) (MLRA 144A, 145, 149B) Parent Material (F21) Shallow Dark Surface (TF12) (Explain in Remarks)
	f hydrophytic vegeta		etland hydro	logy mus	t be prese	ent, unless	disturbed	or problemat	ic.
Restrictive	Layer (if observed)	:							
Typo								Hydric Soi	I Present? Yes No
Type:	ahaa).								
Type: Depth (in Remarks:	ches):								······································

Project/Site: Riverbend Win	ıd	City/C	County: Sanilac Co	ountv sa	ampling Date: <u>2022-04-1</u>		
Applicant/Owner: Liberty Pov				•			
Investigator(s): David Nigro,							
Landform (hillslope, terrace, etc.):	•						
Subregion (LRR or MLRA): LRR							
Soil Map Unit Name: Marlette							
Are climatic / hydrologic conditions							
Are Vegetation, Soil							
Are Vegetation, Soil							
_	-						
SUMMARY OF FINDINGS	<ul> <li>Attach site m</li> </ul>	ap showing san	npling point locati	ons, transects, ir	mportant features, etc.		
Hydrophytic Vegetation Present?	Yes ✓	_ No	Is the Sampled Area				
Hydric Soil Present?		No	within a Wetland?	Yes <u>√</u>	No		
Wetland Hydrology Present?		_ No	If yes, optional Wetlan	d Site ID:			
Remarks: (Explain alternative pre	ocedures here or in a	a separate report.)					
PEM depression in fallow field							
LIVEROLOGY							
HYDROLOGY Wetland Hydrology Indicators				Casandan Indicator	a (minimum of two required)		
Wetland Hydrology Indicators:		( all that apply)		· ·	s (minimum of two required)		
Primary Indicators (minimum of o	-		(DO)	Surface Soil Cra			
✓ Surface Water (A1)		Water-Stained Leave					
High Water Table (A2)		Aquatic Fauna (B13)		Moss Trim Lines (B16) Dry-Season Water Table (C2)			
✓ Saturation (A3)		Marl Deposits (B15)					
Water Marks (B1)		Hydrogen Sulfide Od		Crayfish Burrow			
Sediment Deposits (B2)			res on Living Roots (C3)		le on Aerial Imagery (C9)		
Drift Deposits (B3)		Presence of Reduced	on in Tilled Soils (C6)		ssed Plants (D1)		
Algal Mat or Crust (B4)				✓ Geomorphic Pos			
Iron Deposits (B5)		Thin Muck Surface (C		Shallow Aquitare			
Inundation Visible on Aerial I		Other (Explain in Rer	marks)	✓ Microtopographi			
Sparsely Vegetated Concave Field Observations:	Surface (B8)			FAC-Neutral Te	St (Do)		
	es / No	Depth (inches): 3					
		Depth (inches):					
		Depth (inches): 0		Hydrology Present?	Yes ✓ No		
(includes capillary fringe)							
Describe Recorded Data (stream	gauge, monitoring w	vell, aerial photos, pre	evious inspections), if av	ailable:			
Remarks:							

/EGETATION – Use scientific names of plants				Sampling Point: WL DD1
Tree Stratum (Plot size:30)	Absolute % Cover		t Indicator	Dominance Test worksheet:
1				Number of Dominant Species That Are OBL, FACW, or FAC: (A)
2				Total Number of Dominant Species Across All Strata: 2 (B)
4	<u> </u>			Percent of Dominant Species
5				That Are OBL, FACW, or FAC:
6				Prevalence Index worksheet:
Sapling/Shrub Stratum (Plot size: 15 )		= Total Co		
1				FAC species x 3 =0.00
2				FACU species <u>0.00</u> x 4 = <u>0.00</u>
3.				UPL species $0.00 \times 5 = 0.00$
4.				Column Totals: <u>90.00</u> (A) <u>150.00</u> (B)
5.				Prevalence Index = B/A = <u>1.67</u>
6				Hydrophytic Vegetation Indicators:
7				
		= Total Co	over	∠ 2 - Dominance Test is >50%
Herb Stratum (Plot size:5)				3 - Prevalence Index is ≤3.0¹
1. Spartina pectinata	55	Y	FACW	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
2. <u>Scirpus atrovirens</u>	30	Υ	OBL	Problematic Hydrophytic Vegetation¹ (Explain)
3. <u>Epilobium ciliatum</u>		N	<u>FACW</u>	The disease of budging and problem developed by dealers, married
4. <u>Solidago gigantea</u>	_	N	FACW	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5				Definitions of Vegetation Strata:
6				Tree – Woody plants 3 in. (7.6 cm) or more in diameter
7				at breast height (DBH), regardless of height.
8				Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.
10				Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
11				Woody vines – All woody vines greater than 3.28 ft in
12		= Total Co		height.
Woody Vine Stratum (Plot size:)		Total Oc	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
1				
2				
3				Hydrophytic
4				Vegetation   Present?
		= Total Co	over	
Remarks: (Include photo numbers here or on a separate	sheet.)			

Depth (inches)	Matrix			Redo	x Features				
	Color (moist)	%	Color (m		<u>%</u>	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
0-6	10YR 6/2	85	<u>10YR</u>	5/4	_15_	<u>C</u>	_M_	SCL	Distinct redox.
6-18	10YR 6/2	65	10YR	5/4	35	C	<u>PL</u>	SCL	Distinct redox.
¹Type: C=C	Concentration, D=Dep	letion RM	I=Reduced M	Matrix MS	S=Masked	Sand Gr	ains	<sup>2</sup> Locatio	n: PL=Pore Lining, M=Matrix.
Histoso Histic E Black H Hydroge Stratifie Deplete Thick D Sandy N Sandy F Stripped Dark Su	Indicators:  Indic	<b>ILRA 149</b> ion and w	MLF Thin D Loamy Loamy Deplete Redox Deplete Redox	RA 149B) ark Surfa Mucky M Gleyed I ed Matrix Dark Su ed Dark S Depress	ice (S9) ( <b>L</b> Mineral (F1 Matrix (F2) (F3) fface (F6) Surface (F ions (F8)	rr r, m) (Lrr k	_RA 149B) , L)	2 cm Coas 5 cm Dark Polyv Thin I Iron-N Piedn Mesic Red F Very Other	s for Problematic Hydric Soils <sup>3</sup> :  Muck (A10) (LRR K, L, MLRA 149B)  t Prairie Redox (A16) (LRR K, L, R)  Mucky Peat or Peat (S3) (LRR K, L, R)  Surface (S7) (LRR K, L)  alue Below Surface (S8) (LRR K, L)  Dark Surface (S9) (LRR K, L)  Manganese Masses (F12) (LRR K, L, R)  nont Floodplain Soils (F19) (MLRA 149B)  Spodic (TA6) (MLRA 144A, 145, 149B)  Parent Material (F21)  Shallow Dark Surface (TF12)  (Explain in Remarks)
Туре:									
Depth (in	nches):							Hydric Soi	il Present? Yes No

Project/Site: Riverbend Wir	nd	City/0	County: Sanilac	County	Samp	oling Date: <u>2022-04-1</u>	
Applicant/Owner: Liberty Pov				•			
Investigator(s): David Nigro,							
Landform (hillslope, terrace, etc.):	•						
Subregion (LRR or MLRA): LRR							
Soil Map Unit Name: Marlette							
Are climatic / hydrologic conditions	•	•	• •				
Are Vegetation, Soil							
Are Vegetation, Soil							
_		-					
SUMMARY OF FINDINGS	<ul> <li>Attach site n</li> </ul>	nap showing san	npling point lo	cations, tra	nsects, imp	ortant features, etc.	
Hydrophytic Vegetation Present?	? Yes <u>√</u>	No	Is the Sampled				
Hydric Soil Present?		No	within a Wetland	d? Ye	es <u>√</u> No	0	
Wetland Hydrology Present?		No	If yes, optional W	/etland Site ID:			
Remarks: (Explain alternative pr	rocedures here or in	a separate report.)					
PEM drainage							
HYDROLOGY							
Wetland Hydrology Indicators:				Seconda	arv Indicators (m	ninimum of two required)	
Primary Indicators (minimum of o		k all that apply)			face Soil Cracks	· · · · · · · · · · · · · · · · · · ·	
✓ Surface Water (A1)	-	Water-Stained Leave	es (B9)		inage Patterns (		
High Water Table (A2)		Aquatic Fauna (B13)					
✓ Saturation (A3)		Marl Deposits (B15)		Dry-Season Water Table (C2)			
Water Marks (B1)		Hydrogen Sulfide Od	lor (C1)	Cray	yfish Burrows (C	28)	
Sediment Deposits (B2)		Oxidized Rhizospher	es on Living Roots	s (C3) Satu	uration Visible o	n Aerial Imagery (C9)	
Drift Deposits (B3)	·		Presence of Reduced Iron (C4) Stunted or Stressed Plants (D				
Algal Mat or Crust (B4)		Recent Iron Reduction			omorphic Positio		
Iron Deposits (B5)		Thin Muck Surface (			allow Aquitard (D		
Inundation Visible on Aerial		Other (Explain in Re	marks)		rotopographic R		
Sparsely Vegetated Concav	e Surface (B8)			_ <u>√</u> FAC	C-Neutral Test (E	D5)	
Field Observations:	/aa / Na	Danish (inches). 2					
		Depth (inches): 2					
		Depth (inches):		Hand Hudualan	D	ina ( Na	
Saturation Present? Y (includes capillary fringe)	res_ ✓ No	Depth (inches): 0	wet	liand Hydrology	y Present? 10	es No	
Describe Recorded Data (stream	n gauge, monitoring	well, aerial photos, pre	evious inspections)	, if available:			
Remarks:							
riomanie.							

<b>/EGETATION –</b> Use scientific names of plants				Sampling Point: WL DD2
Tree Stratum (Plot size:30)	Absolute % Cover		t Indicator	Dominance Test worksheet:
1				Number of Dominant Species That Are OBL, FACW, or FAC:3(A)
2				Total Number of Dominant Species Across All Strata: 3 (B)
4				Percent of Dominant Species
5				That Are OBL, FACW, or FAC:
6				Prevalence Index worksheet:  Total % Cover of: Multiply by:
Sapling/Shrub Stratum (Plot size: 15 )		= Total Co		Total % Cover of: Multiply by:  OBL species55.00
1				FAC species 0.00 x 3 = 0.00
2.				FACU species <u>0.00</u> x 4 = <u>0.00</u>
3.				UPL species 0.00 x 5 = 0.00
4				Column Totals: <u>100.00</u> (A) <u>145.00</u> (B)
5.				Prevalence Index = B/A = 1.45
6				Hydrophytic Vegetation Indicators:
7				
		= Total Co	over	∠ 2 - Dominance Test is >50%
Herb Stratum (Plot size:5				3 - Prevalence Index is ≤3.0¹
1. Phalaris arundinacea	_40_	Y	FACW	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
2. Scirpus atrovirens	35	Y	OBL	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
3. Carex lacustris		Y	OBL	<sup>1</sup> Indicators of hydric soil and wetland hydrology must
4. <u>Spartina pectinata</u>	5	N	FACW	be present, unless disturbed or problematic.
5				Definitions of Vegetation Strata:
6				<b>Tree</b> – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
8				
9.				Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.
10.			<u> </u>	Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
11.				Woody vines – All woody vines greater than 3.28 ft in
12		= Total Co	over	height.
Woody Vine Stratum (Plot size:)				
1				
2				
3		-		Hydrophytic
4				Vegetation   Present?
		= Total Co	over	
Remarks: (Include photo numbers here or on a separate				

	cription: (Describe	to the de	oth needed				or confirm	the absence	e of indicators.)
Depth (inches)	Matrix Color (moist)	%	Color (n		x Features %	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
0-12	10YR 3/2	85	10YR	5/4	15	С	М	SCL	Distinct redox.
12-18	10YR 3/2	_60	10YR	5/4	15	С	PL	SCL	Distinct redox.
			10YR	2/2	25	C		SCL	
			10111					OOL	
-			-						
									. <u> </u>
									·
-									·
1 <sub>T. max</sub> C=C	tustion D-Doub	letien DM	L-Dadwaad N	Ambula NAC		C		21	DI -Dana Lining Manadaire
Hydric Soil	oncentration, D=Depl Indicators:	ietion, Riv	=Reduced N	viatrix, ivis	<u>s=iviasked</u>	Sand Gr	ains.		n: PL=Pore Lining, M=Matrix. s for Problematic Hydric Soils <sup>3</sup> :
Histosol	(A1)		Polyva	lue Belov	w Surface (	(S8) ( <b>LR</b> I	R R,	2 cm	Muck (A10) ( <b>LRR K, L, MLRA 149B</b> )
	pipedon (A2)			RA 149B)					Prairie Redox (A16) (LRR K, L, R)
	istic (A3) en Sulfide (A4)				ace (S9) ( <b>L</b> ⁄lineral (F1		LRA 149B) (. L)		Mucky Peat or Peat (S3) (LRR K, L, R) Surface (S7) (LRR K, L)
	d Layers (A5)				Matrix (F2)		·, —,		alue Below Surface (S8) ( <b>LRR K, L</b> )
	d Below Dark Surface	e (A11)		ed Matrix					Dark Surface (S9) (LRR K, L)
	ark Surface (A12) /lucky Mineral (S1)		_/ Redox		rface (F6) Surface (F7	7)			Manganese Masses (F12) ( <b>LRR K, L, R</b> ) nont Floodplain Soils (F19) ( <b>MLRA 149B</b> )
-	Gleyed Matrix (S4)				ions (F8)	' )			Spodic (TA6) (MLRA 144A, 145, 149B)
-	Redox (S5)								Parent Material (F21)
	l Matrix (S6) rface (S7) ( <b>LRR R, N</b>	NI DA 140	B)						Shallow Dark Surface (TF12) (Explain in Remarks)
Dark Su	mace (S7) (LKK K, IV	ILKA 143	<b>D</b> )					Other	(Explain in Remarks)
	f hydrophytic vegetat		etland hydro	ology mus	t be prese	nt, unles	s disturbed	or problemat	ic.
	Layer (if observed):								
Type:								Lludria Cai	I Drecont 2 Voc / No
Depth (in	ches):							nyuric Soi	I Present? Yes No
Remarks:									

Project/Site: Riverbend		City/0	County: Sanilac Cou	untv Sa	mpling Date: 2022-04-11		
Applicant/Owner: Liberty				•			
Investigator(s): K. Yantz, [							
Landform (hillslope, terrace, etc	_						
Subregion (LRR or MLRA): LR							
Soil Map Unit Name: Parkhi							
Are climatic / hydrologic condition	•	•					
Are Vegetation, Soil		-					
Are Vegetation, Soil							
SUMMARY OF FINDING	S – Attach sit	e map snowing san	npling point location	ons, transects, in	nportant features, etc.		
Hydrophytic Vegetation Prese	nt? Yes	✓ No	Is the Sampled Area				
Hydric Soil Present?		✓ No	within a Wetland?	Yes <u>√</u>	No		
Wetland Hydrology Present?		✓ No	If yes, optional Wetland	d Site ID:			
Remarks: (Explain alternative	procedures here of	or in a separate report.)					
PSS wetland							
HYDROLOGY							
Wetland Hydrology Indicato	rs:			Secondary Indicators	(minimum of two required)		
Primary Indicators (minimum o	of one is required; of	check all that apply)		Surface Soil Cra			
✓ Surface Water (A1)		✓ Water-Stained Leave		Drainage Patterns (B10)			
✓ High Water Table (A2)		Aquatic Fauna (B13)		Moss Trim Lines (B16)			
✓ Saturation (A3)		Marl Deposits (B15)		Dry-Season Wat	i i		
Water Marks (B1)		Hydrogen Sulfide Oc		Crayfish Burrows			
Sediment Deposits (B2)		Oxidized Rhizospher	-		e on Aerial Imagery (C9)		
Drift Deposits (B3)		Presence of Reduce		Stunted or Stress			
Algal Mat or Crust (B4)		Recent Iron Reduction		✓ Geomorphic Pos			
Iron Deposits (B5)		Thin Muck Surface (	•	Shallow Aquitard			
Inundation Visible on Aeri		Other (Explain in Re	marks)	Microtopographic			
Sparsely Vegetated Conc	ave Surface (B8)			✓ FAC-Neutral Tes	st (D5)		
Field Observations:		5 4 4					
Surface Water Present?		Depth (inches): 3	<del></del>				
Water Table Present?		Depth (inches): 0			N		
Saturation Present? (includes capillary fringe)	Yes✓ No _	Depth (inches): 0	Wetland F	Hydrology Present?	Yes ✓ No		
Describe Recorded Data (stre	am gauge, monitor	ing well, aerial photos, pre	evious inspections), if ava	ailable:			
Remarks:							

Tree Stratum (Plot size: 30 )	Absolute			Dominance Test worksheet:
		Species?		Number of Dominant Species
Populus deltoides				That Are OBL, FACW, or FAC: (A)
•				Total Number of Dominant
•				Species Across All Strata:
•				Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)
-				That Are OBE, I AGW, OF I AG. 100.00
·				Prevalence Index worksheet:
				Total % Cover of: Multiply by:
	15	= Total Cov	/er	OBL species <u>15.00</u> x 1 = <u>15.00</u>
Sapling/Shrub Stratum (Plot size:)				FACW species 30.00 x 2 = 60.00
. Cornus racemosa	40	<u>Y</u>	FAC	FAC species <u>65.00</u> x 3 = <u>195.00</u>
. Salix discolor	5	N	<b>FACU</b>	FACU species <u>5.00</u> x 4 = <u>20.00</u>
i				UPL species 0.00 x 5 = 0.00
i				Column Totals: <u>115.00</u> (A) <u>290.00</u> (B)
•				Prevalence Index = B/A = 2.52
·				Hydrophytic Vegetation Indicators:
				1 - Rapid Test for Hydrophytic Vegetation
		= Total Cov		∠ 2 - Dominance Test is >50%
Herb Stratum (Plot size: 5 )		10101 001	701	3 - Prevalence Index is ≤3.0¹
	25	V		4 - Morphological Adaptations <sup>1</sup> (Provide supportino data in Remarks or on a separate sheet)
Onoclea sensibilis		<u></u>	FACW	Problematic Hydrophytic Vegetation¹ (Explain)
2. <u>Carex lacustris</u>				1 Toblematic Hydrophytic Vegetation (Explain)
3				<sup>1</sup> Indicators of hydric soil and wetland hydrology must
1				be present, unless disturbed or problematic.
5		· <del></del> -		Definitions of Vegetation Strata:
5				Tree – Woody plants 3 in. (7.6 cm) or more in diameter
7		· <del></del>		at breast height (DBH), regardless of height.
3				Sapling/shrub – Woody plants less than 3 in. DBH
)				and greater than or equal to 3.28 ft (1 m) tall.
0				Herb – All herbaceous (non-woody) plants, regardless
1		. <u></u>		of size, and woody plants less than 3.28 ft tall.
2				Woody vines – All woody vines greater than 3.28 ft in
		= Total Cov	/er	height.
Noody Vine Stratum (Plot size:30)				
ı. <u>Vitis riparia</u>	10	V	FAC	
2. Celastrus scandens		NI	FACU	
3				Hydrophytic Vegetation
1				Present? Yes _ ✓ No
		= Total Cov	/er	
Remarks: (Include photo numbers here or on a separate	sheet.)			

<u>ches)</u> 0-2	Matrix (mariet)	0/		<u>Features</u>	<b>T</b> 1	Loc <sup>2</sup>	T	Dama and a
0-2	Color (moist)		Color (moist)	<u></u> %	Type <sup>1</sup>	LOC	Texture	Remarks
	10YR 5/1	100					SCL	
2-16	10YR 3/2	80	10YR 4/6		<u>C</u>	M	SCL	Prominent redox.
(no: C=C	Panaentration D-Don	Notion PM	=Reduced Matrix, MS	-Masked S	Sond Cr		<sup>2</sup> l continu	n: PL=Pore Lining, M=Matrix.
	Indicators:	netion, Kivi	-Reduced Matrix, Mc	-Waskeu d	bariu Gra	11115.		for Problematic Hydric Soils <sup>3</sup> :
Black H Hydroge Stratified Deplete Thick D Sandy M Sandy G Sandy F Stripped	pipedon (A2) listic (A3) en Sulfide (A4) d Layers (A5) d Below Dark Surfac ark Surface (A12) Mucky Mineral (S1) Gleyed Matrix (S4) Redox (S5) d Matrix (S6) urface (S7) (LRR R, M		MLRA 149B) Thin Dark Surfa Loamy Mucky M Loamy Gleyed M Depleted Matrix Redox Dark Sur Depleted Dark S Redox Depressi	ce (S9) ( <b>LF</b> lineral (F1) Matrix (F2) (F3) face (F6) Surface (F7	(LRR K		5 cm I Dark 8 Polyva Thin E Iron-M Piedm Mesic Red P Very 8	Prairie Redox (A16) (LRR K, L, R) Mucky Peat or Peat (S3) (LRR K, L, R) Surface (S7) (LRR K, L) alue Below Surface (S8) (LRR K, L) Dark Surface (S9) (LRR K, L) Manganese Masses (F12) (LRR K, L, R) Mont Floodplain Soils (F19) (MLRA 1498 Spodic (TA6) (MLRA 144A, 145, 1498 Parent Material (F21) Shallow Dark Surface (TF12) (Explain in Remarks)
			etland hydrology mus	t be presen	t, unless	disturbed	or problemati	c.
	Layer (if observed):	:						
Type:								
Depth (in marks:	nches):						Hydric Soil	I Present? Yes/ No

Project/Site: Riverbend	Citv/C	county: St. Clair Cou	ıntv Sa	ampling Date: 2022-04-1
Applicant/Owner: Liberty			•	Sampling Point: WL DD4
Investigator(s): K. Yantz, D. Nigro -Atv			_	
Landform (hillslope, terrace, etc.): Depression				
•				
Subregion (LRR or MLRA): LRR L, MLRA 99				
Soil Map Unit Name: Conover loam, 0 to				
Are climatic / hydrologic conditions on the site typ	ical for this time of year? Y	res No (If	no, explain in Rema	arks.)
Are Vegetation, Soil, or Hydrology	/ significantly distur	bed? Are "Normal C	Circumstances" pres	ent? Yes <u>√</u> No
Are Vegetation, Soil, or Hydrology	/ naturally problema	atic? (If needed, ex	plain any answers ir	n Remarks.)
SUMMARY OF FINDINGS - Attach si	te map showing sam	pling point location	ıs, transects, in	nportant features, etc.
Hydrophytic Vegetation Present? Yes _	✓ No	Is the Sampled Area		
	✓ No	within a Wetland?	Yes <u>√</u>	No
	✓ No	If yes, optional Wetland S	Site ID:	
Remarks: (Explain alternative procedures here		ii yes, optional wetana e	ле ів.	
PFO wetland	1 ,			
HYDROLOGY				
Wetland Hydrology Indicators:			Secondary Indicators	s (minimum of two required)
Primary Indicators (minimum of one is required;	check all that apply)			
			<ul><li>Surface Soil Cra</li><li>Drainage Patterr</li></ul>	
✓ Surface Water (A1) ✓ High Water Table (A2)	✓ Water-Stained Leave  — Aquatic Fauna (B13)		Moss Trim Lines	
✓ Fight Water Table (A2) ✓ Saturation (A3)	Marl Deposits (B15)	_	Moss Triff Lines Dry-Season Wat	
Water Marks (B1)	Hydrogen Sulfide Od	or (C1)	Crayfish Burrows	
· ·	Oxidized Rhizosphere			le on Aerial Imagery (C9)
Sediment Deposits (B2) Drift Deposits (B3)	Presence of Reduced			
Algal Mat or Crust (B4)	Recent Iron Reductio		Stunted or Stres Geomorphic Pos	
Algar Mat of Crust (B4) Iron Deposits (B5)	Thin Muck Surface (C		Shallow Aquitare	
Inundation Visible on Aerial Imagery (B7)	Other (Explain in Ren		Microtopographi	
Sparsely Vegetated Concave Surface (B8)			Microtopographing ✓ FAC-Neutral Test	
Field Observations:		<u> </u>	Z FAC-Neutral Tes	st (D3)
	Depth (inches): 3			
	Depth (inches): 0			
	Depth (inches): 0	Wotland Hy	drology Present?	Yes ✓ No
(includes capillary fringe)			-	Tes _ v NO
Describe Recorded Data (stream gauge, monito	ring well, aerial photos, pre	vious inspections), if availa	able:	
Remarks:				
Nomano.				

Tree Stratum (Plot size:30)		Dominant Species?		Dominance Test worksheet:
Populus deltoides				Number of Dominant Species That Are OBL, FACW, or FAC:5(A)
Fraxinus pennsylvanica				
Traxinas pennsylvanica				Total Number of Dominant Species Across All Strata: 5 (B)
				Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)
				Prevalence Index worksheet:
		= Total Cov		Total % Cover of: Multiply by:
and the or (Ohanda Ohanda on AF		= Total Cov	ver	OBL species <u>15.00</u> x 1 = <u>15.00</u> FACW species <u>35.00</u> x 2 = <u>70.00</u>
apling/Shrub Stratum (Plot size:15)				FAC species 25.00 x3 = 75.00
-				FACU species 0.00 x 4 = 0.00
				UPL species 0.00 x 5 = 0.00
				Column Totals: <u>75.00</u> (A) <u>160.00</u> (B)
				Prevalence Index = B/A = 2.13
		· <del></del>		
		· <del></del>		Hydrophytic Vegetation Indicators:
·				1 - Rapid Test for Hydrophytic Vegetation
	0	= Total Cov	ver	∠ 2 - Dominance Test is >50%     ∠ 3 - Prevalence Index is ≤3.0¹
erb Stratum (Plot size:5				4 - Morphological Adaptations <sup>1</sup> (Provide supporting
Phalaris arundinacea	30	<u>Y</u>	<b>FACW</b>	data in Remarks or on a separate sheet)
Carex lacustris	15	Y	OBL	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
				1
-				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
·				Definitions of Vegetation Strata:
				<b>Tree</b> – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
				Sapling/shrub – Woody plants less than 3 in. DBH
				and greater than or equal to 3.28 ft (1 m) tall.
0				Herb – All herbaceous (non-woody) plants, regardless
1				of size, and woody plants less than 3.28 ft tall.
2.				<b>Woody vines</b> – All woody vines greater than 3.28 ft in
		= Total Cov	/er	height.
Voody Vine Stratum (Plot size:30)		- Total Co	VCI	
· Vitis riparia	10	Y	EAC	
				Hydrophytic Vegetation
·				Present? Yes _ ✓ No
	10	= Total Cov	ver	

inches)	Matrix Color (moist)	%	Color (m		x Features	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Domarka
U 10					<u>%</u>				Remarks  Draminant raday
0-16	10YR 5/2	_/U_	5YR	5/4	30	C	M	CL	Prominent redox.
					·				
							·		
	-				-				
					-		·		
	- <u></u> -								
	oncentration, D=Depl	etion, RM	=Reduced M	latrix, MS	S=Masked	Sand Gra	ains.	<sup>2</sup> Location	n: PL=Pore Lining, M=Matrix.
	Indicators:								for Problematic Hydric Soils <sup>3</sup> :
_ Histosol	(A1) pipedon (A2)			lue Belov <b>RA 149B</b> )	v Surface	(S8) ( <b>LR</b> F	RR,		Muck (A10) ( <b>LRR K, L, MLRA 149B</b> ) Prairie Redox (A16) ( <b>LRR K, L, R</b> )
_ Histic Ep _ Black His				,		RR R, MI	LRA 149B)		Mucky Peat or Peat (S3) ( <b>LRR K, L, R</b> )
Hydroge	n Sulfide (A4)		Loamy	Mucky M	lineral (F1	) (LRR K		Dark S	Surface (S7) (LRR K, L)
	d Layers (A5) d Below Dark Surface	- (A11)	Loamy _/ Deplet		Matrix (F2)			-	alue Below Surface (S8) (LRR K, L)
	ark Surface (A12)	; (A11)			face (F6)				oark Surface (S9) ( <b>LRR K, L</b> ) langanese Masses (F12) ( <b>LRR K, L, R</b>
_ Sandy M	lucky Mineral (S1)		Deplet	ed Dark S	Surface (F	7)			ont Floodplain Soils (F19) (MLRA 149)
	Gleyed Matrix (S4)		Redox	Depressi	ions (F8)				Spodic (TA6) (MLRA 144A, 145, 149E
	Redox (S5) Matrix (S6)								arent Material (F21) Shallow Dark Surface (TF12)
	rface (S7) ( <b>LRR R, M</b>	ILRA 149	<b>B</b> )						(Explain in Remarks)
dicators of	F by draphytic vegetet	بير امجم جما	atland budga	la av musa	t ha proce	nt unland	diaturbad	ar problemeti	_
	f hydrophytic vegetat  Layer (if observed):		elianu nyuro	logy mus	t be prese	iii, uiiles	s disturbed	or probleman	U.
Type:	, ,								
Depth (inc	ches):							Hydric Soil	Present? Yes No
	, <u> </u>								

Project/Site: Riverbend	City/County: Sanilac County Sampling Date: 2022-04-11
	State: Michigan Sampling Point: WL DD5
Investigator(s): K. Yantz, D. Nigro -Atwell, LLC	
	Local relief (concave, convex, none): Concave Slope (%): 3-7
•	766 Long: <u>-82.809126</u> Datum: <u>WGS84</u>
	slopes, slightly eroded NWI classification: NO
Are climatic / hydrologic conditions on the site typical for this time of	
	intly disturbed? Are "Normal Circumstances" present? Yes ✓ No
	/ problematic? (If needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map show	ing sampling point locations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes ✓ No	Is the Sampled Area
Hydric Soil Present? Yes ✓ No	within a Wetland? Yes No
Wetland Hydrology Present? Yes ✓ No	
Remarks: (Explain alternative procedures here or in a separate r	eport.)
Large PEM wetland	
HYDROLOGY	
Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that app	oly) Surface Soil Cracks (B6)
✓ Surface Water (A1) ✓ Water-Stair	ned Leaves (B9) Drainage Patterns (B10)
<u>✓</u> High Water Table (A2) <u>✓</u> Aquatic Fat	una (B13) Moss Trim Lines (B16)
Marl Depos	its (B15) Dry-Season Water Table (C2)
Water Marks (B1) Hydrogen S	Sulfide Odor (C1) Crayfish Burrows (C8)
Sediment Deposits (B2) Oxidized R	hizospheres on Living Roots (C3) Saturation Visible on Aerial Imagery (C9)
Drift Deposits (B3) Presence o	f Reduced Iron (C4) Stunted or Stressed Plants (D1)
Algal Mat or Crust (B4) Recent Iron	Reduction in Tilled Soils (C6) Geomorphic Position (D2)
Iron Deposits (B5) Thin Muck	Surface (C7) Shallow Aquitard (D3)
Inundation Visible on Aerial Imagery (B7) Other (Expl	ain in Remarks) Microtopographic Relief (D4)
✓ Sparsely Vegetated Concave Surface (B8)	FAC-Neutral Test (D5)
Field Observations:	
Surface Water Present? Yes _ ✓ No Depth (inc	
Water Table Present? Yes <u>√</u> No Depth (inc	
Saturation Present? Yes _ ✓ No Depth (inc (includes capillary fringe)	hes): <u>0</u> Wetland Hydrology Present? Yes✓ No
Describe Recorded Data (stream gauge, monitoring well, aerial p	hotos, previous inspections), if available:
Remarks:	
Nomano.	

7. 0	Absolute	Dominant		Dominance Test worksheet:
Tree Stratum (Plot size: 30 )		Species?		Number of Dominant Species
1. Populus deltoides		<u>Y</u>	<u>FAC</u>	That Are OBL, FACW, or FAC:4 (A)
2. <u>Fraxinus pennsylvanica</u>				Total Number of Dominant
3				Species Across All Strata:4 (B)
4				Percent of Dominant Species
5				That Are OBL, FACW, or FAC:
6				Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
	15	= Total Cov	/er	OBL species <u>20.00</u> x 1 = <u>20.00</u>
Sapling/Shrub Stratum (Plot size: 15 )				FACW species <u>45.00</u> x 2 = <u>90.00</u>
1				FAC species <u>10.00</u> x 3 = <u>30.00</u>
2				FACU species 0.00 x 4 = 0.00
3				UPL species <u>0.00</u> x 5 = <u>0.00</u>
4				Column Totals: <u>75.00</u> (A) <u>140.00</u> (B)
5.				Prevalence Index = B/A = <u>1.87</u>
6.				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
		= Total Cov	/er	
Herb Stratum (Plot size:5)		- 10tai 00t	701	3 - Prevalence Index is ≤3.0¹
1. Phalaris arundinacea	40	V	FACW	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
2. Carex lacustris				Problematic Hydrophytic Vegetation¹ (Explain)
				residing ryaleshiya regelation (Explain)
3				<sup>1</sup> Indicators of hydric soil and wetland hydrology must
4				be present, unless disturbed or problematic.
5				Definitions of Vegetation Strata:
6				Tree – Woody plants 3 in. (7.6 cm) or more in diameter
7				at breast height (DBH), regardless of height.
8				Sapling/shrub – Woody plants less than 3 in. DBH
9				and greater than or equal to 3.28 ft (1 m) tall.
10				Herb – All herbaceous (non-woody) plants, regardless
11				of size, and woody plants less than 3.28 ft tall.
12				Woody vines – All woody vines greater than 3.28 ft in height.
	60	= Total Cov	/er	neight.
Woody Vine Stratum (Plot size:)				
1				
2				
3				Hydrophytic
4				Vegetation Present? Yes ✓ No
	0	= Total Cov	/er	riesent: ies <u>v</u> No
Remarks: (Include photo numbers here or on a separate	sheet.)			

inches)	Matrix Color (moist)	%	Color (m		x Features	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Domarka
U 10					<u>%</u>				Remarks  Draminant raday
0-16	10YR 5/2	_/U_	5YR	5/4	30	C	M	CL	Prominent redox.
					·				
							·		
	-				-				
					-		·		
	- <u></u> -								
	oncentration, D=Depl	etion, RM	=Reduced M	latrix, MS	S=Masked	Sand Gra	ains.	<sup>2</sup> Location	n: PL=Pore Lining, M=Matrix.
	Indicators:								for Problematic Hydric Soils <sup>3</sup> :
_ Histosol	(A1) pipedon (A2)			lue Belov <b>RA 149B</b> )	v Surface	(S8) ( <b>LR</b> F	RR,		Muck (A10) ( <b>LRR K, L, MLRA 149B</b> ) Prairie Redox (A16) ( <b>LRR K, L, R</b> )
_ Histic Ep _ Black His				,		RR R, MI	LRA 149B)		Mucky Peat or Peat (S3) ( <b>LRR K, L, R</b> )
Hydroge	n Sulfide (A4)		Loamy	Mucky M	lineral (F1	) (LRR K		Dark S	Surface (S7) (LRR K, L)
	d Layers (A5) d Below Dark Surface	- (A11)	Loamy _/ Deplet		Matrix (F2)			-	alue Below Surface (S8) (LRR K, L)
	ark Surface (A12)	; (A11)			face (F6)				oark Surface (S9) ( <b>LRR K, L</b> ) langanese Masses (F12) ( <b>LRR K, L, R</b>
_ Sandy M	lucky Mineral (S1)		Deplet	ed Dark S	Surface (F	7)			ont Floodplain Soils (F19) (MLRA 149)
	Gleyed Matrix (S4)		Redox	Depressi	ions (F8)				Spodic (TA6) (MLRA 144A, 145, 149E
	Redox (S5) Matrix (S6)								arent Material (F21) Shallow Dark Surface (TF12)
	rface (S7) ( <b>LRR R, M</b>	ILRA 149	<b>B</b> )						(Explain in Remarks)
dicators of	F by draphytic vegetet	بير امجم جما	atland budga	la av musa	t ha proce	nt unland	diaturbad	ar problemeti	_
	f hydrophytic vegetat  Layer (if observed):		elianu nyuro	logy mus	t be prese	iii, uiiles	s disturbed	or probleman	U.
Type:	, ,								
Depth (inc	ches):							Hydric Soil	Present? Yes No
	, <u> </u>								

Project/Site: Riverbend		City/C	County: Sanilac	County	Sampling Date: 2022-04-1
				•	an Sampling Point: WL DD6
Investigator(s): K. Yantz, [					
	-				Slope (%): <u>3-7</u>
	•				Datum: WGS84
Soil Map Unit Name: Marlet					
Are climatic / hydrologic condition		•			
					present? Yes _ ✓ No
_		-			
Are Vegetation, Soil					
SUMMARY OF FINDING	S – Attach site	e map showing san	npling point loc	ations, transects	s, important features, etc.
Hydrophytic Vegetation Prese	nt? Yes	✓ No	Is the Sampled A	rea	
Hydric Soil Present?		✓ No	within a Wetland?	? Yes <u>√</u>	No
Wetland Hydrology Present?	Yes	✓ No	If yes, optional We	tland Site ID:	
Remarks: (Explain alternative	procedures here o	r in a separate report.)			
Small OW wetland					
HYDROLOGY					
Wetland Hydrology Indicato	rs:			Secondary Indic	ators (minimum of two required)
Primary Indicators (minimum o		heck all that apply)		Surface Soil	l Cracks (B6)
✓ Surface Water (A1)		✓ Water-Stained Leave	es (B9)	Drainage Pa	
✓ High Water Table (A2)		Aquatic Fauna (B13)		✓ Moss Trim L	
✓ Saturation (A3)		Marl Deposits (B15)		Dry-Season	Water Table (C2)
Water Marks (B1)		Hydrogen Sulfide Od		Crayfish Bur	
Sediment Deposits (B2)		Oxidized Rhizosphere			/isible on Aerial Imagery (C9)
Drift Deposits (B3)		Presence of Reduced			Stressed Plants (D1)
Algal Mat or Crust (B4)		Recent Iron Reduction			
Iron Deposits (B5)		Thin Muck Surface (0		Shallow Aqu	
Inundation Visible on Aeri		Other (Explain in Rer	narks)		raphic Relief (D4)
Sparsely Vegetated Cond Field Observations:	ave Surrace (B8)			FAC-Neutra	I Test (D5)
Surface Water Present?	Yes / No	Depth (inches): 12	,		
Water Table Present?		Depth (inches): 0			
Saturation Present?		Depth (inches): 0	Wetla	and Hydrology Prese	nt? Yes ✓ No
(includes capillary fringe)					
Describe Recorded Data (stre	am gauge, monitori	ing well, aerial photos, pre	vious inspections), i	f available:	
Remarks:					

<b>VEGETATION</b> – Use scientific names of plants.				Sampling Point: WL DD6
Tree Stratum (Plot size: 30 )		Dominant Species?		Dominance Test worksheet:
1. Fraxinus pennsylvanica				Number of Dominant Species That Are OBL, FACW, or FAC:3(A)
Ulmus americana				
3.				Total Number of Dominant Species Across All Strata:3(B)
4.				Percent of Dominant Species
5				That Are OBL, FACW, or FAC:
6				Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
	10	= Total Cov	/er	OBL species <u>0.00</u> x 1 = <u>0.00</u>
Sapling/Shrub Stratum (Plot size: 15 )				FACW species 10.00 x 2 = 20.00
1. Carpinus caroliniana				FAC species 10.00 x 3 = 30.00 FACU species 0.00 x 4 = 0.00
2				UPL species <u>0.00</u> x 5 = <u>0.00</u>
3				Column Totals: <u>20.00</u> (A) <u>50.00</u> (B)
4				Prevalence Index = B/A = 2.5
5				Hydrophytic Vegetation Indicators:
6				1 - Rapid Test for Hydrophytic Vegetation
7		= Total Cov		∠ 2 - Dominance Test is >50%
Herb Stratum (Plot size:5)		- Total Ook	701	3 - Prevalence Index is ≤3.0 <sup>1</sup>
1				4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
2.				Problematic Hydrophytic Vegetation¹ (Explain)
3.				1
4				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5				Definitions of Vegetation Strata:
6				Tree – Woody plants 3 in. (7.6 cm) or more in diameter
7				at breast height (DBH), regardless of height.
8				Sapling/shrub – Woody plants less than 3 in. DBH
				and greater than or equal to 3.28 ft (1 m) tall.
10.				<b>Herb</b> – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
11 12.				Woody vines – All woody vines greater than 3.28 ft in
12.		= Total Cov	/er	height.
Woody Vine Stratum (Plot size: 30 )		rotal oot		
1				
2				
3				Hydrophytic
4				Vegetation Present? Yes ✓ No
	0	= Total Cov	/er	100
Remarks: (Include photo numbers here or on a separate s	sheet.)			

inches)	Matrix Color (moist)	%	Color (m		x Features	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Domarka
U 10					<u>%</u>				Remarks  Draminant raday
0-16	10YR 5/2	_/U_	5YR	5/4	30	C	M	CL	Prominent redox.
					·				
							·		
	-				-				
					-		-		
	- <u></u> -								
	oncentration, D=Depl	etion, RM	=Reduced M	latrix, MS	S=Masked	Sand Gra	ains.	<sup>2</sup> Location	n: PL=Pore Lining, M=Matrix.
	Indicators:								for Problematic Hydric Soils <sup>3</sup> :
_ Histosol	(A1) pipedon (A2)			lue Belov <b>RA 149B</b> )	v Surface	(S8) ( <b>LR</b> F	RR,		Muck (A10) ( <b>LRR K, L, MLRA 149B</b> ) Prairie Redox (A16) ( <b>LRR K, L, R</b> )
_ Histic Ep _ Black His				,		RR R, MI	LRA 149B)		Mucky Peat or Peat (S3) ( <b>LRR K, L, R</b> )
Hydroge	n Sulfide (A4)		Loamy	Mucky M	lineral (F1	) (LRR K		Dark S	Surface (S7) (LRR K, L)
	d Layers (A5) d Below Dark Surface	- (A11)	Loamy _/ Deplet		Matrix (F2)			-	alue Below Surface (S8) (LRR K, L)
	ark Surface (A12)	; (A11)			face (F6)				oark Surface (S9) ( <b>LRR K, L</b> ) langanese Masses (F12) ( <b>LRR K, L, R</b>
_ Sandy M	lucky Mineral (S1)		Deplet	ed Dark S	Surface (F	7)			ont Floodplain Soils (F19) (MLRA 149)
	Gleyed Matrix (S4)		Redox	Depressi	ions (F8)				Spodic (TA6) (MLRA 144A, 145, 149E
	Redox (S5) Matrix (S6)								arent Material (F21) Shallow Dark Surface (TF12)
	rface (S7) ( <b>LRR R, M</b>	ILRA 149	<b>B</b> )						(Explain in Remarks)
dicators of	F by draphytic vegetet	بير امجم جما	atland budga	la av musa	t ha proce	nt unland	diaturbad	ar problemeti	_
	f hydrophytic vegetat  Layer (if observed):		elianu nyuro	logy mus	t be prese	iii, uiiles	s disturbed	or probleman	U.
Type:	, ,								
Depth (inc	ches):							Hydric Soil	Present? Yes No
	, <u> </u>								

Project/Site: Riverbend		City/C	County: Sanilac C	County	_ Sampling Date: <u>2022-04-1</u>
Applicant/Owner: Liberty				•	an Sampling Point: WL DD7
Investigator(s): K. Yantz, [				_	· -
	•				Slope (%): <u>0-2</u>
	•				Datum: WGS84
Soil Map Unit Name: Marlet					
Are climatic / hydrologic condition		•			
					present? Yes _ ✓ No
Are Vegetation, Soil					
-	-				
SUMMARY OF FINDING	S – Attach sit	e map showing san	npling point loca	ations, transects	s, important features, etc.
Hydrophytic Vegetation Prese	nt? Yes	✓ No	Is the Sampled Are		
Hydric Soil Present?		✓ No	within a Wetland?	Yes <u>√</u>	No
Wetland Hydrology Present?		✓ No	If yes, optional Wet	land Site ID:	
Remarks: (Explain alternative PSS wetland	procedures here of	or in a separate report.)			
PSS Welland					
HYDROLOGY					
Wetland Hydrology Indicato	rs:			Secondary Indic	ators (minimum of two required)
Primary Indicators (minimum o	of one is required; o	check all that apply)		Surface Soil	l Cracks (B6)
✓ Surface Water (A1)		✓ Water-Stained Leave	es (B9)	Drainage Pa	atterns (B10)
✓ High Water Table (A2)		Aquatic Fauna (B13)		Moss Trim L	
✓ Saturation (A3)		Marl Deposits (B15)		-	Water Table (C2)
Water Marks (B1)		Hydrogen Sulfide Od		_∠ Crayfish Bu	
Sediment Deposits (B2)		Oxidized Rhizospher			/isible on Aerial Imagery (C9)
Drift Deposits (B3)		Presence of Reduced			Stressed Plants (D1)
Algal Mat or Crust (B4)		Recent Iron Reduction			
Iron Deposits (B5)	(5.7)	Thin Muck Surface (0		Shallow Aqu	
Inundation Visible on Aeri	,	Other (Explain in Rer	marks)		raphic Relief (D4)
Sparsely Vegetated Conc Field Observations:	ave Surface (B8)			FAC-Neutra	al Test (D5)
Surface Water Present?	Yes ✓ No	Depth (inches): 12	1		
Water Table Present?		Depth (inches): 0			
Saturation Present?		Depth (inches): 0	Wetlar	nd Hydrology Prese	nt? Yes ✓ No
(includes capillary fringe)		, _			
Describe Recorded Data (stre	am gauge, monitor	ing well, aerial photos, pre	evious inspections), if	available:	
Remarks:					

<b>VEGETATION</b> – Use scientific names of plants.				Sampling Point: WL DD7
Tree Stratum (Plot size: 30 )	Absolute			Dominance Test worksheet:
1. Populus deltoides		Species?		Number of Dominant Species
Fraxinus pennsylvanica		Y	FACW	That Are OBL, FACW, or FAC:5(A)
3. <u>Ulmus americana</u>				Total Number of Dominant Species Across All Strata:5(B)
4.				
5				Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)
6				Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
	20	= Total Cov	/er	OBL species <u>70.00</u> x 1 = <u>70.00</u>
Sapling/Shrub Stratum (Plot size:)				FACW species 40.00 x 2 = 80.00
<u>Cephalanthus occidentalis</u>	_70_	Y	OBL	FAC species 10.00 x 3 = 30.00
2				FACU species 0.00 x 4 = 0.00 UPL species 0.00 x 5 = 0.00
3				Column Totals: 120.00 (A) 180.00 (B)
4				
5				Prevalence Index = B/A = 1.5
6				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
	70	= Total Cov	/er	2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0¹
Herb Stratum (Plot size:)				4 - Morphological Adaptations <sup>1</sup> (Provide supporting
1. Phalaris arundinacea	30	<u>Y</u>	<u>FACW</u>	data in Remarks or on a separate sheet)
2				Problematic Hydrophytic Vegetation¹ (Explain)
3				<sup>1</sup> Indicators of hydric soil and wetland hydrology must
4				be present, unless disturbed or problematic.
5				Definitions of Vegetation Strata:
6				Tree – Woody plants 3 in. (7.6 cm) or more in diameter
7				at breast height (DBH), regardless of height.
8 9.				Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.
10				Herb – All herbaceous (non-woody) plants, regardless
11.				of size, and woody plants less than 3.28 ft tall.
12				Woody vines – All woody vines greater than 3.28 ft in
	30	= Total Cov	/er	height.
Woody Vine Stratum (Plot size:)				
1				
2				
3				Hydrophytic
4				Vegetation Present? Yes No
		= Total Cov	/er	
Remarks: (Include photo numbers here or on a separate s	heet.)			

(inches)	Matrix Color (moist)	%	Color (r		x Features	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
0.40	<del></del>								
) <u>-16</u>	10YR 5/2	_80_	5YR	5/4	20	C	M	CL	Prominent redox.
		. ——			. ———				
								_	-
			-						
	oncentration, D=Dep	letion, RM	=Reduced N	Matrix, MS	S=Masked	Sand Gra	ains.	<sup>2</sup> Location	n: PL=Pore Lining, M=Matrix.
	ndicators:		Dahaa	de Balan	0	(00) (LDI			for Problematic Hydric Soils <sup>3</sup> :
Histosol Histic En	(A1) pipedon (A2)			alue Belov RA 149B)	v Surface	(S8) (LRI	κκ,		Muck (A10) ( <b>LRR K, L, MLRA 149B</b> ) Prairie Redox (A16) ( <b>LRR K, L, R</b> )
Black His				,		RR R, M	RA 149B)	5 cm l	Mucky Peat or Peat (S3) (LRR K, L, R
	n Sulfide (A4)				/lineral (F1		, L)		Surface (S7) ( <b>LRR K, L</b> )
	Layers (A5)	- (011)			Matrix (F2)	)		-	alue Below Surface (S8) (LRR K, L)
	d Below Dark Surface ark Surface (A12)	e (ATT)	Deplet		face (F6)				Dark Surface (S9) ( <b>LRR K, L</b> ) langanese Masses (F12) ( <b>LRR K, L, R</b>
	lucky Mineral (S1)				Surface (F	7)			nont Floodplain Soils (F19) (MLRA 149
-	leyed Matrix (S4)			Depress		,			Spodic (TA6) (MLRA 144A, 145, 149E
	edox (S5)								Parent Material (F21)
	Matrix (S6)	AI DA 140	D)						Shallow Dark Surface (TF12)
_ Dark Sur	rface (S7) ( <b>LRR R, N</b>	ILKA 149	<b>D</b> )					Other	(Explain in Remarks)
			etland hydro	ology mus	t be prese	nt, unless	disturbed	or problemati	C.
	hydrophytic vegetat								
strictive L	hydrophytic vegetat ayer (if observed):								
strictive L Type:	_ayer (if observed):							Hardela Call	I D N
strictive L Type: Depth (inc	_ayer (if observed):							Hydric Soil	Present? Yes No
strictive L Type: Depth (inc	_ayer (if observed):							Hydric Soil	I Present? Yes No
strictive L Type: Depth (inc	_ayer (if observed):							Hydric Soil	I Present? Yes No
strictive L Type: Depth (inc	_ayer (if observed):							Hydric Soil	I Present? Yes <u>√</u> No
strictive L Type: Depth (inc	_ayer (if observed):							Hydric Soil	I Present? Yes <u>√</u> No
strictive L Type: Depth (inc	_ayer (if observed):							Hydric Soil	I Present? Yes <u>√</u> No
strictive L Type: Depth (inc	_ayer (if observed):		<u> </u>					Hydric Soil	I Present? Yes <u>√</u> No
strictive L Type: Depth (inc	_ayer (if observed):							Hydric Soil	I Present? Yes <u>√</u> No
strictive L Type: Depth (inc	_ayer (if observed):							Hydric Soil	I Present? Yes <u>√</u> No
strictive L Type: Depth (inc	_ayer (if observed):							Hydric Soil	I Present? Yes <u>√</u> No
estrictive L Type: Depth (inc	_ayer (if observed):							Hydric Soil	I Present? Yes <u>√</u> No
estrictive L Type: Depth (inc	_ayer (if observed):							Hydric Soil	I Present? Yes <u>√</u> No
estrictive L Type:	_ayer (if observed):							Hydric Soil	I Present? Yes <u>√</u> No
estrictive L Type: Depth (inc	_ayer (if observed):							Hydric Soil	I Present? Yes <u>√</u> No
strictive L Type: Depth (inc	_ayer (if observed):							Hydric Soil	I Present? Yes ✓ No
estrictive L Type: Depth (inc	_ayer (if observed):							Hydric Soil	I Present? Yes <u>√</u> No

Project/Site: Riverbend	City/C	ounty: Sanilac Cou	ıntv s	ampling Date: 2022-04-1		
Applicant/Owner: Liberty			•	Sampling Point: WL DD8		
Investigator(s): K. Yantz, D. Nigro -Atwell			_	· -		
Landform (hillslope, terrace, etc.): Depression						
Subregion (LRR or MLRA): LRR L, MLRA 98 La						
Soil Map Unit Name: Conover loam, 0 to 3						
Are climatic / hydrologic conditions on the site typical						
Are Vegetation, Soil, or Hydrology	✓ significantly disturb	bed? Are "Normal	Circumstances" pres	sent? Yes✓ No		
Are Vegetation, Soil, or Hydrology	naturally problema	tic? (If needed, e	xplain any answers i	in Remarks.)		
SUMMARY OF FINDINGS - Attach site r	map showing sam	pling point locatio	ns, transects, i	mportant features, etc.		
Hydrophytic Vegetation Present? Yes✓	No	Is the Sampled Area				
	No	within a Wetland?	Yes <u>√</u>	No		
Wetland Hydrology Present? Yes✓		If yes, optional Wetland	Site ID:			
Remarks: (Explain alternative procedures here or in		n you, optional trolland	<u> </u>			
Man made open water wetland						
·						
HYDROLOGY						
Wetland Hydrology Indicators:			Secondary Indicator	rs (minimum of two required)		
Primary Indicators (minimum of one is required; cher	ck all that apply)		Surface Soil Cra	acks (B6)		
✓ Surface Water (A1)	_ Water-Stained Leaves	s (B9)	Drainage Patter	rns (B10)		
High Water Table (A2)	_ Aquatic Fauna (B13)		Moss Trim Lines (B16)			
Saturation (A3)	Marl Deposits (B15)		Dry-Season Water Table (C2)			
	_ Hydrogen Sulfide Odd	or (C1)	Crayfish Burrow	vs (C8)		
	Oxidized Rhizosphere	-		ole on Aerial Imagery (C9)		
_ · · · · _	Presence of Reduced	, ,	✓ Stunted or Stress			
	Recent Iron Reduction		✓ Geomorphic Po			
	_ Thin Muck Surface (C		Shallow Aquitard (D3)			
	_ Other (Explain in Rem	,	Microtopographic Relief (D4) _/ FAC-Neutral Test (D5)			
✓ Sparsely Vegetated Concave Surface (B8)			FAC-Neutral Te	est (D5)		
Field Observations:	Double (inches), 10					
	Depth (inches): 48 Depth (inches): 0					
	Depth (inches): <u>0</u> Depth (inches): <u>0</u>	Wetlend U	ydrology Present?	Vac / Na		
(includes capillary fringe)	Depth (inches). <u>U</u>	welland n	yarology Present?	Yes No		
Describe Recorded Data (stream gauge, monitoring	well, aerial photos, prev	vious inspections), if avai	lable:			
Remarks:						
Temane.						
1						

EGETATION – Use scientific names of plants.		Dominant Indicator	Sampling Point: WL DD8
ree Stratum (Plot size:)		Species? Status	Dominance Test worksheet:
-		·	Number of Dominant Species That Are OBL, FACW, or FAC:1 (A)
			Total Number of Dominant
			Species Across All Strata:1 (B)
			Percent of Dominant Species
			That Are OBL, FACW, or FAC: 100.00 (A/B)
			Prevalence Index worksheet:
			Total % Cover of: Multiply by:
	_	= Total Cover	OBL species 0.00 x 1 = 0.00
Sapling/Shrub Stratum (Plot size:15)			FACW species 30.00 x 2 = 60.00
			FAC species <u>0.00</u> x 3 = <u>0.00</u>
			FACU species <u>0.00</u> x 4 = <u>0.00</u>
			UPL species $0.00 \times 5 = 0.00$
:			Column Totals: <u>30.00</u> (A) <u>60.00</u> (B)
			Prevalence Index = B/A = 2.0
			Hydrophytic Vegetation Indicators:
			✓ 1 - Rapid Test for Hydrophytic Vegetation
	_	= Total Cover	∠ 2 - Dominance Test is >50%
Herb Stratum (Plot size:5)			✓ 3 - Prevalence Index is ≤3.0 <sup>1</sup>
Phalaris arundinacea	30	Y FACW	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
			Problematic Hydrophytic Vegetation¹ (Explain)
			<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
			Definitions of Vegetation Strata:
5.			
	-		<b>Tree</b> – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
			Sapling/shrub – Woody plants less than 3 in. DBH
			and greater than or equal to 3.28 ft (1 m) tall.
0			Herb – All herbaceous (non-woody) plants, regardless
1			of size, and woody plants less than 3.28 ft tall.
2.			Woody vines – All woody vines greater than 3.28 ft in
		= Total Cover	height.
Voody Vine Stratum (Plot size: 30 )			
			Hydrophytic
·			Hydrophytic Vegetation
·	_	= Total Cover	Present? Yes No

(inches)	Matrix Color (moist)	%	Color (r		x Features	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
0.40	<del></del>								
) <u>-16</u>	10YR 5/2	_80_	5YR	5/4	20	C	M	CL	Prominent redox.
		. ——			. ———				
								_	-
			-						
	oncentration, D=Dep	letion, RM	=Reduced N	Matrix, MS	S=Masked	Sand Gra	ains.	<sup>2</sup> Location	n: PL=Pore Lining, M=Matrix.
	ndicators:		Dahaa	de Balan	0	(00) (LDI			for Problematic Hydric Soils <sup>3</sup> :
Histosol Histic En	(A1) pipedon (A2)			alue Belov RA 149B)	v Surface	(S8) (LRI	κκ,		Muck (A10) ( <b>LRR K, L, MLRA 149B</b> ) Prairie Redox (A16) ( <b>LRR K, L, R</b> )
Black His				,		RR R, M	RA 149B)	5 cm l	Mucky Peat or Peat (S3) (LRR K, L, R
	n Sulfide (A4)				/lineral (F1		, L)		Surface (S7) ( <b>LRR K, L</b> )
	Layers (A5)	- (011)			Matrix (F2)	)		-	alue Below Surface (S8) (LRR K, L)
	d Below Dark Surface ark Surface (A12)	e (ATT)	Deplet		face (F6)				Dark Surface (S9) ( <b>LRR K, L</b> ) langanese Masses (F12) ( <b>LRR K, L, R</b>
	lucky Mineral (S1)				Surface (F	7)			nont Floodplain Soils (F19) (MLRA 149
-	leyed Matrix (S4)			Depress		,			Spodic (TA6) (MLRA 144A, 145, 149E
	edox (S5)								Parent Material (F21)
	Matrix (S6)	AI DA 140	D)						Shallow Dark Surface (TF12)
_ Dark Sur	rface (S7) ( <b>LRR R, N</b>	ILKA 149	<b>D</b> )					Other	(Explain in Remarks)
			etland hydro	ology mus	t be prese	nt, unless	disturbed	or problemati	C.
	hydrophytic vegetat								
strictive L	hydrophytic vegetat ayer (if observed):								
strictive L Type:	_ayer (if observed):							Hardela Oat	I D N
strictive L Type: Depth (inc	_ayer (if observed):							Hydric Soil	Present? Yes No
strictive L Type: Depth (inc	_ayer (if observed):							Hydric Soil	I Present? Yes No
strictive L Type: Depth (inc	_ayer (if observed):							Hydric Soil	I Present? Yes No
strictive L Type: Depth (inc	_ayer (if observed):							Hydric Soil	I Present? Yes <u>√</u> No
strictive L Type: Depth (inc	_ayer (if observed):							Hydric Soil	I Present? Yes <u>√</u> No
strictive L Type: Depth (inc	_ayer (if observed):							Hydric Soil	I Present? Yes <u>√</u> No
strictive L Type: Depth (inc	_ayer (if observed):		<u> </u>					Hydric Soil	I Present? Yes <u>√</u> No
strictive L Type: Depth (inc	_ayer (if observed):							Hydric Soil	I Present? Yes <u>√</u> No
strictive L Type: Depth (inc	_ayer (if observed):							Hydric Soil	I Present? Yes <u>√</u> No
strictive L Type: Depth (inc	_ayer (if observed):							Hydric Soil	I Present? Yes <u>√</u> No
estrictive L Type: Depth (inc	_ayer (if observed):							Hydric Soil	I Present? Yes <u>√</u> No
estrictive L Type: Depth (inc	_ayer (if observed):							Hydric Soil	I Present? Yes <u>√</u> No
estrictive L Type:	_ayer (if observed):							Hydric Soil	I Present? Yes <u>√</u> No
estrictive L Type: Depth (inc	_ayer (if observed):							Hydric Soil	I Present? Yes <u>√</u> No
strictive L Type: Depth (inc	_ayer (if observed):							Hydric Soil	I Present? Yes ✓ No
estrictive L Type: Depth (inc	_ayer (if observed):							Hydric Soil	I Present? Yes <u>√</u> No

Project/Site: Riverbend		City/C	ounty: Sanilac County	Sampling	Date: 2022-04-11		
Applicant/Owner: Liberty State: Michigan Sampling Point: WL D							
Investigator(s): K. Yantz, [							
Landform (hillslope, terrace, etc	•						
Subregion (LRR or MLRA): LR	•						
Soil Map Unit Name: Conov							
	,				110		
Are climatic / hydrologic condition					, , , , , , , , , , , , , , , , , , ,		
Are Vegetation, Soil							
Are Vegetation, Soil	, or Hydrology _	naturally problema	atic? (If needed, explair	ı any answers in Rema	rks.)		
SUMMARY OF FINDING	S - Attach site	e map showing sam	pling point locations, t	transects, importa	ant features, etc.		
Hydrophytic Vegetation Prese	nt? Yes	√ No	Is the Sampled Area				
Hydric Soil Present?		✓ No	within a Wetland?	Yes No			
Wetland Hydrology Present?		✓ No	If yes, optional Wetland Site I	ID:			
Remarks: (Explain alternative	procedures here or	in a separate report.)					
OW wetland within fi	eld with few t	rees along edge					
HYDROLOGY							
Wetland Hydrology Indicato	rs:		Seco	endary Indicators (minim	num of two required)		
Primary Indicators (minimum o		neck all that apply)		Surface Soil Cracks (B6	· · · · ·		
✓ Surface Water (A1)	-	Water-Stained Leave		Orainage Patterns (B10			
High Water Table (A2)		Aquatic Fauna (B13)		Moss Trim Lines (B16)			
✓ Saturation (A3)	-	Marl Deposits (B15)	[				
Water Marks (B1)	-	Hydrogen Sulfide Ode	or (C1) (	Crayfish Burrows (C8)			
Sediment Deposits (B2)	-	Oxidized Rhizosphere	es on Living Roots (C3) S	Saturation Visible on Ae	erial Imagery (C9)		
Drift Deposits (B3)		Presence of Reduced		Stunted or Stressed Pla			
Algal Mat or Crust (B4)		Recent Iron Reductio		Geomorphic Position (D	)2)		
Iron Deposits (B5)		Thin Muck Surface (C		Shallow Aquitard (D3)			
✓ Inundation Visible on Aeri		Other (Explain in Ren	· —	Microtopographic Relief (D4)			
✓ Sparsely Vegetated Conc	ave Surface (B8)		<u>√</u> ŀ	FAC-Neutral Test (D5)			
Field Observations:	Van ( Na	Danth (inches). A					
Surface Water Present?		Depth (inches): 4					
Water Table Present? Saturation Present?		Depth (inches): <u>0</u> Depth (inches): <u>0</u>		logy Present? Yes	/ No		
(includes capillary fringe)				_	<u> </u>		
Describe Recorded Data (stre	am gauge, monitorir	ng well, aerial photos, pre	vious inspections), if available:	•			
Remarks:							

Sampling	Point:	WL	DD9
eet:			
cies FAC: _	3	_	(A)

Tree Stratum (Plot size:)	% Cover	Species?		Dominance Test worksheet:
1. <u>Salix nigra</u>	10	Y	OBL	Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
2. <u>Ulmus americana</u>	5		FACW	Total Number of Dominant Species Across All Strata: 3 (B)
3				
4.       5.				Percent of Dominant Species That Are OBL, FACW, or FAC:
6				Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
	15	= Total Cov	ver .	OBL species <u>10.00</u> x 1 = <u>10.00</u>
Sapling/Shrub Stratum (Plot size: 15 )				FACW species <u>35.00</u> x 2 = <u>70.00</u>
1				FAC species <u>0.00</u> x 3 = <u>0.00</u>
2				FACU species <u>0.00</u> x 4 = <u>0.00</u> UPL species <u>0.00</u> x 5 = <u>0.00</u>
3				Column Totals: 45.00 (A) 80.00 (B)
4				Prevalence Index = B/A = <u>1.78</u>
5				
6				Hydrophytic Vegetation Indicators:
7				✓ 1 - Rapid Test for Hydrophytic Vegetation     ✓ 2 - Dominance Test is >50%
	0	= Total Cov	er	✓ 3 - Prevalence Index is ≤3.0 <sup>1</sup>
Herb Stratum (Plot size: 5				4 - Morphological Adaptations <sup>1</sup> (Provide supporting
1. <u>Phalaris arundinacea</u>	30	<u>Y</u>	<u>FACW</u>	data in Remarks or on a separate sheet)
2				Problematic Hydrophytic Vegetation¹ (Explain)
3				<sup>1</sup> Indicators of hydric soil and wetland hydrology must
4				be present, unless disturbed or problematic.
5				Definitions of Vegetation Strata:
6				Tree – Woody plants 3 in. (7.6 cm) or more in diameter
7				at breast height (DBH), regardless of height.
8				Sapling/shrub – Woody plants less than 3 in. DBH
9				and greater than or equal to 3.28 ft (1 m) tall.
10				Herb – All herbaceous (non-woody) plants, regardless
11				of size, and woody plants less than 3.28 ft tall.
12				Woody vines – All woody vines greater than 3.28 ft in height.
	30	= Total Cov	er er	g
Woody Vine Stratum (Plot size: 30 )				
1				
2				
3				Hydrophytic
4				Vegetation Present? Yes No
		= Total Cov	er er	
Remarks: (Include photo numbers here or on a separate s	sheet.)			

Depth (inches)	Matrix Color (moist)	%	Color (moist)	ox Features %	Type <sup>1</sup> Loc <sup>2</sup>	Texture	Remarks
0-16	10YR 5/2		5YR 5/4		C M	CL	Prominent redox.
	oncentration, D=Dep Indicators:	letion, RM	I=Reduced Matrix, M	S=Masked Sa	and Grains.		n: PL=Pore Lining, M=Matrix. s for Problematic Hydric Soils <sup>3</sup> :
_ Histosol			Polyvalue Belo		8) ( <b>LRR R</b> ,		Muck (A10) ( <b>LRR K, L, MLRA 149B</b> )
	oipedon (A2) stic (A3)		MLRA 149B	,	R R, MLRA 149E		Prairie Redox (A16) ( <b>LRR K, L, R</b> )  Mucky Peat or Peat (S3) ( <b>LRR K, L, R</b> )
	en Sulfide (A4)		Loamy Mucky	Mineral (F1) (			Surface (S7) ( <b>LRR K, L</b> )
	d Layers (A5)	o (A11)	Loamy Gleyed				alue Below Surface (S8) (LRR K, L)
	d Below Dark Surface ark Surface (A12)	e (ATT)	Depleted Matri Redox Dark Su				Dark Surface (S9) ( <b>LRR K, L</b> ) Manganese Masses (F12) ( <b>LRR K, L, R</b> )
_ Sandy M	Mucky Mineral (S1)		Depleted Dark	Surface (F7)		Piedm	nont Floodplain Soils (F19) ( <b>MLRA 149E</b>
	Gleyed Matrix (S4) Redox (S5)		Redox Depres	sions (F8)			Spodic (TA6) ( <b>MLRA 144A, 145, 149B</b> Parent Material (F21)
-	Matrix (S6)						Shallow Dark Surface (TF12)
	rface (S7) (LRR R, N	/ILRA 149	<b>B</b> )				(Explain in Remarks)
ndicators o	f hydrophytic vegetat	tion and w	etland hydrology mu	st be present	unless disturbed	d or problemat	ic.
	Layer (if observed):						
Type:	ahaa).					Hydric Soi	I Present? Yes/ No
Depth (incention of the contract of the contra	cnes):					Tiyano ool	
illaiks.							

Project/Site: Riverbend		City/0	County: Sanilac Co	unty sa	ampling Date: <u>2022-04-1</u>		
Applicant/Owner: Liberty State: Michigan Sampling Point: WL							
Investigator(s): K. Yantz, [							
Landform (hillslope, terrace, etc	_						
Subregion (LRR or MLRA): LR	•						
Soil Map Unit Name: Marlette							
Are climatic / hydrologic condition	ons on the site typ	ical for this time of year?	/es _ ✓ No	(If no, explain in Rem	arks.)		
Are Vegetation, Soil							
Are Vegetation, Soil		-					
SUMMARY OF FINDING	-						
	- Attach 3i	te map snowing sair			inportant reatures, etc.		
Hydrophytic Vegetation Prese		✓ No	Is the Sampled Area within a Wetland?	Yes <u>√</u>	No		
Hydric Soil Present?		✓ No					
Wetland Hydrology Present?  Remarks: (Explain alternative		✓ No	If yes, optional Wetland	d Site ID:			
PSS depression	procedures here	or in a separate report.)					
1 00 40010331011							
HYDROLOGY				0	(		
Wetland Hydrology Indicato		ala a da a III Ala a Aran anda A		•	s (minimum of two required)		
Primary Indicators (minimum o	of one is required;		<u> </u>	Surface Soil Cra			
✓ Surface Water (A1)		✓ Water-Stained Leave		Drainage Patterns (B10)			
✓ High Water Table (A2)		Aquatic Fauna (B13)		Moss Trim Lines (B16) Dry-Season Water Table (C2)			
✓ Saturation (A3)		Marl Deposits (B15)			i i		
✓ Water Marks (B1)		Hydrogen Sulfide Oc		Crayfish Burrow			
Sediment Deposits (B2)		Oxidized Rhizospher			le on Aerial Imagery (C9)		
Drift Deposits (B3)		Presence of Reduce		Geomorphic Pos	ssed Plants (D1)		
Algal Mat or Crust (B4) Iron Deposits (B5)		Recent Iron Reduction Thin Muck Surface (					
	ial Imagany (P7)						
Inundation Visible on Aeri		Other (Explain in Re	marks)	ks) Microtopographic Relief (D4) FAC-Neutral Test (D5)			
Sparsely Vegetated Conc Field Observations:	ave Surface (Bo)			✓ FAC-Neutral Te	St (Do)		
Surface Water Present?	Ves / No	Depth (inches): <u>12</u>	,				
Water Table Present?		Depth (inches): 0					
Saturation Present?		Depth (inches): 0	Wetland I	Hydrology Present?	Yes ✓ No		
(includes capillary fringe)					163 <u>v</u> NO		
Describe Recorded Data (stre	am gauge, monito	ring well, aerial photos, pre	evious inspections), if ava	ailable:			
Remarks:							
itemarks.							

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?		Dominance Test worksheet:  Number of Dominant Species
1				That Are OBL, FACW, or FAC:4 (A)
2				Total Number of Dominant
3				Species Across All Strata:4 (B)
4				Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)
5				That Are OBL, FACW, or FAC: 100.00 (A/B)
6				Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
	0	= Total Cov	ver	OBL species 90.00 x 1 = 90.00
Sapling/Shrub Stratum (Plot size: 15 )			0.01	FACW species <u>20.00</u> x 2 = <u>40.00</u> FAC species <u>10.00</u> x 3 = <u>30.00</u>
1. Cephalanthus occidentalis			OBL	FACU species 0.00 x4 = 0.00
2. <u>Salix discolor</u>			<u>FACW</u>	UPL species <u>0.00</u> x 5 = <u>0.00</u>
3. <u>Cornus racemosa</u>				Column Totals: 120.00 (A) 160.00 (B)
4				Prevalence Index = B/A = 1.33
6				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
		= Total Cov	ver	2 - Dominance Test is >50%
Herb Stratum (Plot size:5)	100	- Total 00	VCI	3 - Prevalence Index is ≤3.0¹
1. Phalaris arundinacea	10	Υ	FACW	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
Onoclea sensibilis		Y		Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
3.				
4				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5.				
6				Definitions of Vegetation Strata:
7				<b>Tree</b> – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
8				Sapling/shrub – Woody plants less than 3 in. DBH
9				and greater than or equal to 3.28 ft (1 m) tall.
10				Herb – All herbaceous (non-woody) plants, regardless
11				of size, and woody plants less than 3.28 ft tall.
12				Woody vines – All woody vines greater than 3.28 ft in
	15	= Total Cov	ver	height.
Woody Vine Stratum (Plot size:)				
1. <i>Vitis riparia</i>	5	Y	_FAC_	
2				
3				Hydrophytic
4				Vegetation Present? Yes No
		= Total Cov	ver	
Remarks: (Include photo numbers here or on a separate s	sheet.)			

Depth (inches)	Matrix Color (moist)	%	Color (moist)	ox Features %	Type <sup>1</sup> Loc <sup>2</sup>	Texture	Remarks
0-16	10YR 5/2		5YR 5/4		C M	CL	Prominent redox.
						<u> </u>	
							-
						<u> </u>	
						<u> </u>	
						· -	· <u></u>
	oncentration, D=Dep Indicators:	letion, RM	I=Reduced Matrix, N	IS=Masked S	and Grains.		n: PL=Pore Lining, M=Matrix. s for Problematic Hydric Soils <sup>3</sup> :
_ Histosol			Polyvalue Belo		8) ( <b>LRR R</b> ,		Muck (A10) ( <b>LRR K, L, MLRA 149B</b> )
	oipedon (A2) stic (A3)		MLRA 149E	,	R R, MLRA 1491		t Prairie Redox (A16) ( <b>LRR K, L, R</b> ) Mucky Peat or Peat (S3) ( <b>LRR K, L, R</b> )
_ Hydroge	en Sulfide (A4)		Loamy Mucky	Mineral (F1)		Dark	Surface (S7) (LRR K, L)
	d Layers (A5) d Below Dark Surfac	o (A11)	Loamy Gleyed				alue Below Surface (S8) ( <b>LRR K, L</b> )  Dark Surface (S9) ( <b>LRR K, L</b> )
	ark Surface (A12)	e (ATT)	Depleted Matr Redox Dark S				Jark Sunace (39) (LKK K, L) ⁄langanese Masses (F12) (LRR K, L, R)
-	lucky Mineral (S1)		Depleted Dark			Piedm	nont Floodplain Soils (F19) ( <b>MLRA 149E</b>
	Gleyed Matrix (S4) Redox (S5)		Redox Depres	sions (F8)			Spodic (TA6) ( <b>MLRA 144A, 145, 149B</b> Parent Material (F21)
	Matrix (S6)						Shallow Dark Surface (TF12)
	rface (S7) (LRR R, N	/ILRA 149	B)				(Explain in Remarks)
	f hydrophytic vegetat		retland hydrology mu	st be present	, unless disturbe	d or problemat	ic.
	Layer (if observed):						
Type:	ahaa).					Hydric Soi	I Present? Yes No
Depth (incention of the contract of the contra	cnes):		<del></del>			Tiyano oo	11050HC 105 HO
illaiks.							

Project/Site: Riverbend		City/C	county: Sanilac C	ounty	Sampling Date: <u>2022-04-11</u>	
Applicant/Owner: Liberty State: Michigan Sampling Point: WL E						
Investigator(s): K. Yantz, [						
•	•	· ·			Slope (%): <u>0-2</u>	
					Datum: WGS84	
Soil Map Unit Name: Parkhi						
Are climatic / hydrologic condition			•			
					present? Yes No	
Are Vegetation, Soil						
					s, important features, etc.	
SUMMART OF FINDING	5 - Attach site	map showing sam			, important leatures, etc.	
Hydrophytic Vegetation Preser		<u>No</u>	Is the Sampled Are within a Wetland?		No	
Hydric Soil Present?		/ No		·	No	
Wetland Hydrology Present?		/ No	If yes, optional Wetla	and Site ID:		
Remarks: (Explain alternative PEM depression dra	procedures here or ins into adiace	in a separate report.)				
- Livi doprocolori didi	mo mio aajao	on watercourse				
HYDROLOGY						
Wetland Hydrology Indicator	rs:			Secondary Indica	ators (minimum of two required)	
Primary Indicators (minimum c	of one is required; ch	eck all that apply)		Surface Soil	Cracks (B6)	
✓ Surface Water (A1)		Water-Stained Leave		Drainage Patterns (B10)		
<u>✓</u> High Water Table (A2)		Aquatic Fauna (B13)		Moss Trim Lines (B16)		
✓ Saturation (A3)		Marl Deposits (B15)		Dry-Season Water Table (C2)		
Water Marks (B1)		Hydrogen Sulfide Odd		Crayfish Bur		
Sediment Deposits (B2)		Oxidized Rhizosphere	-	·	/isible on Aerial Imagery (C9)	
Drift Deposits (B3)		Presence of Reduced	` '		Stressed Plants (D1)	
Algal Mat or Crust (B4) Iron Deposits (B5)		<ul><li>Recent Iron Reductio</li><li>Thin Muck Surface (C</li></ul>		✓ Geomorphic		
Inundation Visible on Aeri		Other (Explain in Ren	·	Shallow Aquitard (D3) Microtopographic Relief (D4)		
Sparsely Vegetated Conc		Other (Explain in Nen	narks)	Microtopogra		
Field Observations:	ave duriace (Bo)			I AO-Neutral	rest (bo)	
Surface Water Present?	Yes ✓ No	Depth (inches): 1				
Water Table Present?		Depth (inches): 0				
Saturation Present?		Depth (inches): 0	Wetlan	d Hydrology Presei	nt? Yes <u>√</u> No	
(includes capillary fringe)  Describe Recorded Data (stream)	am aguag manitarin	a wall parial photos pro	vious inspections) if a	available:		
Describe Recorded Data (stream	am gauge, monitorin	g well, aerial priolos, pre	vious irispections), ii a	avaliable.		
Remarks:						

Sampling Point:	W/I	FF2
Sambinu Funt.	v v L	-

Tree Stratum (Plot size: 30 )	Absolute % Cover		Indicator Status	Dominance Test worksheet:
1				Number of Dominant Species
2				That Are OBL, FACW, or FAC:1 (A)
				Total Number of Dominant Species Across All Strata:  1 (B)
3				(=)
4				Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)
5				matrus esc, friend, of frie
6				Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
	0	= Total Co	ver	OBL species <u>92.00</u> x 1 = <u>92.00</u>
Sapling/Shrub Stratum (Plot size: 15 )				FACW species <u>8.00</u> x 2 = <u>16.00</u>
1				FACUS procies 0.00 x 3 = 0.00
2				FACU species <u>0.00</u> x 4 = <u>0.00</u> UPL species <u>0.00</u> x 5 = <u>0.00</u>
3				Column Totals: 100.00 (A) 108.00 (B)
4		ē		
5				Prevalence Index = B/A = 1.08
6				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
		= Total Co	ver	∠ 2 - Dominance Test is >50%
Herb Stratum (Plot size:)				3 - Prevalence Index is ≤3.0 <sup>1</sup> 1
1. <u>Calamagrostis canadensis</u>	92	Υ	OBL	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
2. Phalaris arundinacea		N	FACW	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
3. Symphyotrichum lanceolatum			FACW	
. 0	4	N	FACW	<sup>1</sup> Indicators of hydric soil and wetland hydrology must
				be present, unless disturbed or problematic.
5				Definitions of Vegetation Strata:
6				Tree – Woody plants 3 in. (7.6 cm) or more in diameter
7				at breast height (DBH), regardless of height.
8				Sapling/shrub – Woody plants less than 3 in. DBH
9				and greater than or equal to 3.28 ft (1 m) tall.
10				Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
11				
12				Woody vines – All woody vines greater than 3.28 ft in height.
	100 = Total Cover		ver	11-9-11
Woody Vine Stratum (Plot size:)				
1				
2				
3				Hydrophytic
4				Vegetation           Present?         Yes No
	0	= Total Co	ver	163 <u>v</u> 10
Remarks: (Include photo numbers here or on a separate s	sheet.)			

Depth	cription: (Describe Matrix	to the dep	oru ueeded		ment the i ox Features		or confirm	i the absence	oi indicators.)	
(inches)	Color (moist)	%	Color (r		% <u>%</u>	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks	
0-8	10YR 2/2	100						<b>MUCK</b>		
8-16	10YR 5/2	85	10YR	6/4	15	C	M	CL	Distinct redox.	
¹Type: C=C	Concentration, D=De	oletion, RM	=Reduced N	Matrix, M	- ——— S=Masked	Sand Gr	ains.	<sup>2</sup> Location	: PL=Pore Lining, M=Matrix.	
Hydric Soil									for Problematic Hydric Soils <sup>3</sup> :	
Histosol					w Surface	(S8) ( <b>LRI</b>	RR,		Muck (A10) (LRR K, L, MLRA 149B)	
	pipedon (A2) listic (A3)			<b>RA 149B</b> ) Dark Surfa	<i>)</i> ace (S9) ( <b>L</b>	.RR R. MI	LRA 149B		Prairie Redox (A16) ( <b>LRR K, L, R</b> )  Mucky Peat or Peat (S3) ( <b>LRR K, L, R</b> )	
	en Sulfide (A4)				Mineral (F1				Surface (S7) ( <b>LRR K, L</b> )	
	d Layers (A5)				Matrix (F2	)		-	llue Below Surface (S8) ( <b>LRR K, L</b> )	
	d Below Dark Surface	ce (A11)		ted Matrix				Thin Dark Surface (S9) (LRR K, L)		
	ark Surface (A12)				ırface (F6) Surface (F	7)		Iron-Manganese Masses (F12) (LRR K, L, R) Piedmont Floodplain Soils (F19) (MLRA 149B)		
Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Sandy Gleyed Matrix (S4) Redox Depressions (F8)						Mesic Spodic (TA6) (MLRA 144A, 145, 149B)				
Sandy Redox (S5)						Red Parent Material (F21)				
Stripped Matrix (S6)				-	shallow Dark Surface (TF12)					
Dark Su	urface (S7) ( <b>LRR R</b> ,	MLRA 149	<b>B</b> )					Other	(Explain in Remarks)	
<sup>3</sup> Indicators o	of hydrophytic vegeta	ation and w	etland hydro	ology mus	st be prese	ent, unless	disturbed	or problemation	<b>c</b> .	
Restrictive	Layer (if observed)	:								
Type:										
Depth (in	nches):							Hydric Soil	Present? Yes No	
Remarks:								1		

Project/Site: Riverbend Wind City/C	County: Sanilac Sampling Date: 2021-12-14						
	State: Michigan Sampling Point: WL F1						
Investigator(s): K. Yantz, C. LaRiccia-Atwell, LLC Section, Township, Range: sec 26 T009N R014E							
Landform (hillslope, terrace, etc.): Depression Local rel							
Subregion (LRR or MLRA): LRR L, MLRA 99 Lat: 43.182167							
Soil Map Unit Name: Parkhill loam, 0 to 1 percent slopes							
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 distur							
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 No	Is the Sampled Area						
Hydric Soil Present? Yes ✓ No	within a Wetland? Yes <u>√</u> No						
Wetland Hydrology Present? Yes No	If yes, optional Wetland Site ID:						
Remarks: (Explain alternative procedures here or in a separate report.)	in you, optional violatia dito is.						
PEM/PSS/PFO depression.							
Living Con 1 & depression.							
HYDROLOGY							
Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)						
Primary Indicators (minimum of one is required; check all that apply)							
✓ Surface Water (A1)							
High Water Table (A2)  Aquatic Fauna (B13)							
✓ Saturation (A3) Marl Deposits (B15)							
Water Marks (B1) Hydrogen Sulfide Od							
Sediment Deposits (B2)  Oxidized Rhizosphere							
Drift Deposits (B3) Presence of Reduced							
Algal Mat or Crust (B4) Recent Iron Reduction in Tilled Soils (C6) Geomorphic Position (D2							
Iron Deposits (B5) Thin Muck Surface (C							
Inundation Visible on Aerial Imagery (B7) Other (Explain in Rer							
Sparsely Vegetated Concave Surface (B8)	✓ FAC-Neutral Test (D5)						
Field Observations:							
Surface Water Present? Yes _ ✓ No Depth (inches): 1							
Water Table Present? Yes No ✓ Depth (inches):							
Saturation Present? Yes ✓ No Depth (inches): 0	Wetland Hydrology Present? Yes No						
(includes capillary fringe)  Describe Recorded Data (stream gauge, monitoring well, aerial photos, pre	vious inspections) if available:						
besombe recorded bata (stream gauge, monitoring well, actial photos, pre	vious inspections), ii available.						
Remarks:							

(inches)	Matrix Color (moist)	%	Color (moist)	Features  V Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
0.40							Remarks
0-16	10YR 2/1	100				MUCK	
			_				
<u> </u>							
vpe: C=Cc	ncentration. D=Dep	letion. RM=	Reduced Matrix, MS	=Masked Sand G	Frains.	<sup>2</sup> Location:	PL=Pore Lining, M=Matrix.
	ndicators:	,	,				for Problematic Hydric Soils <sup>3</sup> :
Histosol	(A1)		Polyvalue Below	Surface (S8) ( <b>LF</b>	RR R,	_ <pre>∠ 2 cm M</pre>	luck (A10) ( <b>LRR K, L, MLRA 149B</b> )
	ipedon (A2)		MLRA 149B)				Prairie Redox (A16) ( <b>LRR K, L, R</b> )
Black His				ce (S9) ( <b>LRR R, I</b>			lucky Peat or Peat (S3) (LRR K, L, R)
	n Sulfide (A4) Layers (A5)		Loamy Mucky M Loamy Gleyed N	lineral (F1) (LRR	K, L)		urface (S7) ( <b>LRR K, L</b> ) ue Below Surface (S8) ( <b>LRR K, L</b> )
	Below Dark Surfac	e (A11)	Depleted Matrix				ark Surface (S9) (LRR K, L)
	rk Surface (A12)	0 (/ 1.1 /	Redox Dark Sur				anganese Masses (F12) ( <b>LRR K, L, R</b> )
	ucky Mineral (S1)		Depleted Dark S				ont Floodplain Soils (F19) (MLRA 149E
_ Sandy G	leyed Matrix (S4)		Redox Depressi	ons (F8)		Mesic S	Spodic (TA6) ( <b>MLRA 144A, 145, 149B</b>
	edox (S5)						rent Material (F21)
	Matrix (S6)	#L D.A. 4.40D					hallow Dark Surface (TF12)
Dark Sur	face (S7) (LRR R, N	VILKA 149B	)			Other (	Explain in Remarks)
_ Dank Our		tion and we	tland hvdrology must	t be present, unle	ss disturbed	or problematic	
	hydrophytic vegeta						<u>-                                      </u>
ndicators of	hydrophytic vegeta	:					
ndicators of estrictive L	hydrophytic vegeta ayer (if observed):	:					
ndicators of estrictive L Type:	ayer (if observed):	:				Hydric Soil	Present? Yes ✓ No
ndicators of estrictive L Type: Depth (inc	ayer (if observed):		<u> </u>			Hydric Soil	Present? Yes <u>√</u> No
dicators of estrictive L Type: Depth (inc	ayer (if observed):		<u> </u>			Hydric Soil	Present? Yes <u>√</u> No
dicators of strictive L Type:	ayer (if observed):		_			Hydric Soil I	Present? Yes / No
dicators of strictive L Type:	ayer (if observed):	:				Hydric Soil	Present? Yes <u>√</u> No
dicators of strictive L Type:	ayer (if observed):	:				Hydric Soil	Present? Yes <u>√</u> No
dicators of strictive L Type:	ayer (if observed):	:				Hydric Soil I	Present? Yes <u>√</u> No
dicators of estrictive L Type: Depth (inc	ayer (if observed):	:				Hydric Soil I	Present? Yes <u>√</u> No
dicators of strictive L Type:	ayer (if observed):					Hydric Soil	Present? Yes <u>√</u> No
dicators of estrictive L Type: Depth (inc	ayer (if observed):					Hydric Soil	Present? Yes <u>√</u> No
dicators of estrictive L Type: Depth (inc	ayer (if observed):					Hydric Soil	Present? Yes <u>√</u> No
ndicators of estrictive L Type: Depth (inc	ayer (if observed):					Hydric Soil	Present? Yes <u>√</u> No
ndicators of estrictive L Type:	ayer (if observed):					Hydric Soil	Present? Yes <u>√</u> No
ndicators of estrictive L Type: Depth (inc	ayer (if observed):					Hydric Soil	Present? Yes <u>√</u> No
ndicators of estrictive L Type: Depth (inc	ayer (if observed):					Hydric Soil	Present? Yes <u>√</u> No
ndicators of estrictive L Type: Depth (inc	ayer (if observed):					Hydric Soil	Present? Yes <u>√</u> No
ndicators of estrictive L Type: Depth (inc	ayer (if observed):					Hydric Soil	Present? Yes No
dicators of estrictive L Type: Depth (inc	ayer (if observed):					Hydric Soil	Present? Yes No

Project/Site: Riverbend Wind	(	City/County: Sanilac	Samp	ling Date: <u>2021-12-1</u> 4
Applicant/Owner: Liberty Powel	r		State: Michigan San	npling Point: WL F2
Investigator(s): K. Yantz, C. La				
Landform (hillslope, terrace, etc.): De	·			
Subregion (LRR or MLRA): LRR L,	•			
Soil Map Unit Name: Parkhill loa				
Are climatic / hydrologic conditions on				
Are Vegetation, Soil, c				
Are Vegetation, Soil, c				
SUMMARY OF FINDINGS –	Attach site map showing	sampling point lo	cations, transects, impo	ortant features, etc.
Hydrophytic Vegetation Present?	Yes ✓ No	Is the Sampled A	\rea	
Hydric Soil Present?	Yes ✓ No	within a Wetland	!? Yes <u>√</u> No	o
Wetland Hydrology Present?	Yes No	If yes, optional W	etland Site ID:	_
Remarks: (Explain alternative proce	edures here or in a separate report	.)		
PEM/PFO. Forested woo	adot surrounded by ag	ricultural lielus.		
HYDROLOGY				
Wetland Hydrology Indicators:			Secondary Indicators (m	inimum of two required)
Primary Indicators (minimum of one	is required; check all that apply)		Surface Soil Cracks	(B6)
Surface Water (A1)	Water-Stained L		Drainage Patterns (I	B10)
High Water Table (A2)	Aquatic Fauna (l		Moss Trim Lines (B	·
✓ Saturation (A3)	Marl Deposits (B		Dry-Season Water 1	
Water Marks (B1)	Hydrogen Sulfid		Crayfish Burrows (C	·
Sediment Deposits (B2)		pheres on Living Roots		n Aerial Imagery (C9)
Drift Deposits (B3)	Presence of Rec		Stunted or Stressed	· · ·
Algal Mat or Crust (B4) Iron Deposits (B5)	Recent from Red Thin Muck Surfa	uction in Tilled Soils (C6	<ul><li>Geomorphic Position</li><li>Shallow Aquitard (D</li></ul>	
Inundation Visible on Aerial Ima			Microtopographic Re	•
Sparsely Vegetated Concave St		i itemarks)	FAC-Neutral Test (□	` '
Field Observations:	unace (Bo)		<u>√</u> 1 AO-Neutral 1est (E	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
	No _✓ Depth (inches):			
	No ✓ Depth (inches):			
	No Depth (inches):		and Hydrology Present? Ye	es No
(includes capillary fringe)	use monitoring well cariel photos	nraviava inapactiona)	if available:	
Describe Recorded Data (stream ga	uge, monitoring well, aerial photos	s, previous inspections),	ii avaliable:	
Remarks:				

<b>VEGETATION</b> – Use scientific names of plants.				Sampling Point: WL F2
Tree Stratum (Plot size:30)	Absolute % Cover		t Indicator Status	Dominance Test worksheet:
1 <i>Ulmus americana</i>	20	Y	FACW	Number of Dominant Species That Are OBL, FACW, or FAC:6 (A)
2. Acer rubrum	10	Y	FAC	Total Number of Dominant
3. Acer saccharinum	10	Y	<b>FACW</b>	Species Across All Strata: 6 (B)
4. Populus deltoides	5	N	FAC	Percent of Dominant Species
5. Quercus rubra	5	N	FACU	That Are OBL, FACW, or FAC: 100.00 (A/B)
6				Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
	50	= Total Co	over	OBL species <u>10.00</u> x 1 = <u>10.00</u>
Sapling/Shrub Stratum (Plot size:)				FACW species 60.00 x 2 = 120.00
1				FAC species <u>15.00</u> x 3 = <u>45.00</u>
2				FACU species <u>5.00</u> x 4 = <u>20.00</u> UPL species 0.00 x 5 = 0.00
3				Column Totals: 90.00 (A) 195.00 (B)
4				
5				Prevalence Index = B/A = 2.17
6				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
		= Total Co	over	2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0¹
Herb Stratum (Plot size:)				4 - Morphological Adaptations <sup>1</sup> (Provide supporting
1. Phalaris arundinacea				data in Remarks or on a separate sheet)
2. Carex lacustris			OBL	Problematic Hydrophytic Vegetation¹ (Explain)
3. Rubus pubescens	10	Y	FACW	<sup>1</sup> Indicators of hydric soil and wetland hydrology must
4				be present, unless disturbed or problematic.
5				Definitions of Vegetation Strata:
6				Tree – Woody plants 3 in. (7.6 cm) or more in diameter
7				at breast height (DBH), regardless of height.
8				Sapling/shrub – Woody plants less than 3 in. DBH
9		-		and greater than or equal to 3.28 ft (1 m) tall.
10.				<b>Herb</b> – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
11.				Woody vines – All woody vines greater than 3.28 ft in
12		= Total Co		height.
Woody Vine Stratum (Plot size:30)	_40_	- Total Co	ovei	
1				
2				I hadron badio
4				Hydrophytic Vegetation
		= Total Co		Present? Yes ✓ No
Remarks: (Include photo numbers here or on a separate :		10101 00		<u> </u>

Sampling Point: WL F2

inches)	Matrix Color (moist)	%	Color (moist)	x Features %	Type <sup>1</sup> Loc <sup>2</sup>	Texture	Remarks
	•		10YR 4/6	- <u>**</u> - 5	C M		
0-16_	101K 4/Z	95	101K 4/0		C IVI	SL	Prominent redox.
		<del>.</del>					
		<u> </u>					
	-						
	-						
/pe: C=Cc	oncentration, D=Dep	letion, RM	l=Reduced Matrix, M	S=Masked Sa	and Grains.	<sup>2</sup> Location	n: PL=Pore Lining, M=Matrix.
	ndicators:						s for Problematic Hydric Soils <sup>3</sup> :
_ Histosol	(A1) pipedon (A2)		Polyvalue Belo MLRA 149B		8) ( <b>LRR R</b> ,		Muck (A10) ( <b>LRR K, L, MLRA 149B</b> )  Prairie Redox (A16) ( <b>LRR K, L, R</b> )
_ Histic Ep _ Black His				•	R R, MLRA 149E		Mucky Peat or Peat (S3) ( <b>LRR K, L, R</b> )
Hydroge	n Sulfide (A4)		Loamy Mucky I	Mineral (F1) (		Dark	Surface (S7) ( <b>LRR K, L</b> )
	l Layers (A5) l Below Dark Surfac	o (A11)	Loamy Gleyed Depleted Matrix			-	alue Below Surface (S8) (LRR K, L)
	ark Surface (A12)	5 (A11)	Redox Dark Su				Dark Surface (S9) ( <b>LRR K, L</b> ) ⁄langanese Masses (F12) ( <b>LRR K, L, R</b>
_ Sandy M	lucky Mineral (S1)		Depleted Dark	Surface (F7)			nont Floodplain Soils (F19) ( <b>MLRA 149</b>
	leyed Matrix (S4)		Redox Depress	sions (F8)			Spodic (TA6) ( <b>MLRA 144A, 145, 149B</b>
-	edox (S5) Matrix (S6)						Parent Material (F21) Shallow Dark Surface (TF12)
	face (S7) ( <b>LRR R, N</b>	/ILRA 149	<b>B</b> )				(Explain in Remarks)
dicators of	hudranhutia vagatat	tion and u	atland budralagu muu	at ha pragant	unlana diaturba	d ar problemati	
	_ayer (if observed):		etland hydrology mu	st be present	, unless disturbed	or problemati	С.
Type:	,						
Depth (inc	ches):					Hydric Soi	l Present? Yes <u>√</u> No
	/		<del></del>				

Project/Site: Riverbend V	Vind	City/C	County: Sanilac	Sam	pling Date: 2021-12-14
Applicant/Owner: Liberty P	ower			State: Michigan Sa	ampling Point: WL F3
Investigator(s): K. Yantz, 0	C. LaRiccia-A				
Landform (hillslope, terrace, etc		•			
Subregion (LRR or MLRA): LR	•				
Soil Map Unit Name: Parkhi					
Are climatic / hydrologic conditi	•	•			
Are Vegetation, Soil		-			
Are Vegetation, Soil					
SUMMARY OF FINDING	iS – Attach sit	e map showing sam	npling point locat	ions, transects, imp	ortant features, etc.
Hydrophytic Vegetation Prese	ent? Yes	√ No	Is the Sampled Area	1	
Hydric Soil Present?		✓ No	within a Wetland?	Yes <u>√</u> N	10
Wetland Hydrology Present?		✓ No	If yes, optional Wetla	nd Site ID:	
Remarks: (Explain alternative	procedures here o	r in a separate report.)			
PEM. Roadside ditcl	า.				
HYDROLOGY					
Wetland Hydrology Indicato	rs:			Secondary Indicators (r	minimum of two required)
Primary Indicators (minimum	of one is required; c	heck all that apply)		Surface Soil Crack	(s (B6)
Surface Water (A1)		Water-Stained Leave	es (B9)	Drainage Patterns	(B10)
High Water Table (A2)		Aquatic Fauna (B13)		Moss Trim Lines (E	316)
✓ Saturation (A3)		Marl Deposits (B15)		Dry-Season Water	
Water Marks (B1)		Hydrogen Sulfide Od		Crayfish Burrows (	
Sediment Deposits (B2)		Oxidized Rhizosphere	-		on Aerial Imagery (C9)
Drift Deposits (B3)		Presence of Reduced		Stunted or Stresse	
Algal Mat or Crust (B4)		Recent Iron Reduction		✓ Geomorphic Positi	
Iron Deposits (B5)		Thin Muck Surface (C		Shallow Aquitard (	-
Inundation Visible on Aer	,	Other (Explain in Rer	narks)	Microtopographic F	` '
Sparsely Vegetated Cond	:ave Surface (B8)		<u> </u>	FAC-Neutral Test (	(D5)
Surface Water Present?	Vos No	✓ Depth (inches):			
Water Table Present?		✓ Depth (inches):			
Saturation Present?		Depth (inches): 6		I Hydrology Present? \	Vos / No
(includes capillary fringe)					163
Describe Recorded Data (stre	am gauge, monitori	ing well, aerial photos, pre	vious inspections), if a	vailable:	
Remarks:					

Prevalence Index =  Hydrophytic Vegetation  1 - Rapid Test for Hyd  2 - Dominance Test is  3 - Prevalence Index i  4 - Morphological Ada data in Remarks of  Problematic Hydrophy	ties FAC: $2$ (A)  t $2$ (B)  cies FAC: $100.00$ (A/B)  heet:  Multiply by: $x = 0.00$
Number of Dominant Spec That Are OBL, FACW, or F  Total Number of Dominant Species Across All Strata:  Percent of Dominant Spec That Are OBL, FACW, or F  Prevalence Index works!  Total % Cover of:  OBL species 0.00 FACW species 65.00 FACU species 0.00 UPL species 0.00 Column Totals: 65.00  Prevalence Index =  Hydrophytic Vegetation    1 - Rapid Test for Hyd  2 - Dominance Test is  3 - Prevalence Index i  4 - Morphological Ada data in Remarks of Problematic Hydrophy  1 Indicators of hydric soil ar be present, unless disturbe	FAC:
Prevalence Index =  Hydrophytic Vegetation  y 1 - Rapid Test for Hydrophytic User Secured Secure Sec	
Percent of Dominant Spect That Are OBL, FACW, or Factor of Species   Total % Cover of:  OBL species   65.00  FACW species   0.00  FACU species   0.00  UPL species   0.00  Column Totals:   65.00  Prevalence Index =  Hydrophytic Vegetation of Species of S	heet:  Multiply by:  x 1 = 0.00  x 2 = 130.00  x 3 = 0.00  x 4 = 0.00  x 5 = 0.00  D (A) 130.00 (B)  B/A = 2.0  Indicators: drophytic Vegetation  s >50% is ≤3.0¹  aptations¹ (Provide supporting r on a separate sheet) ytic Vegetation¹ (Explain)  and wetland hydrology must
That Are OBL, FACW, or Face Index works In Total % Cover of:  OBL species	heet:  Multiply by:  x 1 = 0.00  x 2 = 130.00  x 3 = 0.00  x 4 = 0.00  x 5 = 0.00  (A) 130.00  (B)  B/A = 2.0  Indicators:  drophytic Vegetation  s > 50%  is ≤3.0¹  aptations¹ (Provide supporting on a separate sheet)  ytic Vegetation¹ (Explain)
Total % Cover of:  OBL species	Multiply by: $x 1 = 0.00$ $x 2 = 130.00$ $x 3 = 0.00$ $x 4 = 0.00$ $x 5 = 0.00$ $x 6 = 0.00$ Magnetic Vegetation $x 6 = 0.00$ Indicators:  Arophytic Vegetation $x 6 = 0.00$ Apptations (Provide supporting on a separate sheet)  Arothytic Vegetation (Explain)
OBL species	x 1 = 0.00 $x 2 = 130.00$ $x 3 = 0.00$ $x 4 = 0.00$ $x 5 = 0.00$ $x 5 = 0.00$ $x 6 = 0.00$ $x 7 = 0.00$ $x$
FACW FAC species 0.00 FACU species 0.00 UPL species 0.00 Column Totals: 65.00 Prevalence Index = Hydrophytic Vegetation I  1 - Rapid Test for Hyd  2 - Dominance Test is  3 - Prevalence Index i  4 - Morphological Ada data in Remarks of Problematic Hydrophy  1 Indicators of hydric soil are be present, unless disturbed	x 3 = 0.00 $x 4 = 0.00$ $x 5 = 0.00$ $x 5 = 0.00$ $x 6 = 0.00$ $x 6 = 0.00$ $x 6 = 0.00$ $x 7 = 0.00$ $x 7$
FACU species 0.00  UPL species 0.00  Column Totals: 65.00  Prevalence Index =  Hydrophytic Vegetation  1 - Rapid Test for Hyd  2 - Dominance Test is  3 - Prevalence Index i  4 - Morphological Ada data in Remarks of Problematic Hydrophy  1 Indicators of hydric soil ar be present, unless disturbed	x = 0.00 $x = 0.00$
UPL species 0.00 Column Totals: 65.00 Prevalence Index =  Hydrophytic Vegetation  1 - Rapid Test for Hyd  2 - Dominance Test is  3 - Prevalence Index i  4 - Morphological Ada data in Remarks of Problematic Hydrophy  1 Indicators of hydric soil ar be present, unless disturbed	x = 0.00 $A = 0.00$
Prevalence Index =  Hydrophytic Vegetation  1 - Rapid Test for Hyd  2 - Dominance Test is  3 - Prevalence Index i  4 - Morphological Ada data in Remarks of  Problematic Hydrophy  Indicators of hydric soil ar be present, unless disturbed	B/A = 2.0  Indicators: drophytic Vegetation s >50% is ≤3.0¹ aptations¹ (Provide supporting r on a separate sheet) ytic Vegetation¹ (Explain) and wetland hydrology must
Prevalence Index =  Hydrophytic Vegetation I  1 - Rapid Test for Hyd  2 - Dominance Test is  3 - Prevalence Index i  4 - Morphological Ada data in Remarks of Problematic Hydrophy  1 Indicators of hydric soil ar be present, unless disturbed	Indicators: drophytic Vegetation s >50% is ≤3.0¹ aptations¹ (Provide supporting r on a separate sheet) /tic Vegetation¹ (Explain) and wetland hydrology must
Hydrophytic Vegetation  1 - Rapid Test for Hyd  2 - Dominance Test is  3 - Prevalence Index i  4 - Morphological Ada data in Remarks of  Problematic Hydrophy  1 Indicators of hydric soil ar be present, unless disturbe	Indicators: drophytic Vegetation s >50% is ≤3.0¹ aptations¹ (Provide supporting r on a separate sheet) /tic Vegetation¹ (Explain) and wetland hydrology must
✓ 1 - Rapid Test for Hyd ✓ 2 - Dominance Test is ✓ 3 - Prevalence Index i — 4 - Morphological Ada data in Remarks of — Problematic Hydrophy   1 Indicators of hydric soil ar be present, unless disturbe	drophytic Vegetation s >50% is ≤3.0¹ septations¹ (Provide supporting r on a separate sheet) ytic Vegetation¹ (Explain) and wetland hydrology must
2 - Dominance Test is  3 - Prevalence Index i  4 - Morphological Ada data in Remarks of  Problematic Hydrophy   1 Indicators of hydric soil ar be present, unless disturbed	s >50% is ≤3.0¹ aptations¹ (Provide supporting r on a separate sheet) /tic Vegetation¹ (Explain) and wetland hydrology must
A - Morphological Ada data in Remarks of Problematic Hydrophy  1 Indicators of hydric soil are be present, unless disturbed.	aptations <sup>1</sup> (Provide supporting r on a separate sheet) vtic Vegetation <sup>1</sup> (Explain) and wetland hydrology must
data in Remarks of Problematic Hydrophy  1 Indicators of hydric soil are be present, unless disturbed.	r on a separate sheet) ytic Vegetation¹ (Explain) nd wetland hydrology must
<sup>1</sup> Indicators of hydric soil ar be present, unless disturbe	nd wetland hydrology must
be present, unless disturbe	
	ed or problematic.
——— Definitions of vegetation	· · · · · · · · · · · · · · · · · · ·
i ree – woody plants 3 in.	
oupling/office Woody P	
of size, and woody plants	
	vines greater than 3.28 ft in
height.	
Present? Yes _	No
r	
	Sapling/shrub – Woody pand greater than or equal  Herb – All herbaceous (no of size, and woody plants  Woody vines – All woody height.  Hydrophytic Vegetation

Sampling Point: WL F3

Depth (inches)	Color (moist)	%		x Features %	Type <sup>1</sup> Loc		Remarks
0-16			10YR 4/6	- <u>~</u> - 5	<u>гуре</u> <u>гос</u> С М		Prominent redox.
		letion, RM	1=Reduced Matrix, M	S=Masked S	and Grains.		n: PL=Pore Lining, M=Matrix.
	Indicators:		Debession Debe	0	(A) (I DD D		s for Problematic Hydric Soils <sup>3</sup> :
_ Histosol _ Histic Ep	(A1) pipedon (A2)		Polyvalue Belo MLRA 149B		8) (LRR R,		Muck (A10) ( <b>LRR K, L, MLRA 149B</b> ) t Prairie Redox (A16) ( <b>LRR K, L, R</b> )
_ Black Hi	istic (A3)		Thin Dark Surfa	ace (S9) ( <b>LR</b>		<b>19B</b> ) 5 cm	Mucky Peat or Peat (S3) (LRR K, L, R)
	en Sulfide (A4) d Layers (A5)		Loamy Mucky I Loamy Gleyed		(LRR K, L)		Surface (S7) ( <b>LRR K, L</b> ) alue Below Surface (S8) ( <b>LRR K, L</b> )
	d Below Dark Surfac	e (A11)	✓ Depleted Matrix				Dark Surface (S9) (LRR K, L)
	ark Surface (A12)		Redox Dark Su				Manganese Masses (F12) ( <b>LRR K, L, R</b> )
-	Mucky Mineral (S1) Gleyed Matrix (S4)		Depleted Dark Redox Depress				nont Floodplain Soils (F19) ( <b>MLRA 149E</b> Spodic (TA6) ( <b>MLRA 144A, 145, 149B</b>
	Redox (S5)		Nedox Depless	sions (Fo)			Parent Material (F21)
_ Stripped	Matrix (S6)					Very	Shallow Dark Surface (TF12)
_ Dark Su	rface (S7) (LRR R, N	/ILRA 149	<b>B</b> )			Other	(Explain in Remarks)
			etland hydrology mu	st be present	, unless distur	bed or problemat	ic.
	Layer (if observed):						
Type:						Hydric Soi	I Present? Yes No
Depth (in	ches):					Hydric 30i	i Fresent? Tesv No
emarks:							

Project/Site: Riverbend Wind	City/County: Sanilac Sampling Date: 2021-12-14				
	State: Michigan Sampling Point: WL F4				
Investigator(s): K. Yantz, C. LaRiccia-Atwell, LLC					
	ocal relief (concave, convex, none): Concave Slope (%): 3-7				
•	16 Long: -82.783964 Datum: WGS84				
•	opes NWI classification: PFO/PSS				
Are climatic / hydrologic conditions on the site typical for this time of y					
Are Vegetation, Soil, or Hydrology significant	ly disturbed? Are "Normal Circumstances" present? Yes ✓ No				
Are Vegetation, Soil, or Hydrology naturally p	oroblematic? (If needed, explain any answers in Remarks.)				
SUMMARY OF FINDINGS - Attach site map showin	ng sampling point locations, transects, important features, etc.				
Hydrophytic Vegetation Present? Yes✓ No	Is the Sampled Area				
Hydric Soil Present? Yes ✓ No	- Western Western 2 Veg / No				
Wetland Hydrology Present? Yes   ✓ No					
Remarks: (Explain alternative procedures here or in a separate rep					
PEM RCG basin.	,				
HYDROLOGY					
Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)				
Primary Indicators (minimum of one is required; check all that apply	<del>-</del> , ,				
Surface Water (A1) Water-Stained					
High Water Table (A2) Aquatic Faun					
✓ Saturation (A3) Marl Deposits					
Water Marks (B1) Hydrogen Sul					
	zospheres on Living Roots (C3) Saturation Visible on Aerial Imagery (C9)				
	Reduced Iron (C4) Stunted or Stressed Plants (D1)  Reduction in Tilled Soils (C6) Geomorphic Position (D2)				
Iron Deposits (B5) Thin Muck Su					
Indit Deposits (B5) Thirt Midck St Other (Explain					
Sparsely Vegetated Concave Surface (B8)	✓ FAC-Neutral Test (D5)				
Field Observations:	<u>+</u> 1716 Hoddal 1881 (20)				
Surface Water Present? Yes No✓ Depth (inche	es):				
Water Table Present? Yes No _✓ Depth (inche					
Saturation Present? Yes   ✓ No Depth (inche					
(includes capillary fringe)					
Describe Recorded Data (stream gauge, monitoring well, aerial pho	itos, previous inspections), if available:				
Remarks:					

<b>VEGETATION –</b> Use scientific names of plants.				Sampling Point: WL F4
Tree Stratum (Plot size:30)	Absolute	Dominant Species?		Dominance Test worksheet:
1. <u>Salix nigra</u>				Number of Dominant Species That Are OBL, FACW, or FAC:3(A)
2				Total Number of Dominant
3				Species Across All Strata:3 (B)
4				Percent of Dominant Species
5	·			That Are OBL, FACW, or FAC:100.00_ (A/B)
6				Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
	15	= Total Cov	/er	OBL species <u>15.00</u> x 1 = <u>15.00</u>
Sapling/Shrub Stratum (Plot size: 15				FACW species <u>55.00</u> x 2 = <u>110.00</u>
1. Physocarpus opulifolius	5	<u> </u>	<u>FACW</u>	FAC species 10.00 x 3 = 30.00 FACU species 0.00 x 4 = 0.00
2				UPL species 0.00 x 5 = 0.00 UPL species
3				Column Totals: 80.00 (A) 155.00 (B)
4				
5				Prevalence Index = B/A = <u>1.94</u>
6				Hydrophytic Vegetation Indicators:
7				
	5	= Total Cov	/er	2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0¹
Herb Stratum (Plot size:)				
1. Phalaris arundinacea	_50_	<u>Y</u>	<u>FACW</u>	data in Remarks or on a separate sheet)
2. <u>Urtica dioica</u>			<u>FAC</u>	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
3				<sup>1</sup> Indicators of hydric soil and wetland hydrology must
4				be present, unless disturbed or problematic.
5				Definitions of Vegetation Strata:
6				Tree – Woody plants 3 in. (7.6 cm) or more in diameter
7				at breast height (DBH), regardless of height.
8				Sapling/shrub – Woody plants less than 3 in. DBH
9				and greater than or equal to 3.28 ft (1 m) tall.
10				Herb – All herbaceous (non-woody) plants, regardless
11				of size, and woody plants less than 3.28 ft tall.
12				Woody vines – All woody vines greater than 3.28 ft in
	60	= Total Cov	/er	height.
Woody Vine Stratum (Plot size:)				
1				
2				
3				Hydrophytic
4				Vegetation Present? Yes ✓ No
		= Total Cov	/er	130 130
Remarks: (Include photo numbers here or on a separate s	sheet.)			

Sampling Point: WL F4

(inches)	Matrix Color (moist)	%	Color (moist)	Features  V Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
0.40							Remarks
0-16	10YR 2/1	100				MUCK	
			_				
					_		
<u> </u>							
					_		
vpe: C=Cc	ncentration. D=Dep	letion. RM=	Reduced Matrix, MS	=Masked Sand G	Frains.	<sup>2</sup> Location:	PL=Pore Lining, M=Matrix.
	ndicators:	,	,				for Problematic Hydric Soils <sup>3</sup> :
Histosol	(A1)		Polyvalue Below	Surface (S8) ( <b>LF</b>	RR R,	_ <pre>∠ 2 cm M</pre>	luck (A10) ( <b>LRR K, L, MLRA 149B</b> )
	ipedon (A2)		MLRA 149B)				Prairie Redox (A16) ( <b>LRR K, L, R</b> )
Black His				ce (S9) ( <b>LRR R, I</b>			lucky Peat or Peat (S3) (LRR K, L, R)
	n Sulfide (A4) Layers (A5)		Loamy Mucky M Loamy Gleyed N	lineral (F1) (LRR	K, L)		urface (S7) ( <b>LRR K, L</b> ) ue Below Surface (S8) ( <b>LRR K, L</b> )
	Below Dark Surfac	e (A11)	Depleted Matrix				ark Surface (S9) (LRR K, L)
	rk Surface (A12)	0 (/ ( ) )	Redox Dark Sur				anganese Masses (F12) ( <b>LRR K, L, R</b> )
	ucky Mineral (S1)		Depleted Dark S				ont Floodplain Soils (F19) (MLRA 149E
_ Sandy G	leyed Matrix (S4)		Redox Depressi	ons (F8)		Mesic S	Spodic (TA6) ( <b>MLRA 144A, 145, 149B</b>
	edox (S5)						rent Material (F21)
	Matrix (S6)	#L D.A. 4.40D					hallow Dark Surface (TF12)
Dark Sur	face (S7) (LRR R, N	VILKA 149B	)			Other (	Explain in Remarks)
_ Dank Our		tion and we	tland hvdrology must	t be present, unle	ss disturbed	or problematic	
	hydrophytic vegeta						<u>-                                      </u>
ndicators of	hydrophytic vegeta	:					
ndicators of estrictive L	hydrophytic vegeta ayer (if observed):	:					
ndicators of estrictive L Type:	ayer (if observed):	:				Hydric Soil	Present? Yes ✓ No
ndicators of estrictive L Type: Depth (inc	ayer (if observed):		<u> </u>			Hydric Soil	Present? Yes <u>√</u> No
dicators of estrictive L Type: Depth (inc	ayer (if observed):		<u> </u>			Hydric Soil	Present? Yes <u>√</u> No
dicators of strictive L Type:	ayer (if observed):		_			Hydric Soil I	Present? Yes / No
dicators of strictive L Type:	ayer (if observed):	:				Hydric Soil	Present? Yes <u>√</u> No
dicators of strictive L Type:	ayer (if observed):	:				Hydric Soil	Present? Yes <u>√</u> No
dicators of strictive L Type:	ayer (if observed):	:				Hydric Soil I	Present? Yes <u>√</u> No
dicators of estrictive L Type: Depth (inc	ayer (if observed):	:				Hydric Soil	Present? Yes <u>√</u> No
dicators of strictive L Type:	ayer (if observed):					Hydric Soil	Present? Yes <u>√</u> No
dicators of estrictive L Type: Depth (inc	ayer (if observed):					Hydric Soil	Present? Yes <u>√</u> No
dicators of estrictive L Type: Depth (inc	ayer (if observed):					Hydric Soil	Present? Yes <u>√</u> No
ndicators of estrictive L Type: Depth (inc	ayer (if observed):					Hydric Soil	Present? Yes <u>√</u> No
ndicators of estrictive L Type:	ayer (if observed):					Hydric Soil	Present? Yes <u>√</u> No
ndicators of estrictive L Type: Depth (inc	ayer (if observed):					Hydric Soil	Present? Yes <u>√</u> No
ndicators of estrictive L Type: Depth (inc	ayer (if observed):					Hydric Soil	Present? Yes <u>√</u> No
ndicators of estrictive L Type: Depth (inc	ayer (if observed):					Hydric Soil	Present? Yes <u>√</u> No
ndicators of estrictive L Type: Depth (inc	ayer (if observed):					Hydric Soil	Present? Yes No
dicators of estrictive L Type: Depth (inc	ayer (if observed):					Hydric Soil	Present? Yes No

Project/Site: Riverbend W	/ind	City/C	County: Sani	lac	Sampling	Date: 2021-12-14
Applicant/Owner: Liberty Po				State: <u>M</u>		
Investigator(s): K. Yantz. (						
Landform (hillslope, terrace, etc		,		_		
Subregion (LRR or MLRA): LR	•					
Soil Map Unit Name: Marlet						
Are climatic / hydrologic condition				•		710
						/ / N-
Are Vegetation, Soil						
Are Vegetation, Soil	, or Hydrology	naturally problema	atic? (If	needed, explain any	answers in Rema	ırks.)
SUMMARY OF FINDING	S - Attach site	map showing sam	npling poin	t locations, trans	sects, import	ant features, etc.
Hydrophytic Vegetation Prese	nt? Yes ✓	No	Is the Samp	led Area		
Hydric Soil Present?		No	within a Wet	tland? Yes	No	
Wetland Hydrology Present?		No	If yes, option	al Wetland Site ID:		
Remarks: (Explain alternative	procedures here or i					
PEM/PSS. Surround	ed by forested	d vegetation, inui	ndated ar	ea in the cente	∍r.	
HYDROLOGY						
Wetland Hydrology Indicator	rs:			Secondary	/ Indicators (minin	num of two required)
Primary Indicators (minimum o		eck all that apply)		Surfac	ce Soil Cracks (B6	3)
✓ Surface Water (A1)		Water-Stained Leave	s (B9)		age Patterns (B10	
✓ High Water Table (A2)		Aquatic Fauna (B13)			Trim Lines (B16)	
✓ Saturation (A3)	_	Marl Deposits (B15)		Dry-Se	eason Water Tabl	le (C2)
Water Marks (B1)		_ Hydrogen Sulfide Ode			sh Burrows (C8)	
Sediment Deposits (B2)		Oxidized Rhizosphere	_			erial Imagery (C9)
Drift Deposits (B3)		_ Presence of Reduced			ed or Stressed Pla	
Algal Mat or Crust (B4)		_ Recent Iron Reductio			norphic Position (D	02)
Iron Deposits (B5)		_ Thin Muck Surface (C			ow Aquitard (D3)	5 (DA)
Inundation Visible on Aeri		_ Other (Explain in Ren	narks)		topographic Relief	
✓ Sparsely Vegetated Conc Field Observations:	ave Surface (B8)			FAC-I	Neutral Test (D5)	
Surface Water Present?	Ves / No	Depth (inches): 6				
Water Table Present?		Depth (inches): 0				
Saturation Present?		Depth (inches): 0		Wetland Hydrology I	Present? Yes	√ No
(includes capillary fringe)						
Describe Recorded Data (stream	am gauge, monitorino	g well, aerial photos, pre	vious inspection	ons), if available:		
Remarks:						

/EGETATION – Use scientific names of plants.				Sampling Point: WL F5
Tree Stratum (Plot size: 30 )	Absolute			Dominance Test worksheet:
1. <u>Ulmus americana</u>		Species?		Number of Dominant Species That Are OBL, FACW, or FAC:3 (A)
2				Total Number of Dominant Species Across All Strata: 3 (B)
3				Species Across All Strata:3 (B)  Percent of Dominant Species
5				That Are OBL, FACW, or FAC: 100.00 (A/B)
6				Prevalence Index worksheet:
7		= Total Cov		
Sapling/Shrub Stratum (Plot size:)		10141 00	VOI	FACW species 35.00 x 2 = 70.00
1. Cephalanthus occidentalis	30	<u>Y</u>	OBL	FAC species <u>0.00</u> x 3 = <u>0.00</u>
2				FACU species 0.00 x 4 = 0.00
3				UPL species $0.00 \times 5 = 0.00$ Column Totals: $65.00 \times 5 = 0.00 \times 5 = 0.00$
4				Column Totals. <u>05.00</u> (A) <u>100.00</u> (B)
5				Prevalence Index = B/A = 1.54
6				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
		= Total Cov	ver	∠ 2 - Dominance Test is >50%
Herb Stratum (Plot size:5				3 - Prevalence Index is ≤3.0¹     4 - Morphological Adaptations¹ (Provide supporting)
1. <u>Phalaris arundinacea</u>	30	<u>Y</u>	<u>FACW</u>	data in Remarks or on a separate sheet)
2				Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
3				¹Indicators of hydric soil and wetland hydrology must
5				be present, unless disturbed or problematic.  Definitions of Vegetation Strata:
6.				
7				<b>Tree</b> – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
8				Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.
9				Herb – All herbaceous (non-woody) plants, regardless
11.				of size, and woody plants less than 3.28 ft tall.
12				Woody vines – All woody vines greater than 3.28 ft in height.
	30	= Total Cov	ver	neight.
Woody Vine Stratum (Plot size:)				
1				
2.				
3				Hydrophytic Vegetation
4				Present? Yes No
Remarks: (Include photo numbers here or on a separate s		= Total Cov	ver	
Tromano. (morado prioto namboro noro di on a deparato s	Siloot.)			

Sampling Point: WL F5

Depth	Matrix			Features	_ 1		_	_
(inches)	Color (moist)	<u>%</u>	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
0-16	<u>10YR 2/1</u>	100					<u>MUCK</u>	
-		· ——						
		· ——						
Type: C=C	oncentration D=Den	letion RM=		=Masked S	Sand Gra	ains	<sup>2</sup> l ocation	: PL=Pore Lining, M=Matrix.
Hydric Soil		iotion, rtivi	Troduced Waters, Wie	Maskea	Jana Ore	aii 10.	Indicators	for Problematic Hydric Soils <sup>3</sup> :
✓ Histosol			Polyvalue Below	/ Surface (	S8) ( <b>LRF</b>	RR,	2 cm N	Muck (A10) ( <b>LRR K, L, MLRA 149B</b> )
	pipedon (A2)		MLRA 149B)	`	/ \	•		Prairie Redox (A16) ( <b>LRR K, L, R</b> )
	istic (A3)		Thin Dark Surface					flucky Peat or Peat (S3) (LRR K, L, R)
	en Sulfide (A4)		Loamy Mucky M		(LRR K	, <b>L</b> )		Surface (S7) (LRR K, L)
	d Layers (A5) d Below Dark Surfac	ο (Δ11)	Loamy Gleyed N Depleted Matrix				-	lue Below Surface (S8) ( <b>LRR K, L</b> ) ark Surface (S9) ( <b>LRR K, L</b> )
	ark Surface (A12)	e (ATT)	Redox Dark Sur					anganese Masses (F12) ( <b>LRR K, L, R</b> )
	/lucky Mineral (S1)		Depleted Dark S		)			ont Floodplain Soils (F19) (MLRA 149B)
-	Gleyed Matrix (S4)		Redox Depressi		,			Spodic (TA6) ( <b>MLRA 144A, 145, 149B</b> )
-	Redox (S5)							arent Material (F21)
	Matrix (S6)		.,					hallow Dark Surface (TF12)
Dark Su	rface (S7) (LRR R, N	/ILRA 149E	3)				Other (	(Explain in Remarks)
Indicators o	f hydrophytic vegetat	tion and we	tland hydrology must	be preser	nt. unless	disturbed	or problematic	<u>.</u>
	Layer (if observed):				,			
Type:	,							
Depth (in	ches).						Hydric Soil	Present? Yes/ No
	CHE3).		<del></del>				, ,	
Remarks:								

Project/Site: Riverbend		City/C	County: Sanilac Count	[V Samplin	ng Date: <u>2022-04-1</u> 1		
Applicant/Owner: Liberty				•			
Investigator(s): K. Yantz, [							
Landform (hillslope, terrace, etc	_						
Subregion (LRR or MLRA): LR	•						
Soil Map Unit Name: Parkhi							
Are climatic / hydrologic condition	•						
Are Vegetation, Soil							
Are Vegetation, Soil							
-				-			
SUMMARY OF FINDING	5 – Attach Site	map snowing san	ipling point locations	, transects, impor	rtant features, etc.		
Hydrophytic Vegetation Prese	nt? Yes	✓ No	Is the Sampled Area				
Hydric Soil Present?		✓ No	within a Wetland?	Yes <u>√</u> No			
Wetland Hydrology Present?		✓ No	If yes, optional Wetland Site	e ID:			
Remarks: (Explain alternative PFO mosaic wetland	∍ procedures here or <b>√</b>	in a separate report.)					
FFO mosaic welland	ı.						
HYDROLOGY							
Wetland Hydrology Indicato	rs:		Se	condary Indicators (min	imum of two required)		
Primary Indicators (minimum o		neck all that apply)		Surface Soil Cracks (E	· · · · · ·		
✓ Surface Water (A1)	-	✓ Water-Stained Leave		Drainage Patterns (B1			
✓ High Water Table (A2)		Aquatic Fauna (B13)		Moss Trim Lines (B16			
✓ Saturation (A3)		Marl Deposits (B15)		Dry-Season Water Ta			
Water Marks (B1)		Hydrogen Sulfide Od					
Sediment Deposits (B2)		Oxidized Rhizospher					
Drift Deposits (B3)		Presence of Reduced	= : :	Stunted or Stressed P			
Algal Mat or Crust (B4)		Recent Iron Reduction		Geomorphic Position			
Iron Deposits (B5)		Thin Muck Surface (0		Shallow Aquitard (D3)			
Inundation Visible on Aeri		Other (Explain in Rer					
Sparsely Vegetated Cond				FAC-Neutral Test (D5			
Field Observations:					,		
Surface Water Present?	Yes✓ No	Depth (inches): 1					
Water Table Present?		Depth (inches): 0					
Saturation Present?	Yes✓ No	Depth (inches): 0	Wetland Hydr	rology Present? Yes	No		
(includes capillary fringe)  Describe Recorded Data (stre	am gauge monitoriu	ag well perial photos pre	avious inspections) if availab	lo·			
Describe Necolded Data (stre	am gauge, monitorii	ig weii, aeriai priotos, pre	vious irispections), ii availabi	ic.			
Remarks:							

Tree Stratum (Plot size: 30 )	Absolute % Cover	Dominant Species?		Dominance Test worksheet:
		Υ		Number of Dominant Species
	20		FACU	That Are OBL, FACW, or FAC:5 (A)
2. Quercus rubra				Total Number of Dominant
3. <u>Ulmus americana</u>		Y	FACW	Species Across All Strata:6(B)
4. Quercus bicolor		N	<u>FACW</u>	Percent of Dominant Species That Are OBL, FACW, or FAC: 83.33 (A/B)
5. <u>Acer rubrum</u>		N	<u>FAC</u>	That Are OBL, FACW, or FAC: 83.33 (A/B)
6. <u>Carya ovata</u>	3	N	<u>FACU</u>	Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
	88	= Total Cov	ver	OBL species <u>5.00</u> x 1 = <u>5.00</u>
Sapling/Shrub Stratum (Plot size:15)				FACW species <u>70.00</u> x 2 = <u>140.00</u>
1				FAC species <u>5.00</u> x 3 = <u>15.00</u>
2.				FACU species <u>23.00</u> x 4 = <u>92.00</u>
3				UPL species <u>0.00</u> x 5 = <u>0.00</u>
				Column Totals: <u>103.00</u> (A) <u>252.00</u> (B)
4				Prevalence Index = B/A = 2.45
6				Hydrophytic Vegetation Indicators:
				1 - Rapid Test for Hydrophytic Vegetation
7	•			∠ 2 - Dominance Test is >50%
_	0	= Total Cov	ver	3 - Prevalence Index is ≤3.0¹
Herb Stratum (Plot size: 5)	E	V	OBL	4 - Morphological Adaptations (Provide supporting
1. Carex lacustris				data in Remarks or on a separate sheet)  Problematic Hydrophytic Vegetation¹ (Explain)
2. <u>Phalaris arundinacea</u>			FACW	Problematic Hydrophytic Vegetation (Explain)
3. <u>Elymus virginicus</u>	5	<u> </u>	<u>FACW</u>	<sup>1</sup> Indicators of hydric soil and wetland hydrology must
4				be present, unless disturbed or problematic.
5				Definitions of Vegetation Strata:
6				Tree – Woody plants 3 in. (7.6 cm) or more in diameter
7				at breast height (DBH), regardless of height.
8.				Sapling/shrub – Woody plants less than 3 in. DBH
9.				and greater than or equal to 3.28 ft (1 m) tall.
10				Herb – All herbaceous (non-woody) plants, regardless
11				of size, and woody plants less than 3.28 ft tall.
12.				Woody vines – All woody vines greater than 3.28 ft in
		= Total Cov	ver	height.
Woody Vine Stratum (Plot size:30)		10141 00	VOI	
1				
2				
3				Hydrophytic Vegetation
4	<del></del>			Present? Yes No
		= Total Cov	ver	
Remarks: (Include photo numbers here or on a separate s	sheet.)			

Profile Des	cription: (Describe Matrix	to the dep	oth needed		nent the in x Features		or confirn	n the absence	of indicators.)		
(inches)	Color (moist)	%	Color (n		%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks		
0-2	10YR 3/2	100						<b>MUCK</b>			
2-6	10YR 5/2	85	10YR	6/4	15	С	M	SCL	Distinct redox.		
6-16	10YR 6/2	60	10YR	6/4	40	С	М	SC	Distinct redox.		
	-				-						
					-						
					<u> </u>						
					-						
					-						
1Type: C=C	concentration, D=Dep	letion RM	=Reduced N	Aatrix MS	S=Masked	Sand Gr	ains	<sup>2</sup> l ocation	n: PL=Pore Lining, M=Matrix.		
Hydric Soil		iotion, rtivi	rtoddocd i	natio, ivic	<u> </u>	Ourid Or	dirio.		for Problematic Hydric Soils <sup>3</sup> :		
Histoso					w Surface	(S8) ( <b>LR</b> I	R R,		Muck (A10) (LRR K, L, MLRA 149B)		
	pipedon (A2) listic (A3)			RA 149B)		DD D M	LRA 149B		Prairie Redox (A16) ( <b>LRR K, L, R</b> )  Mucky Peat or Peat (S3) ( <b>LRR K, L, R</b> )		
	en Sulfide (A4)				/lineral (F1				Surface (S7) ( <b>LRR K, L</b> )		
Stratifie	d Layers (A5)		Loamy	Gleyed I	Matrix (F2)			Polyva	alue Below Surface (S8) (LRR K, L)		
	d Below Dark Surface ark Surface (A12)	e (A11)		ed Matrix (F3)  Dark Surface (F6)					Park Surface (S9) ( <b>LRR K, L</b> )  Ianganese Masses (F12) ( <b>LRR K, L, R</b> )		
	Mucky Mineral (S1)		Redox Dark Surface (F6) Depleted Dark Surface (F7)					Piedmont Floodplain Soils (F19) (MLRA 149B)			
Sandy (	Gleyed Matrix (S4)		Redox Depressions (F8)					Mesic	Mesic Spodic (TA6) ( <b>MLRA 144A, 145, 149B</b> )		
-	Redox (S5)							Red Parent Material (F21)			
	d Matrix (S6) urface (S7) ( <b>LRR R, N</b>	/ILRA 149	B)					Very Shallow Dark Surface (TF12) Other (Explain in Remarks)			
			_,						(Exprain in Comaine)		
	of hydrophytic vegetat		etland hydro	logy mus	t be prese	nt, unles	s disturbed	l or problemation	C.		
	Layer (if observed):										
Type:	achae).							Hydric Soil	Present? Yes <u>√</u> No		
Depth (in Remarks:	icries).							Tryuno con			
Remarks.											

Project/Site: Riverbend		City/C	County: Sanilac Co	untv Sa	mpling Date: 2022-04-11
Applicant/Owner: Liberty				•	
Investigator(s): K. Yantz, D					
Landform (hillslope, terrace, etc.)	•	·			
Subregion (LRR or MLRA): LRF					
Soil Map Unit Name: Parkhill					
Are climatic / hydrologic condition	•	•			
Are Vegetation, Soil					
Are Vegetation, Soil					
SUMMARY OF FINDINGS	3 – Attach site	map showing san	npling point location	ons, transects, in	nportant features, etc.
Hydrophytic Vegetation Presen	ıt? Yes √	No	Is the Sampled Area		
Hydric Soil Present?		No	within a Wetland?	Yes <u>√</u>	No
Wetland Hydrology Present?		No	If yes, optional Wetland	d Site ID:	
Remarks: (Explain alternative	procedures here or in	n a separate report.)			
Small PFO wetland					
HYDROLOGY					
Wetland Hydrology Indicators	s:			Secondary Indicators	(minimum of two required)
Primary Indicators (minimum of		ck all that apply)		Surface Soil Crac	cks (B6)
✓ Surface Water (A1)		_ Water-Stained Leave	es (B9)	Drainage Pattern	
✓ High Water Table (A2)		_ Aquatic Fauna (B13)		Moss Trim Lines	
✓ Saturation (A3)	_	_ Marl Deposits (B15)		Dry-Season Wate	er Table (C2)
Water Marks (B1)		_ Hydrogen Sulfide Od		Crayfish Burrows	
Sediment Deposits (B2)			es on Living Roots (C3)		e on Aerial Imagery (C9)
Drift Deposits (B3)		_ Presence of Reduced		Stunted or Stress	
Algal Mat or Crust (B4)		_ Recent Iron Reduction		✓ Geomorphic Pos	
Iron Deposits (B5)	·	_ Thin Muck Surface (0	,	Shallow Aquitard	· · ·
Inundation Visible on Aeria		_ Other (Explain in Rer	narks)	✓ Microtopographic	
Sparsely Vegetated Conca Field Observations:	ve Surrace (B8)		<u> </u>	✓ FAC-Neutral Tes	ST (D5)
	Vos. / No.	Depth (inches): 1			
		Depth (inches): 0			
		Depth (inches): 0	Wetland	Hydrology Present?	Yes _ ✓ _ No
(includes capillary fringe)		_ , , ,			163 <u>v</u> 110
Describe Recorded Data (strea	m gauge, monitoring	ywell, aerial photos, pre	vious inspections), if ava	ailable:	
Remarks:					

Tree Stratum (Plot size: 30 )	Absolute	Dominant		Dominance Test worksheet:
		Species?		Number of Dominant Species
1. Acer saccharinum				That Are OBL, FACW, or FAC:3(A)
2				Total Number of Dominant Species Across All Strata: 3 (B)
3				Species Across All Strata:3 (B)
4				Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)
5				111at Ale OBE, 1 AGW, 61 1 AG. 100.00 (AB)
6				Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
	100	= Total Cov	/er	OBL species <u>15.00</u> x 1 = <u>15.00</u>
Sapling/Shrub Stratum (Plot size: 15 )				FACW species 105.00 x 2 = 210.00
1				FAC species 0.00 x 3 = 0.00 FACU species 0.00 x 4 = 0.00
2				UPL species
3				Column Totals: 120.00 (A) 225.00 (B)
4				
5				Prevalence Index = B/A = <u>1.88</u>
6				Hydrophytic Vegetation Indicators:
7				
	0	= Total Cov	/er	∠ 2 - Dominance Test is >50%
Herb Stratum (Plot size: 5				3 - Prevalence Index is ≤3.0¹ 4 - Morphological Adaptations¹ (Provide supporting
1. <u>Juncus effusus</u>	15	Y	OBL	data in Remarks or on a separate sheet)
2. Phalaris arundinacea	5	Y	<b>FACW</b>	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
3				1
4.				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5				Definitions of Vegetation Strata:
6.				
7				<b>Tree</b> – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
8				
9				Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.
10				Herb – All herbaceous (non-woody) plants, regardless
11.				of size, and woody plants less than 3.28 ft tall.
12.				Woody vines – All woody vines greater than 3.28 ft in
12.	20	= Total Cov	· · ·	height.
Woody Vine Stratum (Plot size: 30 )		- Total Cov	761	
1				
2				
3				Hydrophytic Vegetation
4		<del></del>		Present? Yes No
Remarks: (Include photo numbers here or on a separate s		= Total Cov	/er	
Tremains. (include prioto numbers here of on a separate s	Sileet.)			

Sampling Point: WL FF2

Profile Desc	cription: (D	escribe 1	to the de	oth needed				or confirm	the absence	e of indicators.)		
Depth (inches)	Color (r	Matrix noist)	%	Color (n		x Features %	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks		
0-4	<u>10YR</u>	2/2	95	<u>10YR</u>	5/4	_5_	С	M	SCL	Distinct redox.		
4-10	10YR	2/2	85	10YR	5/6	15	С	М	SCL	Prominent redox.		
10-16				10YR	6/4	20	С	М	SCL	Distinct redox.		
10 10	<u></u>	U/ =		1011						<u> </u>		
						·				·		
				-								
	-			-								
1		D D		Deduced A	A-A-i- NAC		010		21 4:	DI Dans Lining M Matrix		
<sup>1</sup> Type: C=Co		і, р=рері	letion, Kivi	=Reduced N	/latrix, IVIS	s=Masked	Sand Gr	ains.		n: PL=Pore Lining, M=Matrix. s for Problematic Hydric Soils <sup>3</sup> :		
Histosol				Polyva	ılue Belov	w Surface	(S8) ( <b>LR</b> I	R R,		Muck (A10) (LRR K, L, MLRA 149B)		
	pipedon (A2	)			RA 149B)					t Prairie Redox (A16) ( <b>LRR K, L, R</b> )		
	istic (A3) en Sulfide (A	.A)				ıce (S9) ( <b>L</b> ⁄lineral (F1		LRA 149B)		Mucky Peat or Peat (S3) (LRR K, L, R) Surface (S7) (LRR K, L)		
	d Layers (A					Matrix (F2)		·, <b>-</b> )	Polyvalue Below Surface (S8) (LRR K, L)			
	d Below Dar		e (A11)	Deplet	ed Matrix	(F3)			Thin Dark Surface (S9) (LRR K, L)			
	ark Surface			Redox			<b>7</b> \			Manganese Masses (F12) (LRR K, L, R)		
	⁄lucky Miner Gleyed Matri					Surface (Fi	/)			nont Floodplain Soils (F19) ( <b>MLRA 149B</b> ) Spodic (TA6) ( <b>MLRA 144A, 145, 149B</b> )		
	Redox (S5)	х (Оч)		11000X	Redox Depressions (F8)					Red Parent Material (F21)		
	Matrix (S6)	)							Very Shallow Dark Surface (TF12)			
Dark Su	rface (S7) (I	LRR R, N	ILRA 149	B)					Other	(Explain in Remarks)		
<sup>3</sup> Indicators o	f hydrophyti	c vegetat	ion and w	etland hydro	ology mus	t be prese	nt, unles	s disturbed	or problemat	ic.		
Restrictive						· ·						
Type:												
Depth (in	ches):								Hydric Soi	il Present? Yes <u>√</u> No		
Remarks:												

Project/Site: Riverbend	City/County: Sanilac Cou	ntv Sampling Date: 2022-04-1			
Applicant/Owner: Liberty		State: Michigan Sampling Point: WL FF3			
Investigator(s): K. Yantz, D. Nigro -Atwell, LL					
Landform (hillslope, terrace, etc.): Depression					
Subregion (LRR or MLRA): LRR L, MLRA 98 Lat: 43					
Soil Map Unit Name: Conover loam, 0 to 3 per	•				
Are climatic / hydrologic conditions on the site typical for thi					
Are Vegetation, Soil, or Hydrologys					
Are Vegetation, Soil, or Hydrology r	naturally problematic? (If needed, e.	xplain any answers in Remarks.)			
SUMMARY OF FINDINGS - Attach site map	showing sampling point locatio	ns, transects, important features, etc.			
Hydrophytic Vegetation Present? Yes ✓ N	Is the Sampled Area				
Hydric Soil Present? Yes ✓ N		Yes <u>√</u> No			
Wetland Hydrology Present? Yes ✓ N		Site ID:			
Remarks: (Explain alternative procedures here or in a sep					
Open water wetland within yard					
HYDROLOGY					
Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)			
Primary Indicators (minimum of one is required; check all		Surface Soil Cracks (B6)			
		Drainage Patterns (B10)			
	atic Fauna (B13)	Moss Trim Lines (B16)			
	Deposits (B15)	Dry-Season Water Table (C2)			
	lrogen Sulfide Odor (C1)	Crayfish Burrows (C8)			
		Saturation Visible on Aerial Imagery (C9)			
	sence of Reduced Iron (C4)	Stunted or Stressed Plants (D1)			
	• •	Geomorphic Position (D2)			
	n Muck Surface (C7)	Shallow Aquitard (D3)			
	er (Explain in Remarks)	Shahow Aquitatu (D3) Microtopographic Relief (D4)			
✓ Sparsely Vegetated Concave Surface (B8)		✓ FAC-Neutral Test (D5)			
Field Observations:					
Surface Water Present? Yes No De	pth (inches): 120				
Water Table Present? Yes _ ✓ No De					
Saturation Present? Yes _ ✓ No De	pth (inches): 0 Wetland H	ydrology Present? Yes <u>√</u> No			
(includes capillary fringe)  Describe Recorded Data (stream gauge, monitoring well,	acrial photos provious inspections) if avai	ablo			
Describe Necorded Data (stream gauge, monitoring weil,	aeriai priotos, previous irispections), ii avai	able.			
Remarks:					

Sapling/Shrub Stratum (Plot size: 15 )

Herb Stratum (Plot size: 5

3. \_\_\_\_\_ \_\_\_ \_\_\_ \_\_\_\_

5. \_\_\_\_\_\_ \_\_\_ \_\_\_ \_\_\_\_ \_\_\_\_\_ 6. \_\_\_\_\_ \_\_\_ \_\_\_ \_\_\_ \_\_\_\_

7. \_\_\_\_\_\_ \_\_\_ \_\_\_ \_\_\_ \_\_\_\_ \_\_\_\_

8. \_\_\_\_\_ \_\_\_ \_\_\_ \_\_\_

9. \_\_\_\_\_\_ \_\_\_ \_\_\_ \_\_\_\_ \_\_\_\_\_

5. \_\_\_\_\_\_ \_\_\_\_ \_\_\_\_ \_\_\_\_\_

Tree Stratum (Plot size: \_\_\_\_\_\_)

Absolute Dominant Indicator

% Cover Species? Status

\_\_\_\_0 = Total Cover

\_\_\_\_ = Total Cover

0 = Total Cover

0 = Total Cover

	Sam	nnling Po	int: WL I	=F3
Dominance Test				10
Number of Domin That Are OBL, FA	ant Species		0	(A)
Total Number of E Species Across A			0	(B)
Percent of Domina That Are OBL, FA			00.00	(A/B)
Prevalence Index	workshee	et:		
Total % Cove			Itiply by:	
OBL species _			0.00	_
FACW species			0.00	_
	0.00			_
FACU species _			0.00	-
. –				
. –	0.00	_		- (D)
Column Totals: _	0.00	(A) _	0.00	_ (B)
Prevalence	Index = B/A	A =		_
Hydrophytic Veg  1 - Rapid Tes 2 - Dominanc 3 - Prevalenc 4 - Morpholog data in Re Problematic H  Indicators of hydrophytic present, unless  Definitions of Ve  Tree — Woody pla at breast height (I)  Sapling/shrub — Normand greater than of Herb — All herbac of size, and wood  Woody vines — Aheight.	et for Hydrop te Test is >5 e Index is ≤ gical Adapta marks or or Hydrophytic ric soil and test s disturbed  getation St unts 3 in. (7. DBH), regar  Woody plar or equal to eous (non-ty y plants les	construction of the strength o	Provide suprate sheet) ion¹ (Explainydrology mematic.  more in diaheight.  nan 3 in. Diaheight.  m) tall.  lants, regal	n) nust ameter BH rdless
Hydrophytic Vegetation Present?	Yes <u></u>	<u>′</u> No	)	

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

Woody Vine Stratum (Plot size: 30

No vegetation present due to inundation; assume hydric.

(inches) 0-16	Matrix Color (moist)	0/		Features Type	Loc <sup>2</sup>	Toxture	Damarka
<u>0-16</u>	Color (moist)	%	Color (moist)			Texture	Remarks
	10YR 2/1					MUCK	
		-	·				
-							
						21 (1	B. B
	oncentration, D=Depi I <b>ndicators:</b>	etion, RM=	Reduced Matrix, MS	=Masked Sand	Grains.		PL=Pore Lining, M=Matrix. or Problematic Hydric Soils <sup>3</sup> :
_ Histosol			Polyvalue Below	Surface (S8) (L	.RR R.		uck (A10) (LRR K, L, MLRA 149B)
	pipedon (A2)		MLRA 149B)	Curiaco (CC) (2	,		rairie Redox (A16) ( <b>LRR K, L, R</b> )
_ Black His			Thin Dark Surface			5 cm Mu	ucky Peat or Peat (S3) ( <b>LRR K, L, R</b> )
	n Sulfide (A4)		Loamy Mucky M		R K, L)		urface (S7) (LRR K, L)
	l Layers (A5) d Below Dark Surface	\ (A11)	<ul><li>Loamy Gleyed M</li><li>Depleted Matrix</li></ul>				ue Below Surface (S8) ( <b>LRR K, L</b> ) rk Surface (S9) ( <b>LRR K, L</b> )
	ark Surface (A12)	(A11)	Redox Dark Surf				nganese Masses (F12) ( <b>LRR K, L</b> , <b>R</b> )
	lucky Mineral (S1)		Depleted Dark S				nt Floodplain Soils (F19) ( <b>MLRA 149</b> B
	Bleyed Matrix (S4)		Redox Depression				podic (TA6) (MLRA 144A, 145, 149B)
	ledox (S5)						rent Material (F21)
	Matrix (S6)	U DA 4405	• `				allow Dark Surface (TF12)
_ Dark Sur	rface (S7) ( <b>LRR R, M</b>	ILKA 149E	3)			Other (E	Explain in Remarks)
ndicators of	f hydrophytic vegetat	ion and we	etland hydrology must	be present, unl	ess disturbed	or problematic.	
estrictive l	_ayer (if observed):			<u> </u>			
Туре:							
Depth (inc	ches):					Hydric Soil P	Present? Yes/ No
emarks:	, -		<u> </u>				

Project/Site: Riverbend		City/C	County: Sanilac Count	V Sampling	g Date: <u>2022-04-1</u> 1
Applicant/Owner: Liberty			•	•	
Investigator(s): K. Yantz, I					
Landform (hillslope, terrace, etc	J	•			
Subregion (LRR or MLRA): LR	•				
Soil Map Unit Name: Conov					
Are climatic / hydrologic condition	•				
Are Vegetation, Soil					
Are Vegetation, Soil					
				•	,
SUMMARY OF FINDING	5 – Attach Site	map snowing sam	ipling point locations,	, transects, impor	tant reatures, etc.
Hydrophytic Vegetation Prese		/ No	Is the Sampled Area		
Hydric Soil Present?		✓ No	within a Wetland?	Yes <u>√</u> No _	<del></del>
Wetland Hydrology Present?		/ No	If yes, optional Wetland Site	ə ID:	
Remarks: (Explain alternative PFO mosaic within v		in a separate report.)			
PFO mosaic within v	voodiot				
LIVEROLOGY					
HYDROLOGY			Cod	andar Indicator (mini	imum of two required)
Wetland Hydrology Indicato		المراجعة معاط المراجعة		condary Indicators (mini	· · · · · ·
Primary Indicators (minimum o	-			Surface Soil Cracks (B	
✓ Surface Water (A1)		✓ Water-Stained Leave		Drainage Patterns (B1	
High Water Table (A2)		Aquatic Fauna (B13)		Moss Trim Lines (B16)	·
✓ Saturation (A3)		Marl Deposits (B15)		-	· · ·
Water Marks (B1)		Hydrogen Sulfide Od			
Sediment Deposits (B2)		Oxidized Rhizospher			
Drift Deposits (B3)		Presence of Reduced		Stunted or Stressed Pl	
Algal Mat or Crust (B4)		Recent Iron Reduction		Geomorphic Position (	
Iron Deposits (B5)		Thin Muck Surface (0		Shallow Aquitard (D3)	
Inundation Visible on Aer		Other (Explain in Rer		Microtopographic Relie	
✓ Sparsely Vegetated Cond	ave Surface (B8)			FAC-Neutral Test (D5)	)
Field Observations: Surface Water Present?	Vac / No	Depth (inches): 2			
Water Table Present? Saturation Present?		Depth (inches): 2 Depth (inches): 0		ology Present? Yes	/ No
(includes capillary fringe)	res <b>/</b> NO	Deptit (inches). <u>U</u>	vvetiand nyun	ology Present? Tes	NO
Describe Recorded Data (stre	am gauge, monitorin	ng well, aerial photos, pre	vious inspections), if availabl	le:	
Remarks:					

	Absolute	Dominant	Indicator	Deminance Teet worksheets
Tree Stratum (Plot size:)	% Cover	Species?		Dominance Test worksheet:  Number of Dominant Species
1. Acer saccharinum	35	Y	<u>FACW</u>	That Are OBL, FACW, or FAC:(A)
2. <u>Betula papyrifera</u>	10	Y	<u>FACU</u>	Total Number of Dominant
3. Fraxinus pennsylvanica			FACW	Species Across All Strata:6(B)
4. <u>Tilia americana</u>		Y	FACU	Percent of Dominant Species
5. Populus deltoides			FAC	That Are OBL, FACW, or FAC: 66.67 (A/B)
6. Quercus bicolor			FACW	
				Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
	/5	= Total Cov	er	OBL species <u>15.00</u> x 1 = <u>15.00</u>
Sapling/Shrub Stratum (Plot size: 15 )				FACW species <u>55.00</u> x 2 = <u>110.00</u>
1				FACULARISTICS 20.00 x 4 = 15.00
2				FACU species <u>20.00</u> x 4 = <u>80.00</u> UPL species <u>0.00</u> x 5 = <u>0.00</u>
3				Column Totals: 95.00 (A) 220.00 (B)
4				(A) <u>220.00</u> (B)
5				Prevalence Index = B/A = 2.32
6				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
		= Total Cov		∠ 2 - Dominance Test is >50%
Harl Otrature (District		- Total Cov	ы	3 - Prevalence Index is ≤3.0¹
Herb Stratum (Plot size: 5 )  1. Juncus effusus	15	V	OBL	4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
2. Onoclea sensibilis			FACW	Problematic Hydrophytic Vegetation¹ (Explain)
				residentatio riyarophytic vegetation (Explain)
3				<sup>1</sup> Indicators of hydric soil and wetland hydrology must
4				be present, unless disturbed or problematic.
5				Definitions of Vegetation Strata:
6				Tree – Woody plants 3 in. (7.6 cm) or more in diameter
7				at breast height (DBH), regardless of height.
8				Sapling/shrub – Woody plants less than 3 in. DBH
9				and greater than or equal to 3.28 ft (1 m) tall.
10				Herb – All herbaceous (non-woody) plants, regardless
11				of size, and woody plants less than 3.28 ft tall.
12.				Woody vines – All woody vines greater than 3.28 ft in
	20	= Total Cov	er	height.
Woody Vine Stratum (Plot size: 30 )			·.	
1				
2				
3				Hydrophytic Vegetation
4				Present? Yes No
		= Total Cov	er	
Remarks: (Include photo numbers here or on a separate s	sheet.)			

Sampling Point: WL GG1

	cription: (Describe	to the de	ptn needed				or confirm	i the absence	of indicators.)
Depth (inches)	Matrix Color (moist)	%	Color (n		x Features %	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
0-6	10YR 2/1							MUCK	
6-12	10YR 2/1	85	10YR	6/4	15	С	М	L	Prominent redox.
12-18	10YR 2/1	80	10YR	6/4	15	С	М	L	Prominent redox.
		5	10YR	5/2	5	D	M		
			-						
								-	
								-	
			-						
	oncentration, D=Depl	letion, RM	I=Reduced N	//atrix, MS	S=Masked	Sand Gra	ains.		n: PL=Pore Lining, M=Matrix.
Hydric Soil Histosol			Polyva	ılue Belov	v Surface	(S8) ( <b>I R</b> i	R R		for Problematic Hydric Soils <sup>3</sup> : Muck (A10) (LRR K, L, MLRA 149B)
Histic E	pipedon (A2)		MLF	RA 149B)				Coast	Prairie Redox (A16) (LRR K, L, R)
	istic (A3) en Sulfide (A4)				ce (S9) ( <b>L</b> lineral (F1				Mucky Peat or Peat (S3) (LRR K, L, R) Surface (S7) (LRR K, L)
	d Layers (A5)				Matrix (F2)		, <b>L</b> )		alue Below Surface (S8) ( <b>LRR K, L</b> )
	d Below Dark Surface	e (A11)	Deplet	ed Matrix	(F3)			Thin D	Park Surface (S9) ( <b>LRR K, L</b> )
	ark Surface (A12) Mucky Mineral (S1)				face (F6) Surface (F	7)			langanese Masses (F12) ( <b>LRR K, L, R</b> ) ont Floodplain Soils (F19) ( <b>MLRA 149B</b> )
Sandy C	Gleyed Matrix (S4)			Depress		. ,		Mesic	Spodic (TA6) ( <b>MLRA 144A, 145, 149B</b> )
	Redox (S5) d Matrix (S6)								arent Material (F21) Shallow Dark Surface (TF12)
	ırface (S7) ( <b>LRR R, N</b>	ILRA 149	В)						(Explain in Remarks)
	of hydrophytic vegetat  Layer (if observed):		etland hydro	logy mus	t be prese	nt, unless	disturbed	or problemation	С.
Type:									
Depth (in	ches):							Hydric Soil	Present? Yes No
Remarks:								1	

Project/Site: Riverbend Wind		City/County: Sar	nil <b>ac</b> s	Sampling Date: 2021-12-16			
Applicant/Owner: Liberty Power	er		State: Michigan	Sampling Point: WL H1			
Investigator(s): K. Yantz, C. L							
Landform (hillslope, terrace, etc.): D							
Subregion (LRR or MLRA): LRR L,	•						
Soil Map Unit Name: Parkhill lo							
	•	•					
Are climatic / hydrologic conditions o							
Are Vegetation, Soil,							
Are Vegetation, Soil,	or Hydrology naturally	/ problematic? (	If needed, explain any answers	in Remarks.)			
SUMMARY OF FINDINGS -	Attach site map show	ing sampling poin	nt locations, transects, i	mportant features, etc.			
Hydrophytic Vagatation Procent?	Voc. / No.	Is the Sam	oled Area				
Hydrophytic Vegetation Present? Hydric Soil Present?	Yes ✓ No Yes ✓ No		etland? Yes <u>√</u>	No			
Wetland Hydrology Present?			nal Wetland Site ID:				
Remarks: (Explain alternative proc	edures here or in a separate r	report.)					
PEM/PFO woodlot surro	ounded by agricultur	al fields					
HYDROLOGY							
Wetland Hydrology Indicators:			Secondary Indicato	rs (minimum of two required)			
Primary Indicators (minimum of one	e is required: check all that app	olv)	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·			
Surface Water (A1)		ned Leaves (B9)	Drainage Patte				
High Water Table (A2)	Aquatic Fa		Moss Trim Line				
✓ Saturation (A3)	Marl Depos	sits (B15)	Dry-Season W	ater Table (C2)			
Water Marks (B1)	Hydrogen S	en Sulfide Odor (C1) Crayfish Burrows (C8)					
Sediment Deposits (B2)	Oxidized R	Rhizospheres on Living Roots (C3) Saturation Visible on Aerial Imagery (C9)					
Drift Deposits (B3)	<del></del>	of Reduced Iron (C4)		essed Plants (D1)			
Algal Mat or Crust (B4)		Iron Reduction in Tilled Soils (C6) Geomorphic Position (D2)					
Iron Deposits (B5)	Thin Muck						
Inundation Visible on Aerial Im-	· · · · · · · · · · · · · · · · · · ·	lain in Remarks)					
Sparsely Vegetated Concave S	Surface (B8)		FAC-Neutral To	est (D5)			
Field Observations:	No. / Double (in a	I \					
	No ✓ Depth (inc						
	S No Depth (inc S ✓ No Depth (inc		Wetland Hydrology Present?	) Van / Na			
(includes capillary fringe)	; <u> </u>	nes). <u>U</u>	wettand hydrology Present?	7 fes <u></u> NO			
Describe Recorded Data (stream ga	auge, monitoring well, aerial p	hotos, previous inspect	ions), if available:				
Remarks:							
riomanie.							

	Absolute	Dominant	Indicator	Deminance Testure desired
$\underline{\text{Tree Stratum}} \hspace{0.2cm} (\text{Plot size:} \underline{}}})$		Species?		Dominance Test worksheet:  Number of Dominant Species
1. <u>Ulmus americana</u>	30	Y	<u>FACW</u>	That Are OBL, FACW, or FAC: 4 (A)
2. Acer saccharinum	25	Y	<b>FACW</b>	Total Number of Dominant
3. Quercus palustris	5	N	<u>FACW</u>	Species Across All Strata:4 (B)
4				Percent of Dominant Species
5				That Are OBL, FACW, or FAC: 100.00 (A/B)
6				Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
	_60	= Total Cov	/er	OBL species 10.00 x 1 = 10.00
Sapling/Shrub Stratum (Plot size: 15 )				FACW species <u>135.00</u> x 2 = <u>270.00</u>
1				FAC species <u>5.00</u> x 3 = <u>15.00</u>
2				FACU species <u>0.00</u> x 4 = <u>0.00</u>
3				UPL species $0.00 \times 5 = 0.00$
4				Column Totals: <u>150.00</u> (A) <u>295.00</u> (B)
5.				Prevalence Index = B/A = 1.97
6				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
		= Total Cov	/er	∠ 2 - Dominance Test is >50%
Herb Stratum (Plot size:5)				✓ 3 - Prevalence Index is ≤3.0 <sup>1</sup>
1. Phalaris arundinacea	40	Υ	FACW	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
2. Solidago gigantea	45	Y	FACW	Problematic Hydrophytic Vegetation¹ (Explain)
3. Carex lacustris	40		OBL	
4. Elymus virginicus		N	FACW	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5. Cornus racemosa		N	FAC	· · · · · · · · · · · · · · · · · · ·
6. Onoclea sensibilis		N	FACW	Definitions of Vegetation Strata:
7. Rubus pubescens				<b>Tree</b> – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
8			171011	
•				Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.
10				
11.				Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
12.				Woody vines – All woody vines greater than 3.28 ft in
12.		= Total Cov		height.
Woody Vine Stratum (Plot size:30)		- Total Co	/ei	
,,				
1				
2				
3				Hydrophytic Vegetation
4				Present? Yes <u>√</u> No
Remarks: (Include photo numbers here or on a separate		= Total Cov	/er	
Tremains. (moldae photo numbers here of on a separate	Silect.)			

Sampling Point: WL H1

<u>Color (moist)</u> 10YR 2/1	%	Color (moist) % Type <sup>1</sup> Loc <sup>2</sup>	Texture	Remarks
<u>10YR 2/1</u>				
	100_		SICL	
10YR 6/2	100		CL	
	- ——  –			
	letion, RM=R	Reduced Matrix, MS=Masked Sand Grains.		e Lining, M=Matrix.  lematic Hydric Soils³:
pipedon (A2) distic (A3) en Sulfide (A4) d Layers (A5) d Below Dark Surface ark Surface (A12) Mucky Mineral (S1) Gleyed Matrix (S4) Redox (S5) d Matrix (S6) urface (S7) (LRR R, M	  MLRA 149B)	MLRA 149B) Thin Dark Surface (S9) (LRR R, MLRA 149B) Loamy Mucky Mineral (F1) (LRR K, L) Loamy Gleyed Matrix (F2) Depleted Matrix (F3) Redox Dark Surface (F6) Depleted Dark Surface (F7) Redox Depressions (F8)	Coast Prairie Re 5 cm Mucky Pea Dark Surface (S Polyvalue Below Thin Dark Surfac Iron-Manganese Piedmont Flood Mesic Spodic (T Red Parent Mate Very Shallow Da Other (Explain in	edox (A16) (LRR K, L, R) at or Peat (S3) (LRR K, L, R) 7) (LRR K, L) 7 Surface (S8) (LRR K, L) 9 Masses (F12) (LRR K, L, R) 1 plain Soils (F19) (MLRA 149B) 1 (F21) 1 ark Surface (TF12)
		and hydrology must be present, unless disturbed o	or problematic.	
	•			
nches):			Hydric Soil Present?	? Yes <u>√</u> No
	Indicators:  In (A1)  Ipipedon (A2)  Idistic (A3)  In Sulfide (A4)  Indicators:  In	Indicators:  In (A1) Impipedon (A2) Idistic (A3) Impipedon (A4) Impipedon (A4) Impipedon (A4) Impipedon (A4) Impipedon (A4) Impipedon (A5) Impipedon (A1) Impipedon (A12) Impipedon (A2) Impipedon (A1) Impipedon (A	Polyvalue Below Surface (S8) (LRR R, MLRA 149B)  Ilistic (A3)	Indicators:  Indicators for Prob Id (A1) Implement (A2) Id (A1) Implement (A2) Indicators for Prob Id (A1) Implement (A2) Indicators for Prob Id (A1) Implement (A2) Implement (A2) Indicators for Prob Id (A1) Implement (A2) Implement (A2) Implement (A3) Implement (A3) Implement (A3) Implement (A4) Implemen

Project/Site: Riverbend Cit	ty/County: Sanilac County Sampling Date: 2022-04-11					
	State: Michigan Sampling Point: WL HH1					
Investigator(s): K. Yantz, D. Nigro -Atwell, LLC Se						
	I relief (concave, convex, none): Concave Slope (%): 0-2					
· · · · · · · · · · · · · · · · · · ·	Long: -82.830259 Datum: WGS84					
Soil Map Unit Name: Parkhill loam, 0 to 1 percent slopes						
Are climatic / hydrologic conditions on the site typical for this time of year'						
	sturbed? Are "Normal Circumstances" present? Yes _ ✓ No					
Are Vegetation, Soil, or Hydrology naturally proble						
SUMMARY OF FINDINGS – Attach site map showing s	ampling point locations, transects, important features, etc.					
Hydrophytic Vegetation Present? Yes ✓ No	Is the Sampled Area					
Hydric Soil Present? Yes ✓ No	within a Wetland? Yes No					
Wetland Hydrology Present? Yes No	If yes, optional Wetland Site ID:					
Remarks: (Explain alternative procedures here or in a separate report.) PFO drainage within woodlot						
PPO drainage within woodiot						
HADBOLOGA						
HYDROLOGY Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)					
Primary Indicators (minimum of one is required; check all that apply)	- · · · · · · · · · · · · · · · · · · ·					
✓ Surface Water (A1) ✓ Water-Stained Le.						
✓ High Water Table (A2) — Aquatic Fauna (B						
✓ Saturation (A3) — Aquation (A3) — Marl Deposits (B1						
Water Marks (B1) Hydrogen Sulfide						
	ospheres on Living Roots (C3) Saturation Visible on Aerial Imagery (C9)					
	Reduced Iron (C4) Stunted or Stressed Plants (D1)					
	inction in Tilled Soils (C6)  Geomorphic Position (D2)					
Iron Deposits (B5) Thin Muck Surface						
Individuals (B5) Thin Made during Individuals (B7) Other (Explain in largery (B7) Other (Explain in largery (B7) Other (Explain in largery (B7) Other (B7)						
✓ Sparsely Vegetated Concave Surface (B8)	✓ FAC-Neutral Test (D5)					
Field Observations:	<u>√</u> 1 AC-Neutral Test (D3)					
Surface Water Present? Yes ✓ No Depth (inches): _	1					
Water Table Present? Yes _ / No Depth (inches): _						
Saturation Present? Yes _ / No Depth (inches): (						
(includes capillary fringe)						
Describe Recorded Data (stream gauge, monitoring well, aerial photos,	previous inspections), if available:					
Remarks:						

apling/Shrub Stratum (Plot size: 15 )	40	Y = Total Cov	FACW	Dominance Test worksheet:  Number of Dominant Species That Are OBL, FACW, or FAC:  Total Number of Dominant Species Across All Strata:  Percent of Dominant Species That Are OBL, FACW, or FAC:  100.00 (A/B)
Sapling/Shrub Stratum (Plot size: 15 )	40		FACW	That Are OBL, FACW, or FAC:3 (A)  Total Number of Dominant Species Across All Strata:3 (B)  Percent of Dominant Species
apling/Shrub Stratum (Plot size: 15 )  Rhamnus cathartica	40	= Total Cov		Species Across All Strata:3 (B)  Percent of Dominant Species
apling/Shrub Stratum (Plot size: 15 )  Rhamnus cathartica	40	= Total Cov		Percent of Dominant Species
Rhamnus cathartica		= Total Cov		
Rhamnus cathartica		= Total Cov		That Are OBE, I AGW, GIT AC. 100.00 (A/B)
Rhamnus cathartica		= Total Cov		
Rhamnus cathartica		= Total Cov		Prevalence Index worksheet:
Rhamnus cathartica		= Total Cov		
Rhamnus cathartica	5		er	OBL species
		V	FAC	FAC species 5.00 x3 = 15.00
riaxinus perinsylvanica				FACU species 0.00 x 4 = 0.00
	<u> </u>	<u> </u>	<u>FACW</u>	UPL species <u>0.00</u> x 5 = <u>0.00</u>
				Column Totals: <u>50.00</u> (A) <u>105.00</u> (B)
•				Prevalence Index = B/A = 2.1
				Hydrophytic Vegetation Indicators:
•				1 - Rapid Test for Hydrophytic Vegetation
•	10	= Total Cov		∠ 2 - Dominance Test is >50%
- India Charles (Diet sizes 5	10	= Total Cov	rer	3 - Prevalence Index is ≤3.0¹
l <u>erb Stratum</u> (Plot size:5 )				4 - Morphological Adaptations (Provide supporting
•				data in Remarks or on a separate sheet)  Problematic Hydrophytic Vegetation¹ (Explain)
·				robiematic riyuropriytic vegetation (Explain)
·				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
				Definitions of Vegetation Strata:
				Tree – Woody plants 3 in. (7.6 cm) or more in diameter
•				at breast height (DBH), regardless of height.
·				Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.
0				Herb – All herbaceous (non-woody) plants, regardless
1				of size, and woody plants less than 3.28 ft tall.
2				Woody vines – All woody vines greater than 3.28 ft in height.
-	0	= Total Cov	er er	. No.grin.
Voody Vine Stratum (Plot size: 30 )				
·				
•				
٠				Hydrophytic
·				Vegetation   Present?
- Remarks: (Include photo numbers here or on a separate sh		= Total Cov	er er	

Sampling Point: WL HH1

10YR   2/1   100   MUCK	(inches)	Color (moist)	%	Color (n		x Features %	_Type <sup>1</sup> _	Loc <sup>2</sup>	Texture	Remarks
Negre CeConcentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.  Negric Soil Indicators:  Histosol (A1)  Histic Epipedon (A2)  Black Histic (A3)  Histic (A3)  Histic (A3)  Hydrogen Sulfide (A4)  Loamy Mucky Mineral (F1) (LRR K, L)  Depleted Below Dark Surface (A11)  Depleted Matrix (F2)  Depleted Below Dark Surface (A11)  Depleted Matrix (F3)  Thic Dark Surface (A12)  Sandy Mucky Mineral (S1)  Sandy Mucky Mineral (S1)  Sandy Mucky Mineral (S1)  Sandy Mucky Mineral (S1)  Redox Depressions (F8)  Dark Surface (S7) (LRR K, L)  Polyvalue Below Surface (S8) (LRR K, L)  Depleted Matrix (F3)  Thin Dark Surface (S9) (LRR K, L)  Polyvalue Below Surface (S8) (LRR K, L)  Polyvalue Below Surface (S8) (LRR K, L)  Dark Surface (S7) (LRR K, L)  Thin Dark Surface (S8) (LRR K, L)  Polyvalue Below Surface (S8) (LRR K, L)  Polyvalue Below Surface (S8) (LRR K, L)  Polyvalue Below Surface (S8) (LRR K, L)  Thin Dark Surface (S9) (LRR K, L)  Polyvalue Below Surface (S8) (LRR K, L)  Thin Dark Surface (S9) (LRR K, L)  Polyvalue Below Surface (S8) (LRR K, L)	0 0	<del></del>		(11	10101		1 ypc			nomano
Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.  ydric Soil Indicators: Histosol (A1) Polyvalue Below Surface (S8) (LRR R, Histic Epipedon (A2) Thin Dark Surface (S9) (LRR R, MLRA 149B) Cast Prairie Redox (A16) (LRR K, L, MLRA 149B) Black Histic (A3) Thin Dark Surface (S9) (LRR R, MLRA 149B) Stratified Layers (A5) Loamy Mucky Mineral (F1) (LRR K, L) Dark Surface (S7) (LRR K, L) Depleted Below Dark Surface (A11) Depleted Matrix (F3) Thin Dark Surface (F6) Honomanganese Masses (F12) (LRR K, L) Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Permont Floodplain Soils (F19) MLRA 149B) Sandy Gleyed Matrix (S4) Redox Depressions (F8) Mesic Spodic (TA6) (MLRA 144A, 145, 145, 145, 145, 145, 145, 145, 145	<b>8_16</b>			10VP	6/4	15		M		Prominent redov
Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.   Castion: PL=Pore Lining, M=Matrix.	0-10	10111 2/1	_00_							1 TOMMENT TEGOX.
Histosol (A1) Polyvalue Below Surface (S8) (LRR R, Coast Prairie Redox (A16) (LRR K, L, R)  Histic Epipedon (A2) MLRA 149B) Coast Prairie Redox (A16) (LRR K, L, R)  Black Histic (A3) Thin Dark Surface (S9) (LRR R, MLRA 149B) Stratified Layers (A5) Loamy Mucky Mineral (F1) (LRR K, L)  Stratified Layers (A5) Depleted Below Dark Surface (A11) Depleted Matrix (F2) Polyvalue Below Surface (S9) (LRR K, L)  Thick Dark Surface (A12) Redox Dark Surface (F6) Iron-Manganese Masses (F12) (LRR K, L, Pidemont Floodplain Soils (F19) (MLRA 144 Sandy Redox (S5) Sandy Redox (S5) Red Parent Material (F21) Very Shallow Dark Surface (TF12) Dark Surface (S7) (LRR R, MLRA 149B)  Stripped Matrix (S6) Dark Surface (S7) (LRR R, MLRA 149B)  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.				TUTK	3/2		<u> </u>	IVI	SCL	
Histosol (A1)										
Histosol (A1) — Polyvalue Below Surface (S8) (LRR R, L) — Coast Prairie Redox (A16) (LRR K, L, R) — Black Histic (A3) — Thin Dark Surface (S9) (LRR R, MLRA 149B) — 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) — Dark Surface (S9) (LRR K, L) — Dark Surface (S7) (LRR K, L) — Dorleted Below Surface (S9) (LRR K, L) — Dorleted Below Surface (S9) (LRR K, L) — Dorleted Below Dark Surface (A11) — Depleted Matrix (F3) — Thin Dark Surface (S9) (LRR K, L) — Polyvalue Below Surface (S9) (LRR K, L) — Thin Dark Surface (S9) (LRR K, L) — Thin Dark Surface (S9) (LRR K, L) — Polyvalue Below Surface (S9) (LRR K, L) — Thin Dark Surface (S9) (LRR K, L) — Thin Dark Surface (S9) (LRR K, L) — Piedmont Floodplain Soils (F19) (MLRA 14 — Sandy Gleyed Matrix (S4) — Redox Depressions (F8) — Mesic Spodic (TA6) (MLRA 144A, 145, 145, 145, 145, 145, 145, 145, 145										
Histosol (A1) Polyvalue Below Surface (S8) (LRR R,						<u> </u>				
Histosol (A1) Polyvalue Below Surface (S8) (LRR R, Loant Hughing Surface (S8) (LRR R, Loant Hughing Surface (S8) (LRR R, Loant Hughing Surface (S9) (LRR R, MLRA 149B) Coast Prairie Redox (A16) (LRR K, L, R) Black Histic (A3) Thin Dark Surface (S9) (LRR R, MLRA 149B) Surface (S9) (LRR R, MLRA 149B) Surface (S9) (LRR K, L) Dark Surface (S7) (LRR K, L) Dark Surface (S7) (LRR K, L) Dark Surface (S7) (LRR K, L) Depleted Below Dark Surface (A11) Depleted Matrix (F3) Thin Dark Surface (S9) (LRR K, L) Thin Dark Surface (S9) (LRR K, L) Depleted Below Dark Surface (A12) Redox Dark Surface (F6) Iron-Manganese Masses (F12) (LRR K, L, Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Piedmont Floodplain Soils (F19) (MLRA 144 Sandy Gleyed Matrix (S4) Redox Depressions (F8) Red Parent Material (F21) Very Shallow Dark Surface (TF12) Dark Surface (S7) (LRR R, MLRA 149B) Medicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.										
Histosol (A1) Polyvalue Below Surface (S8) (LRR R, Loant Hughing Surface (S8) (LRR R, Loant Hughing Surface (S8) (LRR R, Loant Hughing Surface (S9) (LRR R, MLRA 149B) Coast Prairie Redox (A16) (LRR K, L, R) Black Histic (A3) Thin Dark Surface (S9) (LRR R, MLRA 149B) Surface (S9) (LRR R, MLRA 149B) Surface (S9) (LRR K, L) Dark Surface (S7) (LRR K, L) Dark Surface (S7) (LRR K, L) Dark Surface (S7) (LRR K, L) Depleted Below Dark Surface (A11) Depleted Matrix (F3) Thin Dark Surface (S9) (LRR K, L) Thin Dark Surface (S9) (LRR K, L) Depleted Below Dark Surface (A12) Redox Dark Surface (F6) Iron-Manganese Masses (F12) (LRR K, L, Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Piedmont Floodplain Soils (F19) (MLRA 144 Sandy Gleyed Matrix (S4) Redox Depressions (F8) Red Parent Material (F21) Very Shallow Dark Surface (TF12) Dark Surface (S7) (LRR R, MLRA 149B) Medicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.										
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Histosol (A1) Polyvalue Below Surface (S8) (LRR R,		-				-				
Histosol (A1) Polyvalue Below Surface (S8) (LRR R, Loant Hughing Surface (S8) (LRR R, Loant Hughing Surface (S8) (LRR R, Loant Hughing Surface (S9) (LRR R, MLRA 149B) Coast Prairie Redox (A16) (LRR K, L, R) Black Histic (A3) Thin Dark Surface (S9) (LRR R, MLRA 149B) Surface (S9) (LRR R, MLRA 149B) Surface (S9) (LRR K, L) Dark Surface (S7) (LRR K, L) Dark Surface (S7) (LRR K, L) Dark Surface (S7) (LRR K, L) Depleted Below Dark Surface (A11) Depleted Matrix (F3) Thin Dark Surface (S9) (LRR K, L) Thin Dark Surface (S9) (LRR K, L) Depleted Below Dark Surface (A12) Redox Dark Surface (F6) Iron-Manganese Masses (F12) (LRR K, L, Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Piedmont Floodplain Soils (F19) (MLRA 144 Sandy Gleyed Matrix (S4) Redox Depressions (F8) Red Parent Material (F21) Very Shallow Dark Surface (TF12) Dark Surface (S7) (LRR R, MLRA 149B) Medicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.		-								
Histosol (A1) Polyvalue Below Surface (S8) (LRR R, Loant Hughing Surface (S8) (LRR R, Loant Hughing Surface (S8) (LRR R, Loant Hughing Surface (S9) (LRR R, MLRA 149B) Coast Prairie Redox (A16) (LRR K, L, R) Black Histic (A3) Thin Dark Surface (S9) (LRR R, MLRA 149B) Surface (S9) (LRR R, MLRA 149B) Surface (S9) (LRR K, L) Dark Surface (S7) (LRR K, L) Dark Surface (S7) (LRR K, L) Dark Surface (S7) (LRR K, L) Depleted Below Dark Surface (A11) Depleted Matrix (F3) Thin Dark Surface (S9) (LRR K, L) Thin Dark Surface (S9) (LRR K, L) Depleted Below Dark Surface (A12) Redox Dark Surface (F6) Iron-Manganese Masses (F12) (LRR K, L, Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Piedmont Floodplain Soils (F19) (MLRA 144 Sandy Gleyed Matrix (S4) Redox Depressions (F8) Red Parent Material (F21) Very Shallow Dark Surface (TF12) Dark Surface (S7) (LRR R, MLRA 149B) Medicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.										
Histosol (A1) Polyvalue Below Surface (S8) (LRR R, Loant Hughing Surface (S8) (LRR R, Loant Hughing Surface (S8) (LRR R, Loant Hughing Surface (S9) (LRR R, MLRA 149B) Coast Prairie Redox (A16) (LRR K, L, R) Black Histic (A3) Thin Dark Surface (S9) (LRR R, MLRA 149B) Surface (S9) (LRR R, MLRA 149B) Surface (S9) (LRR K, L) Dark Surface (S7) (LRR K, L) Dark Surface (S7) (LRR K, L) Dark Surface (S7) (LRR K, L) Depleted Below Dark Surface (A11) Depleted Matrix (F3) Thin Dark Surface (S9) (LRR K, L) Thin Dark Surface (S9) (LRR K, L) Depleted Below Dark Surface (A12) Redox Dark Surface (F6) Iron-Manganese Masses (F12) (LRR K, L, Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Piedmont Floodplain Soils (F19) (MLRA 144 Sandy Gleyed Matrix (S4) Redox Depressions (F8) Red Parent Material (F21) Very Shallow Dark Surface (TF12) Dark Surface (S7) (LRR R, MLRA 149B) Medicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.										
Histosol (A1) Polyvalue Below Surface (S8) (LRR R, 2 cm Muck (A10) (LRR K, L, MLRA 149B) Histic Epipedon (A2)			letion, RM	=Reduced N	//atrix, MS	S=Masked	Sand Gra	ains.	Location	n: PL=Pore Lining, M=Matrix.
Histic Epipedon (A2)  Black Histic (A3)  Hydrogen Sulfide (A4)  Stratified Layers (A5)  Depleted Below Dark Surface (A11)  Thick Dark Surface (A12)  Sandy Mucky Mineral (S1)  Sandy Gleyed Matrix (S4)  Sandy Redox (S5)  Sardy Redox (S6)  Sardy Redox (S7) (LRR R, MLRA 149B)  Mesic Spodic (TA6) (MLRA 144A, 145, 145, 145, 145, 145, 145, 145, 145				Polvva	lue Belov	w Surface	(S8) ( <b>LR</b> F	R.		•
Hydrogen Sulfide (A4) Loamy Mucky Mineral (F1) (LRR K, L) Dark Surface (S7) (LRR K, L) Depleted Layers (A5) Loamy Gleyed Matrix (F2) Polyvalue Below Surface (S8) (LRR K, L) Polyvalue Below Surface (S8) (LRR K, L) Polyvalue Below Surface (S8) (LRR K, L) Thin Dark Surface (A11) Depleted Matrix (F3) Thin Dark Surface (S9) (LRR K, L) Iron-Manganese Masses (F12) (LRR K, L, Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Piedmont Floodplain Soils (F19) (MLRA 144							(00) (=: ::	,		
Stratified Layers (A5) Loamy Gleyed Matrix (F2) Polyvalue Below Surface (S8) (LRR K, L) Depleted Below Dark Surface (A11) Depleted Matrix (F3) Thin Dark Surface (S9) (LRR K, L) Thick Dark Surface (A12) Redox Dark Surface (F6) Iron-Manganese Masses (F12) (LRR K, L, Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Piedmont Floodplain Soils (F19) (MLRA 14 Sandy Gleyed Matrix (S4) Redox Depressions (F8) Mesic Spodic (TA6) (MLRA 144A, 145, 148 Sandy Redox (S5) Red Parent Material (F21) Stripped Matrix (S6) Very Shallow Dark Surface (TF12) Dark Surface (S7) (LRR R, MLRA 149B) Other (Explain in Remarks)  **Idicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.**  **Type:										
Depleted Below Dark Surface (A11) Depleted Matrix (F3) Thin Dark Surface (S9) (LRR K, L) Thick Dark Surface (A12) Redox Dark Surface (F6) Iron-Manganese Masses (F12) (LRR K, L, Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Piedmont Floodplain Soils (F19) (MLRA 14 Sandy Gleyed Matrix (S4) Redox Depressions (F8) Mesic Spodic (TA6) (MLRA 144A, 145, 145, 145, 145, 145, 145, 145, 145								, ∟)		
Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Piedmont Floodplain Soils (F19) (MLRA 144   Sandy Gleyed Matrix (S4) Redox Depressions (F8) Mesic Spodic (TA6) (MLRA 144A, 145, 145   Sandy Redox (S5) Red Parent Material (F21)   Stripped Matrix (S6) Very Shallow Dark Surface (TF12)   Dark Surface (S7) (LRR R, MLRA 149B) Other (Explain in Remarks)   dicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  **Estrictive Layer (if observed):**  Type:			e (A11)		-		'		Thin D	Dark Surface (S9) ( <b>LRR K, L</b> )
Sandy Gleyed Matrix (S4) Redox Depressions (F8) Mesic Spodic (TA6) (MLRA 144A, 145, 148 Sandy Redox (S5) Red Parent Material (F21) Very Shallow Dark Surface (TF12) Other (Explain in Remarks) Other (Explain in Remarks) dicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.							<b>7</b> \			
Sandy Redox (S5) Red Parent Material (F21) Very Shallow Dark Surface (TF12) Other (Explain in Remarks) Ot							/)			
Dark Surface (S7) (LRR R, MLRA 149B) Other (Explain in Remarks)  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  In the estrictive Layer (if observed):  Type:				11000%	Боргоос					
ndicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  estrictive Layer (if observed):  Type:										
estrictive Layer (if observed):  Type:	_ Dark Su	rface (S7) ( <b>LRR R</b> , <b>N</b>	/ILRA 149	<b>B</b> )					Other	(Explain in Remarks)
Type:	ndicators of	f hydrophytic vegetat	tion and w	etland hydro	logy mus	st be prese	nt, unless	disturbed	or problemation	C.
	estrictive I	Layer (if observed):								
Hvdric Soil Present? Yes ✓ No	Type:									
Deput (inclies).	Depth (inc	ches):							Hydric Soil	Present? Yes No

Project/Site: Riverbend		City/0	County: Sanilac Cou	unty Sa	mpling Date: 2022-04-11			
Applicant/Owner: Liberty			•	Sampling Point: WL HH2				
Investigator(s): K. Yantz, [					· -			
Landform (hillslope, terrace, etc	-							
Subregion (LRR or MLRA): LR								
Soil Map Unit Name: McBride s								
Are climatic / hydrologic condition	ons on the site typic	cal for this time of year? Y	′es ✓ No	(If no, explain in Rema	arks.)			
Are Vegetation, Soil		-			•			
Are Vegetation, Soil								
SUMMARY OF FINDING			·					
				,,				
Hydrophytic Vegetation Prese		✓ No	Is the Sampled Area within a Wetland?	Yes <u>√</u>	No			
Hydric Soil Present? Wetland Hydrology Present?		✓ No		·	·			
Remarks: (Explain alternative			If yes, optional Wetland	1 Site ID:				
PSS drainage								
HYDROLOGY								
Wetland Hydrology Indicator	rs:			Secondary Indicators	(minimum of two required)			
Primary Indicators (minimum o	of one is required; of	check all that apply)	_	Surface Soil Cra	cks (B6)			
✓ Surface Water (A1)		✓ Water-Stained Leave		Drainage Patterr				
✓ High Water Table (A2)		Aquatic Fauna (B13)		Moss Trim Lines				
✓ Saturation (A3)		Marl Deposits (B15)		Dry-Season Water Table (C2)				
Water Marks (B1)		Hydrogen Sulfide Od		Crayfish Burrows				
Sediment Deposits (B2)		Oxidized Rhizospher	-		e on Aerial Imagery (C9)			
Drift Deposits (B3) Algal Mat or Crust (B4)		Presence of Reduced Recent Iron Reduction		Stunted or Stres Geomorphic Pos				
Algal Mat of Crust (B4) Iron Deposits (B5)		Thin Muck Surface (	, ,	Shallow Aquitare				
Inundation Visible on Aeri		Other (Explain in Rei						
✓ Sparsely Vegetated Conc		Other (Explain in red	nano)	✓ FAC-Neutral Tes				
Field Observations:	are curiace (Bo)			<u></u>	(20)			
Surface Water Present?	Yes _ ✓ No _	Depth (inches): 1						
Water Table Present?		Depth (inches): 6						
Saturation Present? (includes capillary fringe)		Depth (inches): 0			Yes ✓ No			
Describe Recorded Data (stream	am gauge, monitor	ing well, aerial photos, pre	evious inspections), if ava	ailable:				
Remarks:								

<u>Tree Stratum</u> (Plot size:) 1		Dominant Species?	<u>Status</u>	Dominance Test worksheet:  Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
2				Total Number of Dominant Species Across All Strata: 2 (B)
4				Percent of Dominant Species
5				That Are OBL, FACW, or FAC:
6				Prevalence Index worksheet:
7		= Total Cov		
Sapling/Shrub Stratum (Plot size: 15 )		- Total Cov	GI	FACW species 10.00 x 2 = 20.00
1. Cornus racemosa	30	Y	_FAC_	FAC species <u>35.00</u> x 3 = <u>105.00</u>
2. Fraxinus pennsylvanica	10	Y	<u>FACW</u>	FACU species <u>0.00</u> x 4 = <u>0.00</u> UPL species <u>0.00</u> x 5 = <u>0.00</u>
3. <u>Rhamnus cathartica</u>	5	<u>N</u>	_FAC_	Column Totals: 45.00 (A) 125.00 (B)
4				Prevalence Index = B/A = 2.78
5				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
		= Total Cov	er	∠ 2 - Dominance Test is >50%
Herb Stratum (Plot size: 5 )				3 - Prevalence Index is ≤3.0¹ 4 - Morphological Adaptations¹ (Provide supporting
1				data in Remarks or on a separate sheet)  Problematic Hydrophytic Vegetation¹ (Explain)
2				Troblematic Hydrophytic vegetation (Explain)
3				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5				Definitions of Vegetation Strata:
6				Tree – Woody plants 3 in. (7.6 cm) or more in diameter
7				at breast height (DBH), regardless of height.
8				Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.
10				Herb – All herbaceous (non-woody) plants, regardless
11				of size, and woody plants less than 3.28 ft tall.
12				<b>Woody vines</b> – All woody vines greater than 3.28 ft in height.
20	0	= Total Cov	er	Ü
Woody Vine Stratum (Plot size:30)  1				
2				
3				Hydrophytic
4				Vegetation Present? Yes ✓ No
		= Total Cov	er er	100
Remarks: (Include photo numbers here or on a separate s	sheet.)			

Sampling Point: WL HH2

anhaa\	Matrix Color (moist)	%	Colon /		K Features	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Domorko
nches)			Color (m	-	<u> </u>				Remarks
0-16	10YR 3/2	_80_	<u>10YR</u>	<u>5/6</u>	<u> 15</u>	_ <u>C</u> _	<u> </u>		Prominent redox.
<u>0-16                                    </u>			10YR	5/2	<u> </u>	<u>D</u>	M	SCL	
	oncentration, D=Dep	letion, RM	 I=Reduced N	latrix, MS	 S=Masked	Sand Gr	ains.	<sup>2</sup> Location	n: PL=Pore Lining, M=Matrix.
Black Hi Hydroge Stratified Depleted Thick Da Sandy M Sandy G Sandy F Stripped	(A1) pipedon (A2) istic (A3) en Sulfide (A4) d Layers (A5) d Below Dark Surface ark Surface (A12) Mucky Mineral (S1) Gleyed Matrix (S4) Redox (S5) I Matrix (S6) Irface (S7) (LRR R, N		MLF Thin D Loamy Deplet Redox Deplet Redox	RA 149B) ark Surfa Mucky M Gleyed M ed Matrix Dark Sur ed Dark S	ce (S9) ( <b>L</b> lineral (F1 Matrix (F2) (F3) face (F6) Surface (F	RR R, MI ) (LRR K	_RA 149B)	Coast 5 cm l Dark 9 Polyva Thin E Iron-M Piedm Mesic Red F	Muck (A10) (LRR K, L, MLRA 149B) Prairie Redox (A16) (LRR K, L, R) Mucky Peat or Peat (S3) (LRR K, L, R) Surface (S7) (LRR K, L) Palue Below Surface (S8) (LRR K, L) Park Surface (S9) (LRR K, L) Manganese Masses (F12) (LRR K, L, R) Pront Floodplain Soils (F19) (MLRA 1491) Parent Material (F21) Shallow Dark Surface (TF12) (Explain in Remarks)
	f hydrophytic vegetat Layer (if observed):		etland hydro	logy mus	t be prese	nt, unless	disturbed	or problemati	c.
Type:	Layer (ii observea).								
Depth (in	ches):							Hydric Soi	I Present? Yes No
emarks:									

Project/Site: Riverbend	Citv/County:	Sanilac County	Sampling Date: 2022-04-11				
Applicant/Owner: Liberty		•	gan Sampling Point: WL HH3				
Investigator(s): K. Yantz, D. Nigro -Atwell,							
Landform (hillslope, terrace, etc.): Depression							
Subregion (LRR or MLRA): LRR L, MLRA 98 Lat:							
Soil Map Unit Name: Parkhill loam and clay I	oam, 0 to 2 percent	SIODES NWI classif	fication: None				
Are climatic / hydrologic conditions on the site typical for	r this time of year? Yes✓	No (If no, explain in	Remarks.)				
Are Vegetation, Soil, or Hydrology	significantly disturbed?	Are "Normal Circumstances"	'present? Yes <u>√</u> No				
Are Vegetation, Soil, or Hydrology	naturally problematic?	(If needed, explain any answ	vers in Remarks.)				
SUMMARY OF FINDINGS - Attach site ma	ap showing sampling	point locations, transect	s, important features, etc.				
Hydrophytic Vegetation Present?	No. Is the	Sampled Area					
	110		No				
		optional Wetland Site ID:					
Remarks: (Explain alternative procedures here or in a	•	optional Wotland Oile ID.					
PFO depression	. ,						
T T O depression							
HYDROLOGY							
Wetland Hydrology Indicators:		Secondary India	cators (minimum of two required)				
Primary Indicators (minimum of one is required; check	all that apply)	Surface So	il Cracks (B6)				
✓ Surface Water (A1)	Water-Stained Leaves (B9)	Drainage P	atterns (B10)				
	Aquatic Fauna (B13)						
	Marl Deposits (B15)						
	Hydrogen Sulfide Odor (C1)						
	Oxidized Rhizospheres on Liv		Visible on Aerial Imagery (C9)				
1 ' '	Presence of Reduced Iron (C	e of Reduced Iron (C4)  — Stunted or Stressed Plants (D1) ron Reduction in Tilled Soils (C6)  — Geomorphic Position (D2)					
	Thin Muck Surface (C7)						
✓ Sparsely Vegetated Concave Surface (B8)	Other (Explain in Remarks)	inicrotopographic relief (D4) FAC-Neutral Test (D5)					
Field Observations:		I AO-Neuti	ai rest (D3)				
Surface Water Present? Yes _ ✓ No	Depth (inches): 3						
Water Table Present? Yes ✓ No		_					
Saturation Present? Yes   No		──   Wetland Hydrology Prese	ent? Yes <u>√</u> No				
(includes capillary fringe)		_					
Describe Recorded Data (stream gauge, monitoring we	ell, aerial photos, previous in	spections), if available:					
Remarks:							

Tree Stratum (Plot size: 30 )	Absolute % Cover	Dominant Indicator Species? Status	Dominance Test worksheet:
		Y FACW	Number of Dominant Species
			That Are OBL, FACW, or FAC: (A)
2. <u>Ulmus americana</u>		Y FACW	Total Number of Dominant
3. <u>Salix nigra</u>		N OBL	Species Across All Strata: (B)
4			Percent of Dominant Species
5	<del></del>		That Are OBL, FACW, or FAC: 100.00 (A/B)
6			Prevalence Index worksheet:
7			Total % Cover of: Multiply by:
	65	= Total Cover	OBL species <u>10.00</u> x 1 = <u>10.00</u>
Sapling/Shrub Stratum (Plot size: 15 )			FACW species <u>55.00</u> x 2 = <u>110.00</u>
1			FAC species <u>0.00</u> x 3 = <u>0.00</u>
2			FACU species <u>0.00</u> x 4 = <u>0.00</u>
3			UPL species <u>0.00</u> x 5 = <u>0.00</u>
4.			Column Totals: <u>65.00</u> (A) <u>120.00</u> (B)
5.			Prevalence Index = B/A = <u>1.85</u>
6.			Hydrophytic Vegetation Indicators:
7			✓ 1 - Rapid Test for Hydrophytic Vegetation
T		= Total Cover	∠ 2 - Dominance Test is >50%
Hart Otation (Blatains 5		- Total Cover	3 - Prevalence Index is ≤3.0¹
Herb Stratum (Plot size: 5			4 - Morphological Adaptations <sup>1</sup> (Provide supporting
1			data in Remarks or on a separate sheet)  Problematic Hydrophytic Vegetation¹ (Explain)
2			Problematic Hydrophytic Vegetation (Explain)
3			<sup>1</sup> Indicators of hydric soil and wetland hydrology must
4			be present, unless disturbed or problematic.
5			Definitions of Vegetation Strata:
6			Tree – Woody plants 3 in. (7.6 cm) or more in diameter
7			at breast height (DBH), regardless of height.
8	·		Sapling/shrub – Woody plants less than 3 in. DBH
9			and greater than or equal to 3.28 ft (1 m) tall.
10			Herb – All herbaceous (non-woody) plants, regardless
11			of size, and woody plants less than 3.28 ft tall.
12.			Woody vines – All woody vines greater than 3.28 ft in
	0	= Total Cover	height.
Woody Vine Stratum (Plot size: 30 )			
1			
2			
3			Hydrophytic
4.			Vegetation
	0	= Total Cover	Present? Yes No
Remarks: (Include photo numbers here or on a separate s			
·	,		

Sampling Point: WL HH3

SOIL

iches)	Matrix Color (moist)	%	Color (moist)	Features	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
	•	·	Color (moist)	%	туре	LUC		Remarks
0-6	10YR 2/2	_100_	1017				SCL_	
6-16 ——	10YR 3/2	90_	10YR 6/4		<u>C</u>	M	SCL	Distinct redox.
							21 11	
	oncentration, D=Dep Indicators:	letion, RIV	=Reduced Matrix, MS	=Masked S	and Gra	ains.		n: PL=Pore Lining, M=Matrix. s for Problematic Hydric Soils <sup>3</sup> :
Black Hi Hydroge Stratified Depleted Thick Da Sandy M Sandy G Sandy F Stripped	pipedon (A2) istic (A3) en Sulfide (A4) d Layers (A5) d Below Dark Surface ark Surface (A12) Mucky Mineral (S1) Gleyed Matrix (S4) Redox (S5) I Matrix (S6) Irface (S7) (LRR R, M		MLRA 149B)  Thin Dark Surfactor Loamy Mucky Modely Model	lineral (F1) Matrix (F2) (F3) face (F6) Surface (F7)	(LRR K		5 cm M Dark S Polyva Thin E Iron-M Piedm Mesic Red P Very S	Prairie Redox (A16) (LRR K, L, R) Mucky Peat or Peat (S3) (LRR K, L, R) Surface (S7) (LRR K, L) alue Below Surface (S8) (LRR K, L) Dark Surface (S9) (LRR K, L) Idanganese Masses (F12) (LRR K, L, R) Idant Floodplain Soils (F19) (MLRA 1498 Spodic (TA6) (MLRA 144A, 145, 1498 Idarent Material (F21) Shallow Dark Surface (TF12) (Explain in Remarks)
dicators o	f hydrophytic vegetat	tion and w	etland hydrology mus	be present	t, unless	disturbed of	or problemation	c.
strictive	Layer (if observed):	:						
Type:								
Depth (in	ches):						Hydric Soil	Present? Yes/ No

Project/Site: Riverbend		City/C	County: Sanilac Co	ountv	Sampling Date: <u>2022-04-1</u>
Applicant/Owner: Liberty				•	n Sampling Point: WL HH4
Investigator(s): K. Yantz, [					· · · · · ·
•	•	•			Slope (%): <u>0-2</u>
					Datum: WGS84
Soil Map Unit Name: Parkhi					
Are climatic / hydrologic condition	ons on the site typic	cal for this time of year? Y	′es <u>√</u> No	_ (If no, explain in Re	emarks.)
		-			resent? Yes No
Are Vegetation, Soil					
					important features, etc.
					portuint routuros, stor
Hydrophytic Vegetation Prese		✓ No	Is the Sampled Area within a Wetland?		No
Hydric Soil Present? Wetland Hydrology Present?		✓ No ✓ No			<del></del>
Remarks: (Explain alternative			If yes, optional Wetla	nd Site ID:	
PSS depression					
HYDROLOGY					
Wetland Hydrology Indicato	rs:			Secondary Indicate	ors (minimum of two required)
Primary Indicators (minimum o	of one is required; c	heck all that apply)		Surface Soil C	Cracks (B6)
✓ Surface Water (A1)		✓ Water-Stained Leave	es (B9)	Drainage Patt	erns (B10)
✓ High Water Table (A2)		Aquatic Fauna (B13)		✓ Moss Trim Lin	nes (B16)
✓ Saturation (A3)		Marl Deposits (B15)		-	Vater Table (C2)
Water Marks (B1)		Hydrogen Sulfide Od		Crayfish Burro	
Sediment Deposits (B2)		Oxidized Rhizospher	-	•	sible on Aerial Imagery (C9)
Drift Deposits (B3) Algal Mat or Crust (B4)		Presence of Reduced Recent Iron Reduction	` '	Stunted or Str	essed Plants (D1)
Iron Deposits (B5)		Thin Muck Surface (0		Shallow Aquit	
Inundation Visible on Aeri		Other (Explain in Rer	·		phic Relief (D4)
✓ Sparsely Vegetated Cond		Other (Explain in real	nanoj	FAC-Neutral 1	
Field Observations:					( - /
Surface Water Present?	Yes _ ✓ No _	Depth (inches): 1			
Water Table Present?		Depth (inches): 2			
Saturation Present? (includes capillary fringe)		Depth (inches): <u>0</u>			? Yes/ No
Describe Recorded Data (stre	am gauge, monitori	ing well, aerial photos, pre	evious inspections), if a	vailable:	
Remarks:					
Tiomaine.					

Tree Stratum (Plot size: 30 )	Absolute % Cover	Dominant Species?		Dominance Test worksheet:
1. Fraxinus pennsylvanica				Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)
2.	_			That Are OBL, FACW, or FAC:4 (A)
3				Total Number of Dominant Species Across All Strata: 4 (B)
				(-)
4				Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)
5				
6				Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
4-	5	= Total Cov	er/er	OBL species <u>5.00</u> x 1 = <u>5.00</u>
Sapling/Shrub Stratum (Plot size: 15 )				FACW species <u>5.00</u> x 2 = <u>10.00</u> FAC species <u>90.00</u> x 3 = <u>270.00</u>
1. Rhamnus cathartica		<u> </u>		FACU species 0.00 x4 = 0.00
2. <u>Cornus racemosa</u>	_ <u>_40_</u>	<u> </u>	<u>FAC</u>	UPL species x 5 =
3				Column Totals: <u>100.00</u> (A) <u>285.00</u> (B)
4				
5				Prevalence Index = B/A = 2.85
6				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
	90	= Total Cov	er er	∠ 2 - Dominance Test is >50%
Herb Stratum (Plot size:)				3 - Prevalence Index is ≤3.0¹
1. Carex lacustris	5	Y	OBL_	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
2				Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
3.				
4				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5				
6.				Definitions of Vegetation Strata:
7				Tree – Woody plants 3 in. (7.6 cm) or more in diameter
8				at breast height (DBH), regardless of height.
				Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.
9				
10				Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
11				
12				Woody vines – All woody vines greater than 3.28 ft in height.
20	5	= Total Cov	/er	
Woody Vine Stratum (Plot size: 30 )				
1				
2				
3				Hydrophytic
4				Vegetation Present? Yes No
	0	= Total Cov	er er	
Remarks: (Include photo numbers here or on a separate	sheet.)			

Sampling Point: WL HH4

SOIL

Depth (inches)  0-6  6-16	Matrix			Redo	x Features	<u>.</u>			
	Color (moist)	%	Color (n		<u>%</u>	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
6-16	10YR 3/2	100						SCL	
	10YR 3/2 80 10YR 6/6 20					<u>C</u>	M	SCL	Prominent redox.
<sup>1</sup> Type: C=C Hydric Soil	Concentration, D=Dep	letion, RM	=Reduced N	Matrix, MS	S=Masked	Sand Gra	ains.		n: PL=Pore Lining, M=Matrix. s for Problematic Hydric Soils³:
Histosol (A1) Histic Epipedon (A2) Black Histic (A3) Hydrogen Sulfide (A4) Stratified Layers (A5) Depleted Below Dark Surface (A11) Thick Dark Surface (A12) Sandy Mucky Mineral (S1) Sandy Gleyed Matrix (S4) Sandy Redox (S5) Stripped Matrix (S6) Dark Surface (S7) (LRR R, MLRA 149)			MLF Thin D Loamy Loamy Deplet Redox Deplet Redox	RA 149B) ark Surfa Mucky M Gleyed I ed Matrix Dark Sured Dark Sured	ce (S9) ( <b>L</b> lineral (F1 Matrix (F2) (F3)	RR R, MI ) (LRR K	-RA 149B)	Coast 5 cm Dark 5 Polyv Thin I Iron-N Piedn Mesic Red F	Muck (A10) (LRR K, L, MLRA 149B) t Prairie Redox (A16) (LRR K, L, R) Mucky Peat or Peat (S3) (LRR K, L, R) Surface (S7) (LRR K, L) alue Below Surface (S8) (LRR K, L) Dark Surface (S9) (LRR K, L) Manganese Masses (F12) (LRR K, L, R) nont Floodplain Soils (F19) (MLRA 149B) Parent Material (F21) Shallow Dark Surface (TF12) (Explain in Remarks)
	of hydrophytic vegetat		etland hydro	logy mus	t be prese	nt, unless	disturbed	or problemati	ic.
	Layer (if observed):								
Type:	b\.							Hydric Soi	l Present? Yes <u>√</u> No
Depth (in Remarks:	icnes):							Tryuno oo.	111000HC 100 HO

Project/Site: Riverbend	City/County: Sa	nilac County	Sampling Date: 2022-04-16
Applicant/Owner: Liberty		•	
Investigator(s): J. Brown - Atwell LLC			·
Landform (hillslope, terrace, etc.): Depression			
Subregion (LRR or MLRA): LRR L, MLRA 99 L			
Soil Map Unit Name: Parkhill loam and cla	•	•	•
Are climatic / hydrologic conditions on the site typical			
Are Vegetation, Soil, or Hydrology	significantly disturbed?	Are "Normal Circumstances"	present? Yes ✓ No
Are Vegetation, Soil, or Hydrology _	naturally problematic?	(If needed, explain any answ	ers in Remarks.)
SUMMARY OF FINDINGS - Attach site	map showing sampling po	int locations, transect	s, important features, etc.
Hydrophytic Vagatation Procent?	No. / Is the San	npled Area	
			No <u>✓</u>
Wetland Hydrology Present? Yes		onal Wetland Site ID:	
Remarks: (Explain alternative procedures here or		onar vvotaria ono ib.	
Open water wetland in residential	backvard.		
	zaen, a. a.		
HYDROLOGY			
Wetland Hydrology Indicators:		Secondary Indic	cators (minimum of two required)
Primary Indicators (minimum of one is required; ch	eck all that apply)	Surface Soi	
Surface Water (A1)	Water-Stained Leaves (B9)	Drainage Pa	
	Aquatic Fauna (B13)	Moss Trim I	
✓ Saturation (A3)	Marl Deposits (B15)	Dry-Seasor	n Water Table (C2)
Water Marks (B1)	Hydrogen Sulfide Odor (C1)	Crayfish Bu	rrows (C8)
Sediment Deposits (B2)	Oxidized Rhizospheres on Living	Roots (C3) Saturation \	Visible on Aerial Imagery (C9)
	Presence of Reduced Iron (C4)		Stressed Plants (D1)
	Recent Iron Reduction in Tilled S		c Position (D2)
	Thin Muck Surface (C7)	Shallow Aq	
	Other (Explain in Remarks)		raphic Relief (D4)
Sparsely Vegetated Concave Surface (B8)  Field Observations:		FAC-Neutra	al Test (D5)
	Depth (inches): <u>36</u>		
	Depth (inches): 0		
	Depth (inches): 0	Wetland Hydrology Prese	ent? Yes <u>√</u> No
(includes capillary fringe)			HIL: 165 <u>v</u> NO
Describe Recorded Data (stream gauge, monitoring	g well, aerial photos, previous inspe	ctions), if available:	
Remarks:			
10 ft deep open water			
To it doop opon water			

200	Absolute			Dominance Test worksheet:
ree Stratum (Plot size: <u>30</u> )		Species? S		Number of Dominant Species
				That Are OBL, FACW, or FAC:(A)
				Total Number of Dominant
				Species Across All Strata:1 (B)
				Percent of Dominant Species
				That Are OBL, FACW, or FAC: 0.00 (A/E
				Prevalence Index worksheet:
				Total % Cover of: Multiply by:
		= Total Cover		OBL species 0.00 x 1 = 0.00
pling/Shrub Stratum (Plot size:15)				FACW species 0.00 x 2 = 0.00
				FAC species 0.00 x 3 = 0.00
				FACU species 5.00 x 4 = 20.00
				UPL species 0.00 x 5 = 0.00
				Column Totals: 5.00 (A) 20.00 (B)
				Prevalence Index = B/A = 4.0
				Hydrophytic Vegetation Indicators:
				1 - Rapid Test for Hydrophytic Vegetation
		= Total Cover		2 - Dominance Test is >50%
and Christian (Distring		Total Gover		3 - Prevalence Index is ≤3.0¹
erb Stratum (Plot size: 5	_	V F	A (C)	4 - Morphological Adaptations (Provide supporting
<u>Festuca rubra</u>				data in Remarks or on a separate sheet)
				Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
				<sup>1</sup> Indicators of hydric soil and wetland hydrology must
				be present, unless disturbed or problematic.
				Definitions of Vegetation Strata:
				Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
				Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.
)				Herb – All herbaceous (non-woody) plants, regardless
				of size, and woody plants less than 3.28 ft tall.
l				Woody vines – All woody vines greater than 3.28 ft ir
2				height.
	5	= Total Cover		
/oody Vine Stratum (Plot size:)				
				Hydrophytic
				Vegetation
				Present? Yes No/
		= Total Cover		

SOIL Sampling Point: Wiii1

Depth	Matrix			x Features	1 ^		
inches)	Color (moist)	%	Color (moist)	% Type	e <sup>1</sup> Loc <sup>2</sup>	Texture	Remarks
0-							
						2	
		etion, RM	Reduced Matrix, MS	=Masked Sand	Grains.		PL=Pore Lining, M=Matrix.
ydric Soil I							or Problematic Hydric Soils <sup>3</sup> :
_ Histosol			Polyvalue Below		LRR R,		uck (A10) ( <b>LRR K, L, MLRA 149B</b> )
	ipedon (A2)		MLRA 149B)				Prairie Redox (A16) (LRR K, L, R)
_ Black His			Thin Dark Surface				ucky Peat or Peat (S3) (LRR K, L, R)
	n Sulfide (A4)		Loamy Mucky M		K K, L)		urface (S7) (LRR K, L)
	Layers (A5)	~ (	Loamy Gleyed N				ue Below Surface (S8) (LRR K, L)
	Below Dark Surface rk Surface (A12)	3 (A11)	Depleted Matrix Redox Dark Sur				rk Surface (S9) ( <b>LRR K, L</b> ) nganese Masses (F12) ( <b>LRR K, L, R</b> )
	ucky Mineral (S1)		Depleted Dark S				nt Floodplain Soils (F19) ( <b>MLRA 149B</b>
-	leyed Matrix (S4)		Redox Depressi				Spodic (TA6) ( <b>MLRA 144A, 145, 149B</b> )
	edox (S5)		Nedox Deplessi	ons (Fo)			rent Material (F21)
-	Matrix (S6)						nallow Dark Surface (TF12)
	face (S7) (LRR R, N	JI RΔ 149F	<b>2</b> )				Explain in Remarks)
_ Dark Gui	lace (O7) (EIRICIT, II	ILIXA 140L	<b>-</b> )			Other (E	Explain in Remarks)
ndicators of	hydrophytic vegetat	ion and we	etland hydrology mus	t be present, un	less disturbed	or problematic.	
	ayer (if observed):		, 3,			Τ .	
Type:	,						
						Usalvia Cail F	Present? Yes No <u>√</u>
Depth (inc	:hes):					Hydric Soil F	Present? Yes No <u>√</u>
emarks:							

Project/Site: Riverbend	City/Cc	ounty: Sanilac Co	untv	Sampling Date: 2022-04-16
Applicant/Owner: Liberty			•	gan Sampling Point: WL II2
Investigator(s): J. Brown - Atwell LLC			-	-
Landform (hillslope, terrace, etc.): Depression				
Subregion (LRR or MLRA): LRR L, MLRA 99				
Soil Map Unit Name: Parkhill loam and				
		•		
Are climatic / hydrologic conditions on the site typ				•
Are Vegetation, Soil, or Hydrolog				
Are Vegetation, Soil, or Hydrolog	y naturally problemat	ic? (If needed,	explain any answ	vers in Remarks.)
SUMMARY OF FINDINGS - Attach s	ite map showing sam	oling point location	ons, transect	s, important features, etc.
Hydric Soil Present? Yes _	✓ No	Is the Sampled Area within a Wetland?	·	No
Wetland Hydrology Present? Yes _ Remarks: (Explain alternative procedures here		if yes, optional Wetian	d Site ID:	
PSS/PFO				
HYDROLOGY				
Wetland Hydrology Indicators:	-		Secondary Indic	cators (minimum of two required)
Primary Indicators (minimum of one is required:	check all that apply)		Surface So	il Cracks (B6)
✓ Surface Water (A1)	Water-Stained Leaves	(B9)	Drainage P	
High Water Table (A2)	Aquatic Fauna (B13)		Moss Trim	-
✓ Saturation (A3)  — Water Marks (B1)	<ul><li>Marl Deposits (B15)</li><li>Hydrogen Sulfide Odor</li></ul>	r (C1)	Dry-Seasor Crayfish Bu	n Water Table (C2)
Sediment Deposits (B2)				Visible on Aerial Imagery (C9)
Drift Deposits (B3)	Presence of Reduced			Stressed Plants (D1)
Algal Mat or Crust (B4)	Recent Iron Reduction			c Position (D2)
Iron Deposits (B5)	Thin Muck Surface (C7		Shallow Aq	
Inundation Visible on Aerial Imagery (B7)	Other (Explain in Rema	arks)	✓ Microtopog	raphic Relief (D4)
✓ Sparsely Vegetated Concave Surface (B8)			FAC-Neutra	al Test (D5)
Field Observations:	40			
	Depth (inches): <u>10</u>			
	Depth (inches):			
(includes capillary fringe)	Depth (inches): 0			ent? Yes <u>√</u> No
Describe Recorded Data (stream gauge, monitor	oring well, aerial photos, previ	ious inspections), if ava	ailable:	
Remarks:				
The PFO section of the complex		•	ft at the de	epest spot. The PSS
section was adjacent to a mainta	ained lawn and ag f	ield.		
I .				

EGETATION – Use scientific names of plants.	Sampling Point: <u>wlii2</u>

Tree Stratum (Plot size:)	Absolute	Dominant		Dominance Test worksheet:
		Species?	FAC	Number of Dominant Species
1. Acer rubrum				That Are OBL, FACW, or FAC:3 (A)
2. Acer saccharinum				Total Number of Dominant Species Across All Strata: 5 (B)
3				Species Across All Strata: (B)
4				Percent of Dominant Species That Are OBL, FACW, or FAC: 60.00 (A/B)
5				That Are OBL, FACW, or FAC. <u>80.00</u> (A/B)
6				Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
	60	= Total Cov	ver	OBL species <u>0.00</u> x 1 = <u>0.00</u>
Sapling/Shrub Stratum (Plot size:)				FACW species <u>83.00</u> x 2 = <u>166.00</u>
1. <u>Alnus incana</u>	50	Y	<u>FACW</u>	FAC species <u>59.00</u> x 3 = <u>177.00</u>
2. Acer rubrum	10	N	<u>FAC</u>	FACU species 15.00 x 4 = 60.00
3. <u>Ribes americanum</u>	3	N	<u>FACW</u>	UPL species <u>0.00</u> x 5 = <u>0.00</u> Column Totals: <u>157.00</u> (A) <u>403.00</u> (B)
4. <u>Cornus racemosa</u>	2	N	<u>FAC</u>	Column rotals. <u>137.00</u> (A) <u>403.00</u> (B)
5				Prevalence Index = B/A = <u>2.57</u>
6				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
		= Total Cov		∠ 2 - Dominance Test is >50%
Herb Stratum (Plot size:5				3 - Prevalence Index is ≤3.0¹
1. <u>Carex sp</u>	15	<u>Y</u>	<u>FACU</u>	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
2. <u>Moss</u>		Y		Problematic Hydrophytic Vegetation¹ (Explain)
3. <u>Toxicodendron radicans</u>			FAC	
4. Symphyotrichum lanceolatum		N	FACW	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5. Onoclea sensibilis		N	FACW	
6. <u>Vitis riparia</u>			FAC	Definitions of Vegetation Strata:
				Tree – Woody plants 3 in. (7.6 cm) or more in diameter
7				at breast height (DBH), regardless of height.
8				Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.
9				
10				Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
11				
12				Woody vines – All woody vines greater than 3.28 ft in height.
00	_4/_	= Total Cov	ver	
Woody Vine Stratum (Plot size: 30 )				
1				
2				
3				Hydrophytic
4				Vegetation   Present?
		= Total Cov	ver	
Remarks: (Include photo numbers here or on a separate s		a maint	ainad la	un. The DEO is a rad maple awarm
The PSS is a dense stand of alder adja	icent to	a mami	amed ia	wit. The PPO is a red maple swamp.

SOIL Sampling Point: Wlii2

Profile Des	cription: (Describe t	o the dep	th needed	to docun	nent the i	ndicator	or confirm	the absence of i	ndicators.)
Depth	Matrix				x Features	4	. 2		
(inches)	Color (moist)	%	Color (m	noist)	%	Type'	Loc <sup>2</sup>	Texture	Remarks
0-8	10YR 3/3							CL	
<u>8-18</u>	<u>10YR 5/1</u>	<u>94</u>	<u>10YR</u>	<u>5/6</u>	_6_	<u>_C</u>	<u>_M_</u>	C	
			-				-		
1								21 " "	
Hydric Soil	oncentration, D=Deple Indicators:	etion, Rivi	=Reaucea N	iatrix, ivis	s=iviasked	Sand Gr	ains.	Indicators for	_=Pore Lining, M=Matrix.  Problematic Hydric Soils <sup>3</sup> :
Histoso			Polyva	lue Belov	v Surface	(S8) ( <b>LR</b> i	RR,		(A10) (LRR K, L, MLRA 149B)
	pipedon (A2)		MLF	RA 149B)					rie Redox (A16) ( <b>LRR K, L, R</b> )
	istic (A3) en Sulfide (A4)				ce (S9) ( <b>L</b> 1ineral (F1		LRA 149B)		y Peat or Peat (S3) ( <b>LRR K, L, R</b> ) ce (S7) ( <b>LRR K, L</b> )
	d Layers (A5)		-	-	Matrix (F2		, <b>-</b> )		Below Surface (S8) (LRR K, L)
	d Below Dark Surface	(A11)		ed Matrix					Surface (S9) ( <b>LRR K, L</b> )
	ark Surface (A12) Mucky Mineral (S1)				face (F6) Surface (F	7)		_	anese Masses (F12) ( <b>LRR K, L, R</b> ) Floodplain Soils (F19) ( <b>MLRA 149B</b> )
	Gleyed Matrix (S4)			Depress		7)			dic (TA6) ( <b>MLRA 144A, 145, 149B</b> )
Sandy F	Redox (S5)			•	,			Red Paren	t Material (F21)
	d Matrix (S6)								ow Dark Surface (TF12)
Dark St	ırface (S7) ( <b>LRR R, M</b>	LRA 149	3)					Other (Exp	lain in Remarks)
	of hydrophytic vegetati	on and w	etland hydro	logy mus	t be prese	ent, unless	s disturbed	or problematic.	
Restrictive	Layer (if observed):								
Type:									
	ches):							Hydric Soil Pre	sent? Yes <u>√</u> No
Remarks:									

Project/Site: Riverbend		City/C	ounty: Sanilac (	County	Sampling Date: 2022-04-10
Applicant/Owner: Liberty				•	an Sampling Point: WL II3
Investigator(s): J. Brown - A					 I R014E
Landform (hillslope, terrace, etc.)					
Subregion (LRR or MLRA): LRF					
Soil Map Unit Name: Parkhill					
Are climatic / hydrologic condition	•	•	•		
Are Vegetation, Soil		-			•
Are Vegetation, Soil				ed, explain any answer	•
SUMMARY OF FINDINGS	- Attach site n	nap snowing sam	pling point loca	ations, transects,	, important features, etc.
Hydrophytic Vegetation Present		No	Is the Sampled Ar		
Hydric Soil Present?		No	within a Wetland?	Yes <u>√</u>	No
Wetland Hydrology Present?  Remarks: (Explain alternative p		No	If yes, optional Wet	tland Site ID:	
LIVEROI OGY					
HYDROLOGY Wetland Hydrology Indicators	<del></del>			Secondary Indica	tors (minimum of two required)
Wetland Hydrology Indicators  Primary Indicators (minimum of		al all that apply)		-	<del></del>
·	•	• • • •		Surface Soil	` '
Surface Water (A1) High Water Table (A2)		<ul><li>Water-Stained Leaves</li><li>Aquatic Fauna (B13)</li></ul>	3 (B9)	Drainage Pat Moss Trim Li	
Saturation (A3)		Marl Deposits (B15)			Water Table (C2)
Water Marks (B1)		_ Hydrogen Sulfide Odd	or (C1)	Crayfish Burr	
Sediment Deposits (B2)		Oxidized Rhizosphere			sible on Aerial Imagery (C9)
Drift Deposits (B3)		Presence of Reduced		•	tressed Plants (D1)
Algal Mat or Crust (B4)		Recent Iron Reduction	n in Tilled Soils (C6)	Geomorphic	Position (D2)
Iron Deposits (B5)		Thin Muck Surface (C	•	Shallow Aqui	
Inundation Visible on Aerial		Other (Explain in Rem	narks)	Microtopogra	
Sparsely Vegetated Concar	ve Surface (B8)			FAC-Neutral	Test (D5)
Field Observations:	Vaa / No	Depth (inches): 3			
		Depth (inches): _ Depth (inches):			
		Depth (inches): <u>0</u>		nd Hydrology Presen	t? Yes <u>√</u> No
(includes capillary fringe)					ll! 169 <u>γ</u> 160
Describe Recorded Data (stream	m gauge, monitoring	well, aerial photos, prev	vious inspections), if	available:	
Remarks:					

**VEGETATION** – Use scientific names of plants. Sampling Point: Wlii3 Absolute Dominant Indicator **Dominance Test worksheet:** Tree Stratum (Plot size: 30 ) % Cover Species? Status **Number of Dominant Species** 1\_\_\_\_ (A) That Are OBL, FACW, or FAC: **Total Number of Dominant** <u>1</u> (B) Species Across All Strata: Percent of Dominant Species That Are OBL, FACW, or FAC: \_\_100.00\_ (A/B) 5. \_\_\_\_\_ \_\_\_ \_\_\_ \_\_\_ \_\_\_ \_\_\_\_ 6. \_\_\_\_\_ \_\_ \_\_\_ \_\_\_ \_\_\_ \_\_\_\_ Prevalence Index worksheet: Total % Cover of: Multiply by: \_\_\_\_0 = Total Cover OBL species \_\_\_\_\_\_0.00\_\_\_ x 1 = \_\_\_\_\_0.00\_\_\_ FACW species  $113.00 \times 2 = 226.00$ Sapling/Shrub Stratum (Plot size: 15 ) FAC species  $0.00 \times 3 = 0.00$ FACU species 2.00 x 4 = 8.00 2. \_\_\_\_\_ \_\_\_ \_\_\_ \_\_\_ \_\_\_\_ UPL species  $0.00 \times 5 = 0.00$ 3. \_\_\_\_\_ \_\_\_ \_\_\_ \_\_\_\_ Column Totals: <u>115.00</u> (A) <u>234.00</u> (B) 4. \_\_\_\_\_\_ \_\_\_ \_\_\_ \_\_\_ \_\_\_\_ \_\_\_\_ Prevalence Index = B/A = 2.03**Hydrophytic Vegetation Indicators:** 6. \_\_\_\_\_\_ \_\_\_ \_\_\_\_\_ \_\_\_ 1 - Rapid Test for Hydrophytic Vegetation ∠ 2 - Dominance Test is >50% \_\_\_\_0 = Total Cover 3 - Prevalence Index is ≤3.0¹ Herb Stratum (Plot size: \_\_\_\_\_\_5 ) \_\_\_ 4 - Morphological Adaptations<sup>1</sup> (Provide supporting 1. Phragmites australis 90 Y FACW data in Remarks or on a separate sheet) \_\_\_ Problematic Hydrophytic Vegetation<sup>1</sup> (Explain) 2. Phalaris arundinacea 18 N FACW \_\_\_\_\_ \_\_\_ \_\_\_ \_\_\_ \_\_\_\_ \_\_\_\_ 3. Moss <sup>1</sup>Indicators of hydric soil and wetland hydrology must 4. <u>Symphyotrichum lanceolatum</u> <u>5</u> <u>N</u> <u>FACW</u> be present, unless disturbed or problematic. \_\_\_\_\_ 2\_\_ N\_\_ FACU 5. Carex sp **Definitions of Vegetation Strata:** Tree - Woody plants 3 in. (7.6 cm) or more in diameter 7. \_\_\_\_\_\_ \_\_\_ \_\_\_\_ at breast height (DBH), regardless of height. 8.\_\_\_\_\_ Sapling/shrub - Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall. 9. \_\_\_\_\_ \_\_\_ \_\_\_ \_\_\_ \_\_\_\_ Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. 11. \_\_\_\_\_\_ \_\_\_ \_\_\_\_ Woody vines - All woody vines greater than 3.28 ft in height. 120 = Total Cover Woody Vine Stratum (Plot size: 30 3. \_\_\_\_\_ Hydrophytic Vegetation Yes \_\_\_\_ No \_\_\_\_ Present? = Total Cover Remarks: (Include photo numbers here or on a separate sheet.) The feature is mostly Phragmites and Phalaris. There is one planted willow in the depression.

SOIL Sampling Point: Wlii3

	cription: (Describe	to the de	oth needed				or confirm	the absence	of indicators.)
Depth (inches)	Matrix Color (moist)	%	Color (n		<u>x Feature</u> %	s Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
0-2	10YR 5/2							CL	
2-18	10YR 5/1	94	10YR	5/6	6			<u> </u>	
	10111 0/1		1011	5/0					
						·			
					· <del></del>				
					· <del></del>	·			
	oncentration, D=Depl	etion, RM	=Reduced N	Matrix, MS	S=Masked	d Sand Gr	ains.		: PL=Pore Lining, M=Matrix.  for Problematic Hydric Soils <sup>3</sup> :
Hydric Soil Histosol			Polyva	lua Balov	w Surface	(S8) (LRI	D D		for Problematic Hydric Soils: fuck (A10) (LRR K, L, MLRA 149B)
	oipedon (A2)		-	RA 149B)		(OO) (EIXI	ιι,		Prairie Redox (A16) (LRR K, L, R)
	stic (A3)						LRA 149B)		lucky Peat or Peat (S3) (LRR K, L, R)
	en Sulfide (A4) d Layers (A5)			-	/lineral (F Matrix (F2	1) ( <b>LRR K</b>	, L)		urface (S7) ( <b>LRR K, L</b> ) lue Below Surface (S8) ( <b>LRR K, L</b> )
	d Below Dark Surface	e (A11)		ed Matrix		-)		-	ark Surface (S9) (LRR K, L)
Thick Da	ark Surface (A12)	, ,	Redox	Dark Su	rface (F6)			Iron-Ma	anganese Masses (F12) ( <b>LRR K, L, R</b> )
-	Mucky Mineral (S1)				Surface (F	<del>-</del> 7)			ont Floodplain Soils (F19) (MLRA 149B)
	Gleyed Matrix (S4) Redox (S5)		Redox	Depress	ions (F8)				Spodic (TA6) ( <b>MLRA 144A, 145, 149B</b> ) arent Material (F21)
-	Matrix (S6)								hallow Dark Surface (TF12)
Dark Su	rface (S7) (LRR R, N	ILRA 149	<b>B</b> )					Other (	Explain in Remarks)
<sup>3</sup> Indicators o	f hydrophytic vegetat	ion and w	etland hvdro	loav mus	t be prese	ent. unless	s disturbed	or problematic	
	Layer (if observed):		,	- 37					
Type:									
Depth (in	ches):							Hydric Soil	Present? Yes No
Remarks:								II.	
									ļ

Project/Site: Riverbend	City/Co	ounty: Sanilac Cou	ntv s	Sampling Date: 2022-04-16
			•	Sampling Point: WL II4
Investigator(s): J. Brown - Atwell LLC			_	· -
Landform (hillslope, terrace, etc.): Depression				
Subregion (LRR or MLRA): LRR L, MLRA 99 Lat:		·	•	
Soil Map Unit Name: Parkhill loam, 0 to 1 pe				
·	•			
Are climatic / hydrologic conditions on the site typical for	-	•		·
Are Vegetation, Soil, or Hydrology				
Are Vegetation, Soil, or Hydrology	naturally problema	tic? (If needed, ex	cplain any answers	in Remarks.)
SUMMARY OF FINDINGS - Attach site m	nap showing sam	pling point location	ns, transects, i	mportant features, etc.
Hydrophytic Vegetation Present? Yes✓	No	Is the Sampled Area		
	No	within a Wetland?	Yes <u>√</u>	No
-		If yes, optional Wetland	Site ID <sup>.</sup>	
Remarks: (Explain alternative procedures here or in		,,		
PFO				
HYDROLOGY				
Wetland Hydrology Indicators:			Secondary Indicato	rs (minimum of two required)
Primary Indicators (minimum of one is required; chec	k all that apply)		Surface Soil Ci	
Surface Water (A1)	Water-Stained Leaves		Drainage Patte	
	Aquatic Fauna (B13)	·	Moss Trim Line	
Saturation (A3)	Marl Deposits (B15)	-	Dry-Season W	ater Table (C2)
	Hydrogen Sulfide Odo		Crayfish Burro	
	·	• , , -		ble on Aerial Imagery (C9)
	Presence of Reduced			essed Plants (D1)
	Recent Iron Reduction Thin Muck Surface (C		<ul><li>Geomorphic Post</li><li>Shallow Aquita</li></ul>	
	Other (Explain in Rem	·		` '
✓ Sparsely Vegetated Concave Surface (B8)	Carlor (Explain in Front		✓ FAC-Neutral To	
Field Observations:		-		()
Surface Water Present? Yes _ ✓ No	Depth (inches): 1			
Water Table Present? Yes _ ✓ No				
Saturation Present? Yes _ ✓ No	Depth (inches): 0	Wetland Hy	drology Present?	Yes <u>√</u> No
(includes capillary fringe)  Describe Recorded Data (stream gauge, monitoring v	wall parial photos prov	vious inspections) if avail	able:	
Describe Necorded Data (stream gauge, monitoring v	veii, aeriai priotos, prev	nous inspections), il avail	abie.	
Remarks:				
Some standing water.				

	<b>VEGETATION –</b>	Use	scientific	names	of	plants.
--	---------------------	-----	------------	-------	----	---------

<b>VEGETATION</b> – Use scientific names of plants.				Sampling Point: wlii4
Tree Stratum (Plot size:)	Absolute % Cover		t Indicator Status	Dominance Test worksheet:
1. Quercus bicolor			FACW	Number of Dominant Species That Are OBL, FACW, or FAC:6 (A)
2. Acer rubrum		Y	FAC	
3. <u>Ulmus americana</u>		N		Total Number of Dominant Species Across All Strata: 7 (B)
Acer saccharinum				
				Percent of Dominant Species That Are OBL, FACW, or FAC: 85.71 (A/B)
5				
6				Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
	_110_	= Total Co	over	OBL species 0.00 x1 = 0.00
Sapling/Shrub Stratum (Plot size: 15 )	4.0			FACW species <u>98.00</u> x 2 = <u>196.00</u> FAC species <u>57.00</u> x 3 = <u>171.00</u>
1. <u>Acer rubrum</u>				FACU species 8.00 x4 = 32.00
2. <u>Ribes americanum</u>				UPL species <u>0.00</u> x 5 = <u>0.00</u>
3. <u>Cornus racemosa</u>	2	N	_FAC_	Column Totals: <u>163.00</u> (A) <u>399.00</u> (B)
4				
5				Prevalence Index = B/A = 2.45
6				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
	15	= Total Co	over	∠ 2 - Dominance Test is >50%
Herb Stratum (Plot size: 5				✓ 3 - Prevalence Index is ≤3.0 <sup>1</sup>
1. <u>Phalaris arundinacea</u>	10	Y	<u>FACW</u>	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
2. <u>Onoclea sensibilis</u>				Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
3. <u>Carex sp</u>				
4. <u>Toxicodendron radicans</u>			FAC	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5. <u>Moss</u>				· · ·
6. <u>Symphyotrichum lanceolatum</u>				Definitions of Vegetation Strata:
7				<b>Tree</b> – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
8				
9.				Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.
10				Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
11	-			Woody vines – All woody vines greater than 3.28 ft in
12				height.
	<u>43</u>	= Total Co	over	
Woody Vine Stratum (Plot size:)				
1				
2				
3				Hydrophytic
4				Vegetation   Present?
		= Total Co	over	
Remarks: (Include photo numbers here or on a separate s	sheet.)			

SOIL Sampling Point: Wiii4

	cription: (Describe	to the de	oth needed				or confirm	the absence	of indicators.)
Depth (inches)	Matrix Color (moist)	%	Color (n		<u>x Feature</u> %	s Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
0-8	10YR 3/3							CL	
8-18	10YR 5/1	94	10YR	5/6	6			<u> </u>	
_0-10_	10111 0/1		1011	5/0					
									<del></del>
						·			
					· <del></del>				
	-								
		· ——			· <del></del>				
	oncentration, D=Dep	letion, RM	=Reduced N	Matrix, MS	S=Masked	d Sand Gr	ains.		: PL=Pore Lining, M=Matrix.  for Problematic Hydric Soils <sup>3</sup> :
Hydric Soil Histosol			Polyva	lua Balov	w Surface	(S8) ( <b>LR</b>	D D		luck (A10) (LRR K, L, MLRA 149B)
	oipedon (A2)		-	RA 149B)		(00) (EI	ιι,		Prairie Redox (A16) (LRR K, L, R)
	stic (A3)						LRA 149B)		lucky Peat or Peat (S3) (LRR K, L, R)
	en Sulfide (A4) d Layers (A5)			-	/lineral (F Matrix (F2	1) ( <b>LRR K</b>	, <b>L</b> )		urface (S7) ( <b>LRR K, L</b> ) lue Below Surface (S8) ( <b>LRR K, L</b> )
	d Below Dark Surface	e (A11)		ed Matrix		-)			ark Surface (S9) (LRR K, L)
	ark Surface (A12)				rface (F6)				anganese Masses (F12) ( <b>LRR K, L, R</b> )
-	Mucky Mineral (S1)				Surface (F	=7)			ont Floodplain Soils (F19) (MLRA 149B)
	Gleyed Matrix (S4) Redox (S5)		Redox	Depress	ions (F8)				Spodic (TA6) ( <b>MLRA 144A, 145, 149B</b> ) arent Material (F21)
-	l Matrix (S6)								hallow Dark Surface (TF12)
Dark Su	rface (S7) (LRR R, N	/ILRA 149	<b>B</b> )					Other (	Explain in Remarks)
<sup>3</sup> Indicators o	f hydrophytic vegetat	tion and w	etland hvdro	loav mus	t be prese	ent. unless	s disturbed	or problematic	
	Layer (if observed):			- 37		,		<u>'</u>	
Type:									
Depth (in	ches):							Hydric Soil	Present? Yes <u>√</u> No
Remarks:								1	

Project/Site: Riverbend Wind	d	City/County: <u>Sar</u>	nilac County	Sampling Date: <u>2022-01-03</u>
Applicant/Owner: Liberty Pow			•	higan Sampling Point: WL J1
Investigator(s): C. LaRiccia, (				)9N R015E
•				Slope (%): <u>0-2</u>
	•			Datum: WGS84
Soil Map Unit Name: Tonkev a				
Are climatic / hydrologic conditions		•	•	
				es" present? Yes ✓ No
		-		
Are Vegetation, Soil			· · · · · · · · · · · · · · · · · · ·	
SUMMARY OF FINDINGS -	Attach site map s	howing sampling poi	nt locations, transe	ects, important features, etc.
Hydrophytic Vegetation Present?	Yes✓ No	Is the Sam	pled Area	
Hydric Soil Present?	Yes <u>✓</u> No		etland? Yes	No
Wetland Hydrology Present?	Yes <u>√</u> No	If yes, optic	nal Wetland Site ID:	
Remarks: (Explain alternative pro		rate report.)		
PFO depression in woo	dlot			
HYDROLOGY				
Wetland Hydrology Indicators:			Secondary In	ndicators (minimum of two required)
Primary Indicators (minimum of or	e is required; check all th	nat annly)	· · · · · · · · · · · · · · · · · · ·	Soil Cracks (B6)
Surface Water (A1)	•	r-Stained Leaves (B9)		e Patterns (B10)
High Water Table (A2)		tic Fauna (B13)		im Lines (B16)
✓ Saturation (A3)		Deposits (B15)	· <del></del>	son Water Table (C2)
Water Marks (B1)		ogen Su <b>l</b> fide Odor (C1)		Burrows (C8)
Sediment Deposits (B2)	Oxidiz	zed Rhizospheres on Living I	Roots (C3) Saturatio	on Visible on Aerial Imagery (C9)
Drift Deposits (B3)		ence of Reduced Iron (C4)		or Stressed Plants (D1)
Algal Mat or Crust (B4)		nt Iron Reduction in Tilled Sc		phic Position (D2)
Iron Deposits (B5)		Muck Surface (C7)	· <del></del>	Aquitard (D3)
Inundation Visible on Aerial In		(Explain in Remarks)		oographic Relief (D4)
Sparsely Vegetated Concave	Surface (B8)		FAC-Neu	utral Test (D5)
Field Observations:	- Na / David	Ha (in all and a		
		th (inches):		
		th (inches):th (inches): 2	Watland Hydrology Pro	esent? Yes <u>√</u> No
(includes capillary fringe)	s_ <u>v</u> _ No Dept	.ii (iiiciies). <u>Z</u>	welland nydrology Pre	sent! Tesv No
Describe Recorded Data (stream	gauge, monitoring well, ac	erial photos, previous inspec	tions), if available:	
Remarks: Snow covered				
Chow covered				
				1
				1
1				!

Total Christian (District) 20	Absolute Dominant Indicator	
Tree Stratum (Plot size: 30 )	% Cover Species? Status	Number of Dominant Species
1. Acer rubrum		( ,
2. <u>Ulmus americana</u>		Total Number of Dominant
3		Species Across All Strata:1 (B)
4		Percent of Dominant Species
5		That Are OBL, FACW, or FAC: 100.00 (A/B)
6		Prevalence Index worksheet:
7		Total % Cover of: Multiply by:
	60 = Total Cover	OBL species <u>0.00</u> x 1 = <u>0.00</u>
Sapling/Shrub Stratum (Plot size: 15 )		FACW species <u>10.00</u> x 2 = <u>20.00</u>
1		FAC species <u>50.00</u> x 3 = <u>150.00</u>
2.		FACU species <u>0.00</u> x 4 = <u>0.00</u>
3.		UPL species <u>0.00</u> x 5 = <u>0.00</u>
		Column Totals: <u>60.00</u> (A) <u>170.00</u> (B)
4		Prevalence Index = B/A = 2.83
5 6		
		1 - Rapid Test for Hydrophytic Vegetation
7		2 - Dominance Test is >50%
<b>.</b>	= Total Cover	3 - Prevalence Index is ≤3.0¹
Herb Stratum (Plot size: 5		4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
2.		Problematic Hydrophytic Vegetation¹ (Explain)
3.		-
4.		<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5.		
6.		- Definitions of Vegetation Strata:
7.		Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
8		- Sapling/shrub – Woody plants less than 3 in. DBH
9		and greater than or equal to 3.28 ft (1 m) tall.
10		Herb – All herbaceous (non-woody) plants, regardless
11		of size, and woody plants less than 3.28 ft tall.
12		Woody vines – All woody vines greater than 3.28 ft in
	0 = Total Cover	height.
Woody Vine Stratum (Plot size: 30 )		
1		
2.		
3.		- - Hydrophytic
4		Vegetation
	 = Total Cover	Present? Yes <u>√</u> No
Remarks: (Include photo numbers here or on a separate		
Snow covered, difficult to assess	01100(1)	

Sampling Point: WL J1

SOIL

(inches)	Matrix				x Features				
~ ~	Color (moist)	%	Color (n	noist)	<u>%</u>	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
<u> 0-6</u>	10YR 3/1	_100_						SL	
6-16	10YR 3/1	80	10YR	5/6	20_	_C_	<u>M/PL</u>	SL_	Prominent redox.
	Concentration, D=Dep Indicators:	letion, RM	=Reduced N	latrix, MS	S=Masked	Sand Gr	ains.		n: PL=Pore Lining, M=Matrix. s for Problematic Hydric Soils <sup>3</sup> :
Black H Hydrogo Stratifie Deplete Thick D Sandy I Sandy I Stripped	ipipedon (A2) listic (A3) en Sulfide (A4) ed Layers (A5) ed Below Dark Surface lark Surface (A12) Mucky Mineral (S1) Gleyed Matrix (S4) Redox (S5) d Matrix (S6) urface (S7) (LRR R, M		Thin D Loamy Loamy Deplet ✓ Redox Deplet Redox	Mucky M Gleyed I ed Matrix Dark Su ed Dark S	ce (S9) (L /lineral (F1 /latrix (F2) (F3)	) (LRR K	LRA 149B)	5 cm l Dark \$ Polyva Thin E Iron-M Piedm Mesic Red F	Prairie Redox (A16) (LRR K, L, R) Mucky Peat or Peat (S3) (LRR K, L, R) Surface (S7) (LRR K, L) alue Below Surface (S8) (LRR K, L) Dark Surface (S9) (LRR K, L) Manganese Masses (F12) (LRR K, L, R) nont Floodplain Soils (F19) (MLRA 149B) Parent Material (F21) Shallow Dark Surface (TF12) (Explain in Remarks)
	of hydrophytic vegeta		et <b>l</b> and hydro	logy mus	t be prese	nt, un <b>l</b> es	s disturbed	or prob <b>l</b> emati	с.
	Layer (if observed):	:							
Type:								Uvdria Cai	I Present? Yes/ No
Depth (in Remarks:	nches):							Hydric Soi	I Present? Yes No

Project/Site: Riverbend Wind	City/C	County: Sanilac County	Sampling Date: <u>2022-01-03</u>
Applicant/Owner: Liberty Power		•	Michigan Sampling Point: WL J2
Investigator(s): C. LaRiccia, C. Scho			009N R015E
Landform (hillslope, terrace, etc.): Depres			
Subregion (LRR or MLRA): LRR L, MLRA			
Soil Map Unit Name: Parkhill Ioam. 0			
Are climatic / hydrologic conditions on the site	•		
Are Vegetation, Soil, or Hydro			
Are Vegetation, Soil, or Hydro	ology naturally problem	atic? (If needed, explain any	answers in Remarks.)
SUMMARY OF FINDINGS – Attack	າ site map showing san	npling point locations, tran	sects, important features, etc.
Hydrophytic Vegetation Present?	es ✓ No	Is the Sampled Area	
1	es No	within a Wetland? Yes	s/No
I	es No	If yes, optional Wetland Site ID: _	
Remarks: (Explain alternative procedures h			
PFO depression in woodlot, c	onnects to WC J2 ar	nd WC J3	
HYDROLOGY			
Wetland Hydrology Indicators:		Secondar	y Indicators (minimum of two required)
Primary Indicators (minimum of one is requi	red; check all that apply)		ace Soil Cracks (B6)
Surface Water (A1)	Water-Stained Leave		nage Patterns (B10)
High Water Table (A2)	Aquatic Fauna (B13)		Trim Lines (B16)
✓ Saturation (A3)	Marl Deposits (B15)	Dry-S	Season Water Table (C2)
Water Marks (B1)	Hydrogen Sulfide Od	lor (C1) Cray	fish Burrows (C8)
Sediment Deposits (B2)	Oxidized Rhizospher	res on Living Roots (C3) Satu	ration Visible on Aerial Imagery (C9)
Drift Deposits (B3)	Presence of Reduced		ed or Stressed Plants (D1)
Algal Mat or Crust (B4)	Recent Iron Reduction		norphic Position (D2)
Iron Deposits (B5)	Thin Muck Surface (0	•	ow Aquitard (D3)
Inundation Visible on Aerial Imagery (B		· —	otopographic Relief (D4)
Sparsely Vegetated Concave Surface (	B8)	_ <u>√</u> FAC-	Neutral Test (D5)
Field Observations:	Na / Danth (inches)		
	No _ ✓ Depth (inches):		
	No _ ✓ Depth (inches):		Present? Yes/_ No
(includes capillary fringe)	No Depth (inches): 2	wetland Hydrology	Present? res No
Describe Recorded Data (stream gauge, mo	onitoring well, aerial photos, pre	evious inspections), if available:	
Remarks:			
Snow covered			

PLOCIATION - Ose scientific flames of plants.				Sampling Folit. VVL 32
<u>Tree Stratum</u> (Plot size:)	Absolute % Cover	Dominant Species?		Dominance Test worksheet:
1. Acer rubrum		<u> Y</u>	FAC	Number of Dominant Species That Are OBL, FACW, or FAC:7 (A)
2. <u>Ulmus americana</u>		Y	FACW	
3. <u>Carpinus caroliniana</u>		N	FAC	Total Number of Dominant Species Across All Strata: 7 (B)
4. <u>Carya ovata</u>			FACU	Percent of Dominant Species
5				That Are OBL, FACW, or FAC: 100.00 (A/B)
6				Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
		= Total Cov		OBL species 3.00 x 1 = 3.00
Sapling/Shrub Stratum (Plot size: 15 )				FACW species <u>47.00</u> x 2 = <u>94.00</u>
1. <u>Cornus racemosa</u>	15	Y	_FAC_	FAC species <u>85.00</u> x 3 = <u>255.00</u>
2				FACU species 2.00 x 4 = 8.00
3.				UPL species 0.00 x 5 = 0.00
4.				Column Totals: <u>137.00</u> (A) <u>360.00</u> (B)
5.				Prevalence Index = B/A = <u>2.63</u>
6.				Hydrophytic Vegetation Indicators:
7.				1 - Rapid Test for Hydrophytic Vegetation
		= Total Cov		∠ 2 - Dominance Test is >50%
Herb Stratum (Plot size:)				3 - Prevalence Index is ≤3.0¹
1. <u>Carex sp.</u>	12	Υ	FACW	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
2. Elymus virginicus			FACW	
3. Onoclea sensibilis			FACW	
4. Juncus effusus			OBL	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5.				Definitions of Vegetation Strata:
6.				-
7.				Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
8.				Sapling/shrub – Woody plants less than 3 in. DBH
9.				and greater than or equal to 3.28 ft (1 m) tall.
10				Herb – All herbaceous (non-woody) plants, regardless
11.				of size, and woody plants less than 3.28 ft tall.
12				Woody vines – All woody vines greater than 3.28 ft in
		= Total Cov	ver	height.
Woody Vine Stratum (Plot size:)				
1. <u>Vitis riparia</u>	3	Y	_FAC_	
2. <u>Toxicodendron radicans</u>	2	Y	_FAC_	
3				Hydrophytic
4				Vegetation
	_	= Total Cov		Present? Yes <u>√</u> No
Remarks: (Include photo numbers here or on a separate s Snow covered, difficult to assess	sheet.)			

Sampling Point: WL J2

SOIL

0-6 6-16	Color (moist)				x Features				
		<u>%</u>	Color (m	noist)	<u>%</u>	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
6-16	<u>10YR 3/1</u>	_100_						SL	
	10YR 3/1	<u>80</u>	10YR	5/6	20_	_C_	<u>M/PL</u>	SL	Prominent redox.
	oncentration, D=Dep	letion, RM	=Reduced M	latrix, MS	S=Masked	Sand Gr	ains.		n: PL=Pore Lining, M=Matrix. s for Problematic Hydric Soils <sup>3</sup> :
Black H Hydroge Stratified Depleted Thick Do Sandy N Sandy C Sandy F Stripped	pipedon (A2) listic (A3) len Sulfide (A4) d Layers (A5) led Below Dark Surface ark Surface (A12) Mucky Mineral (S1) Gleyed Matrix (S4) Redox (S5) d Matrix (S6) urface (S7) (LRR R, M		Thin D Loamy Loamy Deplet ✓ Redox Deplet Redox	Mucky N Gleyed I ed Matrix Dark Su ed Dark S	ice (S9) ( <b>L</b> /linera <b>l</b> (F1 /latrix (F2) (F3)	) (LRR K	LRA 149B)	5 cm l Dark S Polyva Thin E Iron-M Piedm Mesic Red F	Prairie Redox (A16) (LRR K, L, R) Mucky Peat or Peat (S3) (LRR K, L, R) Surface (S7) (LRR K, L) alue Below Surface (S8) (LRR K, L) Dark Surface (S9) (LRR K, L) Manganese Masses (F12) (LRR K, L, R) nont Floodplain Soils (F19) (MLRA 149B) Parent Material (F21) Shallow Dark Surface (TF12) (Explain in Remarks)
	of hydrophytic vegeta		etland hydro	logy mus	t be prese	nt, un <b>l</b> es	s disturbed	or prob <b>l</b> emati	С.
	Layer (if observed):	:							
Type:								Uvdria Cai	I Present? Yes ✓ No
Depth (in emarks:	iches):							Hydric Soi	I Present? Yes No

Project/Site: Riverbend Wind	City/C	County: Sanilac Cou	unty Sa	mpling Date: <u>2022-01-03</u>
Applicant/Owner: Liberty Power			•	Sampling Point: WL J3
Investigator(s): C. LaRiccia, C. Scholt				015E
Landform (hillslope, terrace, etc.): Depression				
Subregion (LRR or MLRA): LRR L, MLRA 99				
Soil Map Unit Name: Parkhill loam, 0 to				
Are climatic / hydrologic conditions on the site type	•			
Are Vegetation, Soil, or Hydrolog				
Are Vegetation, Soil, or Hydrolog			explain any answers in	
SUMMARY OF FINDINGS – Attach s			•	•
SUMMENT OF FINDINGS - ALLGOID	The map snowing same			iportant reatures, etc.
	No	Is the Sampled Area within a Wetland?	Yes <u> </u>	No
I -	✓ No			
Remarks: (Explain alternative procedures here	or in a senarate report )	If yes, optional Wetland	Site ID:	
HYDROLOGY				
Wetland Hydrology Indicators:			Secondary Indicators	(minimum of two required)
Primary Indicators (minimum of one is required	· check all that apply)		Surface Soil Crac	
Surface Water (A1)	Water-Stained Leave		Drainage Pattern	
High Water Table (A2)	Aquatic Fauna (B13)	, ,	Moss Trim Lines	
Saturation (A3)	Marl Deposits (B15)		Dry-Season Water	
Water Marks (B1)	Hydrogen Sulfide Odd	or (C1)	Crayfish Burrows	
Sediment Deposits (B2)	Oxidized Rhizosphere	• , ,	Saturation Visible	e on Aerial Imagery (C9)
Drift Deposits (B3)	Presence of Reduced		Stunted or Stress	, ,
Algal Mat or Crust (B4)	Recent Iron Reductio		Geomorphic Pos	
Iron Deposits (B5)	Thin Muck Surface (C		Shallow Aquitard	
<ul><li>Inundation Visible on Aerial Imagery (B7)</li><li>Sparsely Vegetated Concave Surface (B8)</li></ul>	Other (Explain in Ren	narks)	Microtopographic FAC-Neutral Tes	
Field Observations:			<u>/</u> 1/10-Nouliai 100	
	Depth (inches):			
	Depth (inches):			
	Depth (inches): 0	Wetland F	lydrology Present?	Yes No
(includes capillary fringe)  Describe Recorded Data (stream gauge, monit	oring well aerial photos pre	wious inspections) if ava	ilahla:	
Describe Necorded Data (Stream gauge, memo	Jilly well, actial priolog, pro	vious inspections, il ava	liable.	
Remarks: Snow covered		<u></u>		
Silow covered				

To 2011 1 (District 20)	Absolute		t Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 30 )		Species?		Number of Dominant Species
1. <u>Acer rubrum</u>			_FAC_	That Are OBL, FACW, or FAC:8 (A)
2. <u>Ulmus americana</u>		Y		Total Number of Dominant
3. <u>Carpinus caroliniana</u>				Species Across All Strata:8 (B)
4. <u>Populus tremuloides</u>			_FAC_	Percent of Dominant Species
5. <u>Carya ovata</u>	2	N	FACU	That Are OBL, FACW, or FAC: 100.00 (A/B)
6			- <u></u>	Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
	82	= Total Co	ver	OBL species <u>3.00</u> x 1 = <u>3.00</u>
Sapling/Shrub Stratum (Plot size: 15 )				FACW species <u>35.00</u> x 2 = <u>70.00</u>
1. <u>Cornus racemosa</u>	18	Y	_FAC_	FAC species <u>85.00</u> x 3 = <u>255.00</u>
2				FACU species <u>5.00</u> x 4 = <u>20.00</u>
3				UPL species <u>0.00</u> x 5 = <u>0.00</u>
4.				Column Totals: <u>128.00</u> (A) <u>348.00</u> (B)
5.				Prevalence Index = B/A = <u>2.72</u>
6				Hydrophytic Vegetation Indicators:
7			-	1 - Rapid Test for Hydrophytic Vegetation
		= Total Co		∠ 2 - Dominance Test is >50%
Herb Stratum (Plot size:5)	10	- Total Co	ovei	3 - Prevalence Index is ≤3.0 <sup>1</sup>
1. Elymus virginicus	5	Υ	FACW	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
2. Onoclea sensibilis		Y	FACW	✓ Problematic Hydrophytic Vegetation¹ (Explain)
3. Carex sp.			FACW	
		N	OBL	<sup>1</sup> Indicators of hydric soil and wetland hydrology must
	•			be present, unless disturbed or problematic.
5. <u>Rubus allegheniensis</u>		N	<u>FACU</u>	Definitions of Vegetation Strata:
6				Tree – Woody plants 3 in. (7.6 cm) or more in diameter
7				at breast height (DBH), regardless of height.
8				Sapling/shrub – Woody plants less than 3 in. DBH
9		-		and greater than or equal to 3.28 ft (1 m) tall.
10			·	Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
11				
12				Woody vines – All woody vines greater than 3.28 ft in height.
	_21_	= Total Co	ver	noight.
Woody Vine Stratum (Plot size:)				
1. <i>Vitis riparia</i>	_ 5	<u>Y</u>	_FAC_	
2. <u>Toxicodendron radicans</u>	2	Y	_FAC_	
3				Hydrophytic
4				Vegetation           Present?         Yes         No
	_7_	= Total Co	ver	rieseitt! Tes No
Remarks: (Include photo numbers here or on a separate s	sheet.)			
Snow covered, difficult to assess				

Sampling Point: WL J3

Sampling Point: WL J3

(inches) 0-16	Matrix			<u> Features</u>			
<u>U-16</u>	Color (moist)	<u>%</u>	Color (moist)		Type <sup>1</sup> Loc <sup>2</sup>	<u>Texture</u>	Remarks
	10YR 3/1	_/5_	<u>10YR 5/6</u>	_25	C M/PL	SL	Prominent redox.
		etion, RM	I=Reduced Matrix, MS	S=Masked Sa	and Grains.		n: PL=Pore Lining, M=Matrix.
-	Indicators:		5 5.		o)		s for Problematic Hydric Soils <sup>3</sup> :
Histosol Histic Et	i (A1) pipedon (A2)		Polyvalue Belov MLRA 149B)		B) (LRR R,		Muck (A10) ( <b>LRR K, L, MLRA 149B</b> ) Prairie Redox (A16) ( <b>LRR K, L, R</b> )
	istic (A3)		Thin Dark Surfa		R R, MLRA 149E		Mucky Peat or Peat (S3) ( <b>LRR K, L, R</b> )
	en Sulfide (A4)		Loamy Mucky M		LRR K, L)		Surface (S7) (LRR K, L)
	d Layers (A5) d Below Dark Surface	e (A11)	<ul><li>Loamy Gleyed Matrix</li></ul>				alue Below Surface (S8) (LRR K, L) Dark Surface (S9) (LRR K, L)
	ark Surface (A12)	,	Redox Dark Sur				Manganese Masses (F12) ( <b>LRR K, L, R</b> )
	Mucky Mineral (S1)		Depleted Dark S				nont Floodplain Soils (F19) (MLRA 149B)
	Gleyed Matrix (S4) Redox (S5)		<u>∨</u> Redox Depressi	ons (F8)			Spodic (TA6) ( <b>MLRA 144A, 145, 149B</b> ) Parent Material (F21)
	d Matrix (S6)						Shallow Dark Surface (TF12)
Dark Su	ırface (S7) ( <b>LRR R, M</b>	ILRA 149	<b>B</b> )			Other	(Explain in Remarks)
Indicators o	of hydrophytic vegetati	ion and w	etland hydrology mus	t be present	unless disturbed	d or prob <b>l</b> emati	c.
Restrictive	Layer (if observed):						
Type:							
	ches):					Hydric Soi	Present? Yes No
Remarks:							

Project/Site: Riverbend Wind	City/Co	unty: <u>Sani<b>l</b>ac</u>	Sampling Date: <u>2022-01-0</u> 4
			State: Michigan Sampling Point: WL K1
Investigator(s): C. LaRiccia, C. Scholten	Section	ı, Township, Range: <u>S</u>	ec 21 T009N R015E
Landform (hillslope, terrace, etc.): Depression			
Subregion (LRR or MLRA): LRR L, MLRA 99 L			
Soil Map Unit Name: Parkhill loam, 0 to 1			
Are climatic / hydrologic conditions on the site typica	•		
Are Vegetation, Soil, or Hydrology			
Are Vegetation, Soil, or Hydrology			explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site			
		Is the Sampled Area	· · · · · ·
		-	Yes <u>/</u> No
			Site ID:
Remarks: (Explain alternative procedures here or i		1 900, 000000000000000000000000000000000	Cite ID.
HYDROLOGY			
Wetland Hydrology Indicators:			Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; che	eck all that apply)		Surface Soil Cracks (B6)
	Water-Stained Leaves		Drainage Patterns (B10)
<u> </u>	Aquatic Fauna (B13)	(50)	Moss Trim Lines (B16)
	Marl Deposits (B15)		Dry-Season Water Table (C2)
	Hydrogen Sulfide Odor	(C1)	Crayfish Burrows (C8)
	Oxidized Rhizospheres		Saturation Visible on Aerial Imagery (C9)
	Presence of Reduced I		Stunted or Stressed Plants (D1)
<del></del>	<ul><li>Recent Iron Reduction</li><li>Thin Muck Surface (C7</li></ul>		Geomorphic Position (D2)
	Thin Muck Surface (C7 Other (Explain in Rema		<ul><li>Shallow Aquitard (D3)</li><li>Microtopographic Relief (D4)</li></ul>
Sparsely Vegetated Concave Surface (B8)	_ Other (Explain in Nome	ins,	FAC-Neutral Test (D5)
Field Observations:			
Surface Water Present? Yes No	Depth (inches):		
Water Table Present? Yes No	Depth (inches):		
	Depth (inches): 2	Wetland H	lydrology Present? Yes No
(includes capillary fringe)  Describe Recorded Data (stream gauge, monitoring	α well, aerial photos, previ	ous inspections), if avai	ilable:
3 3 ,	g (1-1), a-1-1-1-1	,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,, ,,	
Remarks: Snow covered			
one severes			

<b>VEGETATION –</b>	Use scientific	names o	of plants.

<b>VEGETATION</b> – Use scientific names of plants.				Sampling Point: WL K1
Tree Stratum (Plot size: 30 )		Dominant Species?		Dominance Test worksheet:
1. <u>Acer rubrum</u>	50	Y	FAC	Number of Dominant Species That Are OBL, FACW, or FAC: 10 (A)
2. <u>Ulmus americana</u>	_20_	Y	<u>FACW</u>	Total Number of Dominant
3. <u>Carya ovata</u>	_2_	N	<u>FACU</u>	Species Across All Strata:10 (B)
4				Percent of Dominant Species
5				That Are OBL, FACW, or FAC:100.00_ (A/B)
6				Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
	72	= Total Co	ver	OBL species <u>2.00</u> x 1 = <u>2.00</u>
Sapling/Shrub Stratum (Plot size:)				FACW species <u>53.00</u> x 2 = <u>106.00</u>
1. Cornus racemosa	18	<u>Y</u>	_FAC_	FACUL appariso 2.00 x 4 = 2.25.00
2				FACU species <u>2.00</u> x 4 = <u>8.00</u> UPL species 0.00 x 5 = 0.00
3			·	Column Totals: <u>132.00</u> (A) <u>341.00</u> (B)
4			·	
5				Prevalence Index = B/A = 2.58
6				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
	18	= Total Co	ver	2 - Dominance Test is >50%     3 - Prevalence Index is ≤3.0¹
Herb Stratum (Plot size: 5				4 - Morphological Adaptations <sup>1</sup> (Provide supporting
1. Carex intumescens		<u>Y</u>	<u>FACW</u>	data in Remarks or on a separate sheet)
2. <u>Elymus virginicus</u>	5	<u>Y</u>	<u>FACW</u>	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
3. <u>Onoclea sensibilis</u>		<u>Y</u>	<u>FACW</u>	<sup>1</sup> Indicators of hydric soil and wetland hydrology must
4. Carex sp.		<u>Y</u>	<u>FACW</u>	be present, unless disturbed or problematic.
5. <u>Phalaris arundinacea</u>		<u>Y</u>	<u>FACW</u>	Definitions of Vegetation Strata:
6. <u>Rubus pubescens</u>		_N_	<u>FACW</u>	Tree – Woody plants 3 in. (7.6 cm) or more in diameter
7. <u>Geum rivale</u>	2	_N_	OBL	at breast height (DBH), regardless of height.
8				Sapling/shrub – Woody plants less than 3 in. DBH
9				and greater than or equal to 3.28 ft (1 m) tall.
10				Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
11				
12				Woody vines – All woody vines greater than 3.28 ft in height.
	35	= Total Co	ver	
Woody Vine Stratum (Plot size: 30 )	_			
1. <u>Vitis riparia</u>		<u>Y</u>	_FAC_	
2. <u>Toxicodendron radicans</u>			_FAC_	
3				Hydrophytic Vegetation
4				Present? Yes <u>/</u> No
Remarks: (Include photo numbers here or on a separate s		= Total Co	ver	
Snow covered, difficult to assess	леса,			

Sampling Point: WL K1

	Matrix			x Features	1 . 2		
(inches)	Color (moist)	<u>%</u>	Color (moist)		/pe <sup>1</sup> Loc <sup>2</sup>	<u>Texture</u>	Remarks
0-16	10YR 3/1	_/5_	<u>10YR 5/6</u>		C M/PL	SL	Prominent redox.
				· —— —			
				. <u> </u>			
			-				
	oncentration, D=Depl	etion, RM	I=Reduced Matrix, M	S=Masked Sar	nd Grains.		n: PL=Pore Lining, M=Matrix.
Hydric Soil				0 (00)			for Problematic Hydric Soils <sup>3</sup> :
Histosol Histic Er	(A1) pipedon (A2)		Polyvalue Below		(LKK K,		Muck (A10) ( <b>LRR K, L, MLRA 149B</b> ) Prairie Redox (A16) ( <b>LRR K, L, R</b> )
	istic (A3)		•	•	R, MLRA 149B)		Mucky Peat or Peat (S3) ( <b>LRR K, L, R</b> )
	en Sulfide (A4)		Loamy Mucky N		RR K, L)		Surface (S7) (LRR K, L)
	d Layers (A5) d Below Dark Surface	e (A11)	Loamy Gleyed Depleted Matrix				alue Below Surface (S8) (LRR K, L) Dark Surface (S9) (LRR K, L)
	ark Surface (A12)	(,	Redox Dark Su				langanese Masses (F12) ( <b>LRR K, L, R</b> )
	Mucky Mineral (S1)		Depleted Dark				nont Floodplain Soils (F19) (MLRA 149B)
	Gleyed Matrix (S4) Redox (S5)		<u> </u> Redox Depress	ions (F8)			Spodic (TA6) ( <b>MLRA 144A, 145, 149B</b> ) Parent Material (F21)
	Matrix (S6)						Shallow Dark Surface (TF12)
Dark Su	rface (S7) (LRR R, M	LRA 149	B)			Other	(Explain in Remarks)
Indicators o	f hydrophytic vegetati	on and w	etland hydrology mus	st be present, u	unless disturbed	or prob <b>l</b> emati	c.
Restrictive I	Layer (if observed):						
Type						_	
Type:						Hydric Soil	Present? Yes <u> </u>
	ches):						
Depth (in	ches):						
Depth (in	ches):						
Depth (in	ches):						
Depth (in	ches):						
Depth (in	ches):						
Depth (in	ches):						
Depth (in	ches):						
Depth (in	ches):						
Depth (in	ches):						
Depth (in	ches):						
Depth (in	ches):						
= :	ches):						
Depth (in	ches):						
Depth (in	ches):						

Project/Site: Riverbend Wind	City/C	County: Sanilac	Sampling Date	e: <u>2022-01-0</u> 5
			State: <u>Michigan</u> Sampling Po	
Investigator(s): C. LaRiccia, C. Scholt				
Landform (hillslope, terrace, etc.): Depression				Slope (%): 0-2
Subregion (LRR or MLRA): LRR L, MLRA 99				
Soil Map Unit Name: Parkhill loam, 0 to				
•	· ·			<u>.0/3010</u>
Are climatic / hydrologic conditions on the site typ				
Are Vegetation, Soil, or Hydrolog				
Are Vegetation, Soil, or Hydrolog	y naturally problema	atic? (If needed, e	explain any answers in Remarks.)	)
SUMMARY OF FINDINGS - Attach s	ite map showing sam	npling point locatio	ns, transects, important	features, etc.
Ludraphytic Vacatation Present? Vac	·/ No	Is the Sampled Area		
	✓ No ✓ No		Yes <u>/</u> No	_
	<u>✓</u> No	If ves. ontional Wetland	Site ID:	
Remarks: (Explain alternative procedures here		11 ) 55, 5pm:	0.10.12.	
HYDROLOGY				
Wetland Hydrology Indicators:			Secondary Indicators (minimum	of two required)
Primary Indicators (minimum of one is required:	; check all that apply)		Surface Soil Cracks (B6)	
Surface Water (A1)	Water-Stained Leave	` '	Drainage Patterns (B10)	
High Water Table (A2)	Aquatic Fauna (B13)		Moss Trim Lines (B16)	
Saturation (A3)	Marl Deposits (B15)	(04)	Dry-Season Water Table (C	.2)
	Hydrogen Sulfide Od		Crayfish Burrows (C8)	Imagany (CQ)
Sediment Deposits (B2) Drift Deposits (B3)	Oxidized Rhizosphere Presence of Reduced		<ul><li>Saturation Visible on Aerial</li><li>Stunted or Stressed Plants (</li></ul>	
Algal Mat or Crust (B4)	Recent Iron Reductio		Geomorphic Position (D2)	(01)
Iron Deposits (B5)	Thin Muck Surface (0		Shallow Aquitard (D3)	
Inundation Visible on Aerial Imagery (B7)	Other (Explain in Ren		Microtopographic Relief (D4	<b>!</b> )
Sparsely Vegetated Concave Surface (B8)		,	FAC-Neutral Test (D5)	,
Field Observations:				
Surface Water Present? Yes No	Depth (inches):			
	Depth (inches):			
	Depth (inches): 2	Wetland H	lydrology Present? Yes <u> </u>	No
(includes capillary fringe)  Describe Recorded Data (stream gauge, monitor)	oring well, aerial photos, pre	l evious inspections), if ava	ilable:	
		•		
D d				
Remarks: Snow covered				
<b>O</b> 110.110.110				

	Sampling Point: WL L1
Absolute Dominant Ind	Dominance Test Worksheet.
Tree Stratum (Plot size: 30 ) % Cover Species? S  1. Acer rubrum 50 Y F	Number of Dominant Species
	That Are OBL, FACW, or FAC: 5 (A)
3. Ulmus americana 10 N FA	Total Number of Dominant
4	The 4 Are ODI EAGNA - EAGN 100 00 (A/D)
5	
6	
7	
	OBL species <u>2.00</u> x 1 = <u>2.00</u> FACW species <u>45.00</u> x 2 = <u>90.00</u>
Sapling/Shrub Stratum (Plot size: 15	510 · 5000 0 45000
1. <u>Cornus racemosa</u> 3 N F	FACU species 0.00 x 4 = 0.00
2	UPL species
3	Column rotals. 100.00 (A) 231.00 (B)
4	D
5	
6	4. Domini Took for the plantage with Managerian
7	∠ 2 - Dominance Test is >50%
	3 - Prevalence Index is ≤3.0¹
Herb Stratum (Plot size: 5	4 - Morphological Adaptations <sup>1</sup> (Provide supporting
	data in Remarks or on a separate sheet)
	ACW Problematic Hydrophytic Vegetation¹ (Explain)
,	ACW Indicators of hydric soil and wetland hydrology must
4. <u>Geum rivale</u> 2 N C	
5	
6	I ree - woody plants 3 in. (7.6 cm) or more in diameter
7	
8	cupining, cini and through plants room than a min a and
9	and greater than or equal to 3.28 ft (1 m) tall.
10	Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
11	
12	Woody vines – All woody vines greater than 3.28 ft in height.
= Total Cover	
Woody Vine Stratum (Plot size:30)	
1	
2	
3	Hydrophytic Vegetation
4	Present? Yes <u>✓</u> No
Remarks: (Include photo numbers here or on a separate sheet.)	
Snow covered, difficult to assess	

1 Type: C=Concentration, D Hydric Soil Indicators: Histosol (A1) Histic Epipedon (A2) Black Histic (A3) Hydrogen Sulfide (A4) Stratified Layers (A5) Depleted Below Dark S Thick Dark Surface (A1 Sandy Mucky Mineral (Sandy Gleyed Matrix (Sandy Redox (S5) Stripped Matrix (S6)	2/1 80	Color (moist) 10YR 6/8	% Type¹ Lo 20 C M/		Prominent redox.
Type: C=Concentration, D ydric Soil Indicators:  Histosol (A1)  Histic Epipedon (A2)  Black Histic (A3)  Hydrogen Sulfide (A4)  Stratified Layers (A5)  Depleted Below Dark S  Thick Dark Surface (A1  Sandy Mucky Mineral (Sandy Gleyed Matrix (Sandy Redox (S5)  Stripped Matrix (S6)					Prominent redox.
dric Soil Indicators:  Histosol (A1) Histic Epipedon (A2) Black Histic (A3) Hydrogen Sulfide (A4) Stratified Layers (A5) Depleted Below Dark S Thick Dark Surface (A1 Sandy Mucky Mineral (Sandy Gleyed Matrix (Sandy Redox (S5) Stripped Matrix (S6)	D=Depletion, R				
dric Soil Indicators:  Histosol (A1) Histic Epipedon (A2) Black Histic (A3) Hydrogen Sulfide (A4) Stratified Layers (A5) Depleted Below Dark S Thick Dark Surface (A1 Sandy Mucky Mineral (Sandy Gleyed Matrix (Sandy Redox (S5) Stripped Matrix (S6)	D=Depletion, R				
dric Soil Indicators:  Histosol (A1) Histic Epipedon (A2) Black Histic (A3) Hydrogen Sulfide (A4) Stratified Layers (A5) Depleted Below Dark S Thick Dark Surface (A1 Sandy Mucky Mineral (Sandy Gleyed Matrix (Sandy Redox (S5) Stripped Matrix (S6)	D=Depletion, R				
dric Soil Indicators:  Histosol (A1) Histic Epipedon (A2) Black Histic (A3) Hydrogen Sulfide (A4) Stratified Layers (A5) Depleted Below Dark S Thick Dark Surface (A1 Sandy Mucky Mineral (Sandy Gleyed Matrix (Sandy Redox (S5) Stripped Matrix (S6)	D=Depletion, R				
dric Soil Indicators:  Histosol (A1) Histic Epipedon (A2) Black Histic (A3) Hydrogen Sulfide (A4) Stratified Layers (A5) Depleted Below Dark S Thick Dark Surface (A1 Sandy Mucky Mineral (Sandy Gleyed Matrix (Sandy Redox (S5) Stripped Matrix (S6)	D=Depletion, R				
/dric Soil Indicators:  Histosol (A1) Histic Epipedon (A2) Black Histic (A3) Hydrogen Sulfide (A4) Stratified Layers (A5) Depleted Below Dark S Thick Dark Surface (A1 Sandy Mucky Mineral (Sandy Gleyed Matrix (Sandy Redox (S5) Stripped Matrix (S6)	D=Depletion, R				
rdric Soil Indicators:  Histosol (A1) Histic Epipedon (A2) Black Histic (A3) Hydrogen Sulfide (A4) Stratified Layers (A5) Depleted Below Dark S Thick Dark Surface (A1 Sandy Mucky Mineral (Sandy Gleyed Matrix (Sandy Redox (S5) Stripped Matrix (S6)	D=Depletion, R				
dric Soil Indicators:  Histosol (A1) Histic Epipedon (A2) Black Histic (A3) Hydrogen Sulfide (A4) Stratified Layers (A5) Depleted Below Dark S Thick Dark Surface (A1 Sandy Mucky Mineral (Sandy Gleyed Matrix (Sandy Redox (S5) Stripped Matrix (S6)	D=Depletion, R				
rdric Soil Indicators:  Histosol (A1) Histic Epipedon (A2) Black Histic (A3) Hydrogen Sulfide (A4) Stratified Layers (A5) Depleted Below Dark S Thick Dark Surface (A1 Sandy Mucky Mineral (Sandy Gleyed Matrix (Sandy Redox (S5) Stripped Matrix (S6)	D=Depletion, R				
rdric Soil Indicators:  Histosol (A1) Histic Epipedon (A2) Black Histic (A3) Hydrogen Sulfide (A4) Stratified Layers (A5) Depleted Below Dark S Thick Dark Surface (A1 Sandy Mucky Mineral (Sandy Gleyed Matrix (Sandy Redox (S5) Stripped Matrix (S6)	D=Depletion, R				
dric Soil Indicators:  Histosol (A1) Histic Epipedon (A2) Black Histic (A3) Hydrogen Sulfide (A4) Stratified Layers (A5) Depleted Below Dark S Thick Dark Surface (A1 Sandy Mucky Mineral (Sandy Gleyed Matrix (Sandy Redox (S5) Stripped Matrix (S6)	D=Depletion, R				
rdric Soil Indicators:  Histosol (A1) Histic Epipedon (A2) Black Histic (A3) Hydrogen Sulfide (A4) Stratified Layers (A5) Depleted Below Dark S Thick Dark Surface (A1 Sandy Mucky Mineral (Sandy Gleyed Matrix (Sandy Redox (S5) Stripped Matrix (S6)	D=Depletion, R				
rdric Soil Indicators:  Histosol (A1) Histic Epipedon (A2) Black Histic (A3) Hydrogen Sulfide (A4) Stratified Layers (A5) Depleted Below Dark S Thick Dark Surface (A1 Sandy Mucky Mineral (Sandy Gleyed Matrix (Sandy Redox (S5) Stripped Matrix (S6)	D=Depletion, R				-
/dric Soil Indicators:  Histosol (A1) Histic Epipedon (A2) Black Histic (A3) Hydrogen Sulfide (A4) Stratified Layers (A5) Depleted Below Dark S Thick Dark Surface (A1 Sandy Mucky Mineral (Sandy Gleyed Matrix (Sandy Redox (S5) Stripped Matrix (S6)	D=Depletion, R				
Histosol (A1) Histic Epipedon (A2) Black Histic (A3) Hydrogen Sulfide (A4) Stratified Layers (A5) Depleted Below Dark S Thick Dark Surface (A1 Sandy Mucky Mineral (Sandy Gleyed Matrix (Sandy Redox (S5) Stripped Matrix (S6)		M=Reduced Matrix, IV	IS=Masked Sand Grains.		n: PL=Pore Lining, M=Matrix.
Histic Epipedon (A2) Black Histic (A3) Hydrogen Sulfide (A4) Stratified Layers (A5) Depleted Below Dark S Thick Dark Surface (A1 Sandy Mucky Mineral (Second Sandy Redox (S5) Stripped Matrix (S6)		Polyvoluo Polo	ow Surface (S8) ( <b>LRR R</b> ,		s for Problematic Hydric Soils <sup>3</sup> : Muck (A10) (LRR K, L, MLRA 149B)
Black Histic (A3) Hydrogen Sulfide (A4) Stratified Layers (A5) Depleted Below Dark S Thick Dark Surface (A1 Sandy Mucky Mineral (Sandy Gleyed Matrix (Sandy Redox (S5) Stripped Matrix (S6)		MLRA 149E			t Prairie Redox (A16) ( <b>LRR K, L, R</b> )
Stratified Layers (A5) Depleted Below Dark S Thick Dark Surface (A1 Sandy Mucky Mineral (S Sandy Gleyed Matrix (S Sandy Redox (S5) Stripped Matrix (S6)		Thin Dark Surf	ace (S9) ( <b>LRR R, MLRA</b>		Mucky Peat or Peat (S3) (LRR K, L, R)
Depleted Below Dark S Thick Dark Surface (A1 Sandy Mucky Mineral (S Sandy Gleyed Matrix (S Sandy Redox (S5) Stripped Matrix (S6)			Mineral (F1) (LRR K, L)		Surface (S7) (LRR K, L)
Thick Dark Surface (A1 Sandy Mucky Mineral (Second Second Se		Loamy Gleyed Depleted Matri			alue Below Surface (S8) (LRR K, L) Dark Surface (S9) (LRR K, L)
<ul><li>Sandy Gleyed Matrix (S</li><li>Sandy Redox (S5)</li><li>Stripped Matrix (S6)</li></ul>	• •	Redox Dark Si			Nanganese Masses (F12) ( <b>LRR K, L, R</b> )
Sandy Redox (S5) Stripped Matrix (S6)		Depleted Dark		Piedm	nont Floodplain Soils (F19) ( <b>MLRA 149E</b>
Stripped Matrix (S6)	(S4)	Redox Depres	sions (F8)		Spodic (TA6) ( <b>MLRA 144A, 145, 149B</b>
					Parent Material (F21) Shallow Dark Surface (TF12)
_ Dark Surface (S7) (LRF	RR R, MLRA 14	.9B)			(Explain in Remarks)
ndicators of hydrophytic ve	vegetation and	wetland bydrology mu	ist he nresent unless disti	irhed or problemati	in
estrictive Layer (if obser	-	wedana nyarology me	ot be present, unless dist	Indea or problemati	
Type:					
Depth (inches):				Hydric Soi	l Present? Yes <u></u> No
emarks:					

Project/Site: Riverbend Wind C	ity/County: Sanilac County Sampling Date: 2022-01-06
Applicant/Owner: Liberty Power	
Investigator(s): C. LaRiccia, C. Scholten s	
·	al relief (concave, convex, none): Concave Slope (%): 0-2
	Long: <u>-82,862401</u> Datum: <u>WGS84</u>
Soil Map Unit Name: Marlette loam, 0 to 2 percent slope	
Are climatic / hydrologic conditions on the site typical for this time of year	
	isturbed? Are "Normal Circumstances" present? Yes No
Are Vegetationv_, Soil, or Hydrologyv_ naturally probl	
SUMMARY OF FINDINGS – Attach site map showing s	sampling point locations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes ✓ No	Is the Sampled Area
Hydric Soil Present? Yes ✓ No	within a Wetland? Yes No
Wetland Hydrology Present?  Yes No  Remarks: (Explain alternative procedures here or in a separate report.	If yes, optional Wetland Site ID:
PEM/PSS depression including small drainage of	canal
HYDROLOGY	
Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)	Surface Soil Cracks (B6)
Surface Water (A1) Water-Stained Le	· · · · · · · · · · · · · · · · · · ·
High Water Table (A2) Aquatic Fauna (B	
✓ Saturation (A3) Marl Deposits (B	
Water Marks (B1) Hydrogen Sulfide	
	pheres on Living Roots (C3) Saturation Visible on Aerial Imagery (C9)
Drift Deposits (B3) Presence of Redule Algal Mat or Crust (B4) Recent Iron Redu	uced Iron (C4) Stunted or Stressed Plants (D1) uction in Tilled Soils (C6) Geomorphic Position (D2)
Algal Mat of Crust (B4) Recent Iron Redu Iron Deposits (B5) Thin Muck Surface	· · · · · · · · · · · · · · · · · · ·
Inundation Visible on Aerial Imagery (B7)  Other (Explain in	
Sparsely Vegetated Concave Surface (B8)	FAC-Neutral Test (D5)
Field Observations:	<u> </u>
Surface Water Present? Yes 🗸 No Depth (inches):	3
Water Table Present? Yes No Depth (inches):	
Saturation Present? Yes _ v No Depth (inches):	0 Wetland Hydrology Present? Yes _ ✓ No
(includes capillary fringe)  Describe Recorded Data (stream gauge, monitoring well, aerial photos,	previous inspections), if available:
Doodles (1888) and Jana (2888) gangs, memory and a	, provided inopositions, in artifacture.
Remarks: Snow covered	
Show covered	

<b>VEGETATION</b> – Use scientific names of plants
--

rit Indicator Status FAC FAC FACW FAC FAC FACW FAC FACW FACW	Dominance Test worksheet:         Number of Dominant Species         That Are OBL, FACW, or FAC:
FACW FACW FACW FACW FACW FACW FACW	That Are OBL, FACW, or FAC:
FACW FACW FACW FACW FACW FACW FACW	Percent of Dominant Species That Are OBL, FACW, or FAC:
FACW FACW FACW FACW FACW FACW FACW	That Are OBL, FACW, or FAC:
FACW FACW FACW FACW FACW FACW FACW	Prevalence Index worksheet:
FACW FACW FACW FACW FACW FACW FACW	Total % Cover of:  OBL species 0.00 x 1 = 0.00  FACW species 80.00 x 2 = 160.00  FAC species 43.00 x 3 = 129.00  FACU species 0.00 x 4 = 0.00  UPL species 0.00 x 5 = 0.00  Column Totals: 123.00 (A) 289.00 (B)  Prevalence Index = B/A = 2.35  Hydrophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation  2 - Dominance Test is >50%  3 - Prevalence Index is ≤3.0¹  4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)  Problematic Hydrophytic Vegetation¹ (Explain)  ¹Indicators of hydric soil and wetland hydrology must
FACW FACW FACW FACW FACW FACW	OBL species 0.00 x1 = 0.00  FACW species 80.00 x2 = 160.00  FAC species 43.00 x3 = 129.00  FACU species 0.00 x4 = 0.00  UPL species 0.00 x5 = 0.00  Column Totals: 123.00 (A) 289.00 (B)  Prevalence Index = B/A = 2.35  Hydrophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation  2 - Dominance Test is >50%  3 - Prevalence Index is ≤3.0¹  4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)  Problematic Hydrophytic Vegetation¹ (Explain)  ¹Indicators of hydric soil and wetland hydrology must
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FACW FACW FACW FAC	FAC species 43.00 x 3 = 129.00  FACU species 0.00 x 4 = 0.00  UPL species 0.00 x 5 = 0.00  Column Totals: 123.00 (A) 289.00 (B)  Prevalence Index = B/A = 2.35  Hydrophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation  2 - Dominance Test is >50%  3 - Prevalence Index is ≤3.0¹  4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)  Problematic Hydrophytic Vegetation¹ (Explain)  ¹Indicators of hydric soil and wetland hydrology must
FACW FACW FACW FAC	FACU species
Cover  FACW FACW FACW	Column Totals: 123.00 (A) 289.00 (B)  Prevalence Index = B/A = 2.35  Hydrophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation  2 - Dominance Test is >50%  3 - Prevalence Index is ≤3.0¹  4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)  Problematic Hydrophytic Vegetation¹ (Explain)  ¹Indicators of hydric soil and wetland hydrology must
cover  FACW FACW FAC	Prevalence Index = B/A = 2.35  Hydrophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation  _ 2 - Dominance Test is >50%  _ 3 - Prevalence Index is ≤3.0¹  _ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)  _ Problematic Hydrophytic Vegetation¹ (Explain)  ¹Indicators of hydric soil and wetland hydrology must
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FACW FACW FACW	Hydrophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0¹ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet) Problematic Hydrophytic Vegetation¹ (Explain)  ¹Indicators of hydric soil and wetland hydrology must
FACW FACW FACW FAC	1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0¹ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet) Problematic Hydrophytic Vegetation¹ (Explain)  ¹Indicators of hydric soil and wetland hydrology must
FACW FACW FAC	2 - Dominance Test is >50%     3 - Prevalence Index is ≤3.0¹     4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)     Problematic Hydrophytic Vegetation¹ (Explain)  ¹Indicators of hydric soil and wetland hydrology must
FACW FACW FAC	3 - Prevalence Index is ≤3.0¹     4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)     ▶ Problematic Hydrophytic Vegetation¹ (Explain)  ¹Indicators of hydric soil and wetland hydrology must
FACW FAC	4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)  Problematic Hydrophytic Vegetation¹ (Explain)  ¹Indicators of hydric soil and wetland hydrology must
FACW FAC	Problematic Hydrophytic Vegetation¹ (Explain)  ¹Indicators of hydric soil and wetland hydrology must
FAC	<sup>1</sup> Indicators of hydric soil and wetland hydrology must
_ <u></u>	
	be present, unless disturbed or problematic.
	Definitions of Vegetation Strata:
	<b>Tree</b> – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
	Sapling/shrub – Woody plants less than 3 in. DBH
	and greater than or equal to 3.28 ft (1 m) tall.
	Herb – All herbaceous (non-woody) plants, regardless
	of size, and woody plants less than 3.28 ft tall.
	Woody vines – All woody vines greater than 3.28 ft in
Cover	height.
_ FAC_	
	Hydrophytic
	Vegetation
over	Present? Yes <u>✓</u> No
	1
	Cover  Cover

Sampling Point: WL M1

Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.   *Location: PL=Pore Lining, M=Matrix.	inches) 0-16	Matrix	0/			<u>Features</u>		12	T4	D I
Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.  ydric Soil Indicators: Histosoi (A1) Histos Epipedon (A2) Histic (A3) H	()-16	· · · · · · · · · · · · · · · · · · ·						· · ·		
Histosol (A1) Polyvalue Below Surface (S8) (LRR R, Coast Prairie Redox (A10) (LRR K, L, MLRA 149B) Coast Prairie Redox (A16) (LRR K, L, R)  Black Histic (A3) Thin Dark Surface (S9) (LRR R, MLRA 149B) Some MLRA (A10) (LRR K, L, R)  Black Histic (A3) Thin Dark Surface (S9) (LRR R, MLRA 149B) Some Mucky Peat or Peat (S3) (LRR K, L, R)  Hydrogen Sulfide (A4) Loamy Mucky Mineral (F1) (LRR K, L) Dark Surface (S7) (LRR K, L)  Stratified Layers (A5) Loamy Gleyed Matrix (F2) Polyvalue Below Surface (S9) (LRR K, L)  Depleted Below Dark Surface (A11) Depleted Matrix (F3) Thin Dark Surface (S9) (LRR K, L)  Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Piedmont Floodplain Soils (F19) (MLRA 144 Sandy Mucky Mineral (S1) Piedmont Floodplain Soils (F19) (MLRA 144 Sandy Redox (S5) Red Parent Material (F21) Very Shallow Dark Surface (TF12) Dark Surface (S7) (LRR R, MLRA 149B)  Sandy Redox (S5) Red Parent Material (F21) Very Shallow Dark Surface (TF12) Other (Explain in Remarks)  Andicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Type:	<u> </u>	10YR 3/1	. <u>80</u>	<u>10YR</u>	5/6	<u>20</u>	<u> </u>	M/PL	SL_	Prominent redox.
Indicators for Problematic Hydric Soils*:  Histosol (A1)			- ——							
Indicators for Problematic Hydric Soils Histosol (A1) Polyvalue Below Surface (S8) (LRR R, Coast Prairie Redox (A10) (LRR K, L, MLRA 149B) Coast Prairie Redox (A16) (LRR K, L, R) Black Histic (A3) Thin Dark Surface (S9) (LRR R, MLRA 149B) 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) Hydrogen Sulfide (A4) Loamy Mucky Mineral (F1) (LRR K, L) Dark Surface (S7) (LRR K, L) Stratified Layers (A5) Loamy Gleyed Matrix (F2) Polyvalue Below Surface (S9) (LRR K, L) Thin Dark Surface (A11) Depleted Matrix (F3) Thin Dark Surface (A12) Redox Dark Surface (F6) Iron-Manganese Masses (F12) (LRR K, L, Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Piedmont Floodplain Soils (F19) (MLRA 144) Sandy Gleyed Matrix (S4) Redox Depressions (F8) Mesic Spodic (TA6) (MLRA 144A, 145, 149 Sandy Redox (S5) Red Parent Material (F21) Very Shallow Dark Surface (TF12) Dark Surface (S7) (LRR R, MLRA 149B)  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Type:		-								
Indicators for Problematic Hydric Soils Histosol (A1) Polyvalue Below Surface (S8) (LRR R, Coast Prairie Redox (A10) (LRR K, L, MLRA 149B) Coast Prairie Redox (A16) (LRR K, L, R) Black Histic (A3) Thin Dark Surface (S9) (LRR R, MLRA 149B) 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) Hydrogen Sulfide (A4) Loamy Mucky Mineral (F1) (LRR K, L) Dark Surface (S7) (LRR K, L) Stratified Layers (A5) Loamy Gleyed Matrix (F2) Polyvalue Below Surface (S9) (LRR K, L) Thin Dark Surface (A11) Depleted Matrix (F3) Thin Dark Surface (A12) Redox Dark Surface (F6) Iron-Manganese Masses (F12) (LRR K, L, Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Piedmont Floodplain Soils (F19) (MLRA 144) Sandy Gleyed Matrix (S4) Redox Depressions (F8) Mesic Spodic (TA6) (MLRA 144A, 145, 149 Sandy Redox (S5) Red Parent Material (F21) Very Shallow Dark Surface (TF12) Dark Surface (S7) (LRR R, MLRA 149B)  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Type:										
Indicators for Problematic Hydric Soils*:  Histosol (A1)										
Indicators for Problematic Hydric Soils*:  Histosol (A1)		-	. ——							
Indicators for Problematic Hydric Soils*:  Histosol (A1)		-	- ——	-						
Indicators for Problematic Hydric Soils*:  Histosol (A1)										
Indicators for Problematic Hydric Soils*:  Histosol (A1)				-						
Indicators for Problematic Hydric Soils*:  Histosol (A1)										
Indicators for Problematic Hydric Soils*:  Histosol (A1)										
Indicators for Problematic Hydric Soils*:  Histosol (A1)			. ——							
Indicators for Problematic Hydric Soils*:  Histosol (A1)			- ——					·		
Indicators for Problematic Hydric Soils*:  Histosol (A1)										
Histosol (A1) Polyvalue Below Surface (S8) (LRR R,			letion, RM	I=Reduced M	atrix, MS	=Masked	Sand G	ains.		
Histic Epipedon (A2)  MLRA 149B)  Black Histic (A3)  Thin Dark Surface (S9) (LRR R, MLRA 149B)  Stratified (A4)  Loamy Mucky Mineral (F1) (LRR K, L)  Stratified Layers (A5)  Loamy Gleyed Matrix (F2)  Depleted Below Dark Surface (A11)  Thick Dark Surface (A12)  Sandy Mucky Mineral (S1)  Sandy Mucky Mineral (S1)  Sandy Gleyed Matrix (S4)  Sandy Redox (S5)  Stripped Matrix (S6)  Dark Surface (S7) (LRR K, L)  Redox Depressions (F8)  Stripped Matrix (S6)  Dark Surface (S9) (LRR K, L)  Hind Dark Surface (S9) (LRR K, L)  Iron-Manganese Masses (F12) (LRR K, L, I)  Piedmont Floodplain Soils (F19) (MLRA 144A, 145, 149)  Sandy Redox (S5)  Stripped Matrix (S6)  Dark Surface (S7) (LRR R, MLRA 149B)  Adicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Betrictive Layer (if observed):  Type:  Depth (inches):  Hydric Soil Present? Yes Value (S3) (LRR K, L, R)  Some Mucky Peat or Peat (S3) (LRR K, L, R)  Some Mucky Peat or Peat (S3) (LRR K, L, R)  Dark Surface (S7) (LRR K, L)  Dark Surface (S7) (LRR K, L)  Mucky Peat or Peat (S3) (LRR K, L, R)  Dark Surface (S7) (LRR K, L)  Mucky Peat or Peat (S3) (LRR K, L, R)  Dark Surface (S7) (LRR K, L)  Mucky Peat or Peat (S3) (LRR K, L, R)  Dark Surface (S7) (LRR K, L)  Mucky Surface (S7) (LRR K, L)  No  Hydric Soil Present? Yes Value (S3)  Type:  Depth (inches):				Dalumal	Dala	. Cumfa a a	(CO) (I D	D D		· ·
Black Histic (A3)	_	` '				Surrace	(58) ( <b>LR</b>	KK,		
Hydrogen Sulfide (A4) Loamy Mucky Mineral (F1) (LRR K, L) Dark Surface (S7) (LRR K, L) Stratified Layers (A5) Loamy Gleyed Matrix (F2) Polyvalue Below Surface (S8) (LRR K, L) Polyvalue Below Surface (S8) (LRR K, L) Polyvalue Below Surface (S8) (LRR K, L) Thin Dark Surface (S9) (LRR K, L)					,	ce (S9) ( <b>L</b>	.RR R, M	LRA 149B)		
Depleted Below Dark Surface (A11) Depleted Matrix (F3) Thin Dark Surface (S9) (LRR K, L) Thick Dark Surface (A12) Redox Dark Surface (F6) Iron-Manganese Masses (F12) (LRR K, L, I) Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Piedmont Floodplain Soils (F19) (MLRA 144, Sandy Gleyed Matrix (S4) Redox Depressions (F8) Mesic Spodic (TA6) (MLRA 144A, 145, 149) Sandy Redox (S5) Red Parent Material (F21) Stripped Matrix (S6) Person (S7) (LRR R, MLRA 149B) Dark Surface (S7) (LRR R, MLRA 149B)  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Setrictive Layer (if observed): Type: Depth (inches):  Hydric Soil Present? Yes Volume Masses (F12) (LRR K, L) Iron-Manganese Masses (F12) (LRR K, L) Ir										
Thick Dark Surface (A12)	_ Stratifie	d Layers (A5)		Loamy	Gleyed N	/latrix (F2)	)		Polyva	alue Below Surface (S8) (LRR K, L)
Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Piedmont Floodplain Soils (F19) (MLRA 144   Sandy Gleyed Matrix (S4) Redox Depressions (F8) Mesic Spodic (TA6) (MLRA 144A, 145, 149   Sandy Redox (S5) Red Parent Material (F21)   Stripped Matrix (S6) Very Shallow Dark Surface (TF12)   Dark Surface (S7) (LRR R, MLRA 149B) Other (Explain in Remarks)   Other (Explain in Remarks)   Depth (inches):   Depth (inches):	-		e (A11)	-						
Sandy Gleyed Matrix (S4)							<del>-</del> \			
Sandy Redox (S5) Red Parent Material (F21) Very Shallow Dark Surface (TF12) Dark Surface (S7) (LRR R, MLRA 149B) Other (Explain in Remarks) Other (Explain in Remarks)						-	7)			
Stripped Matrix (S6) Very Shallow Dark Surface (TF12) Other (Explain in Remarks)				<u>√</u> Redox	Depressi	ons (Fo)				
Dark Surface (S7) (LRR R, MLRA 149B) Other (Explain in Remarks)  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.		· · ·								
Depth (inches):   Hydric Soil Present? Yes No			/ILRA 149	В)						
Depth (inches):   Hydric Soil Present? Yes No		of hydrophytic yegotat	tion and w	rotland bydrol	oay muci	ho proco	nt unloc	e dieturbed (	or problemati	0
Type:  Depth (inches):	adioatora a	n nyaropnylic vegetai		etiano nyoroi	ogy musi	be prese	int, unies	s disturbed (	or probleman	С.
Depth (inches): No										
	estrictive									
amarke:	estrictive Type:	Layer (if observed):							Hydric Soil	l Present? Yes ✓ No
	estrictive Type: Depth (in	Layer (if observed):							Hydric Soil	I Present? Yes <u> </u>
	estrictive Type: Depth (in	Layer (if observed):							Hydric Soil	I Present? Yes <u>v</u> No
	estrictive Type: Depth (in	Layer (if observed):							Hydric Soil	I Present? Yes <u> </u>
	estrictive Type: Depth (in	Layer (if observed):							Hydric Soil	I Present? Yes <u>✓</u> No
	estrictive Type: Depth (in	Layer (if observed):							Hydric Soil	I Present? Yes <u>✓</u> No
	estrictive Type: Depth (in	Layer (if observed):							Hydric Soil	I Present? Yes <u> </u>
	estrictive Type: Depth (in	Layer (if observed):							Hydric Soil	I Present? Yes <u> </u>
	estrictive Type: Depth (in	Layer (if observed):							Hydric Soil	I Present? Yes <u>✓</u> No
	estrictive Type: Depth (in	Layer (if observed):							Hydric Soil	I Present? Yesv_ No
	estrictive Type: Depth (in	Layer (if observed):							Hydric Soil	I Present? Yesv_ No
	estrictive Type:	Layer (if observed):							Hydric Soil	I Present? Yes <u> </u>
	estrictive Type: Depth (in	Layer (if observed):							Hydric Soil	I Present? Yes <u> </u>
	estrictive Type: Depth (in	Layer (if observed):							Hydric Soil	I Present? Yes <u>✓</u> No
	estrictive Type: Depth (in	Layer (if observed):							Hydric Soil	I Present? Yes <u> </u>
	estrictive Type: Depth (in	Layer (if observed):							Hydric Soil	I Present? Yes No

Project/Site: Riverbend Wind	City/County: <u></u>	City/County: Sanilac County Sampling Date: 2022-01-0					
	State: Michigan Sampling Point: WL M2						
_		Section, Township, Range: <u>sec 10 T009N R014E</u>					
•	Local relief (concave, convex, none): Concave Slope (%): 0-2						
Subregion (LRR or MLRA): LRR L, MLRA 99 Lat							
Soil Map Unit Name: Parkhill loam and clay							
Are climatic / hydrologic conditions on the site typical f	•	•					
Are Vegetation, Soil, or Hydrology							
Are Vegetation, Soil, or Hydrology	naturally problematic?	(If needed, explain any ans	swers in Remarks.)				
SUMMARY OF FINDINGS – Attach site n	nap showing sampling r	ooint locations, transec	cts, important features, etc.				
Hydrophytic Vegetation Present? Yes	Sampled Area						
	No within a	a Wetland? Yes	<u>/</u> No				
		optional Wetland Site ID:					
PFO depression connecting to WC							
HYDROLOGY							
Wetland Hydrology Indicators:		Secondary Inc	dicators (minimum of two required)				
Primary Indicators (minimum of one is required; chec	k all that apply)	Surface S	Soil Cracks (B6)				
<del></del>	Water-Stained Leaves (B9)		Patterns (B10)				
	Aquatic Fauna (B13)		n Lines (B16)				
<del>-</del>	Marl Deposits (B15)		Dry-Season Water Table (C2)				
	Hydrogen Sulfide Odor (C1)		Burrows (C8)				
	Oxidized Rhizospheres on Livi Presence of Reduced Iron (C4	= : :	n Visible on Aerial Imagery (C9) or Stressed Plants (D1)				
	Recent Iron Reduction in Tilled		hic Position (D2)				
<del>-                                    </del>	Thin Muck Surface (C7)	Shallow A					
	Other (Explain in Remarks)		ographic Relief (D4)				
Sparsely Vegetated Concave Surface (B8)		FAC-Neu					
Field Observations:							
Surface Water Present? Yes No	_ Depth (inches):	_					
	_ Depth (inches):						
Saturation Present? Yes _ v No	_ Depth (inches): 0	_ Wetland Hydrology Pre	sent? Yes <u> </u>				
(includes capillary fringe)  Describe Recorded Data (stream gauge, monitoring	well, aerial photos, previous ins	l pections), if available:					
, , , , , , ,		,,					
Remarks: Snow covered							

<b>VEGETATION -</b>	Haa	agiontifia	namaa	of n	lonto
VEGETATION -	use	scientific	names	OI D	iants.

VEGETATION – Use scientific names of plants.				Sampling Point: WL M2
Tree Stratum (Plot size: 30 )	Absolute % Cover	Dominant		Dominance Test worksheet:
1. Acer rubrum				Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)
2. <u>Carpinus caroliniana</u>			FAC	Total Number of Dominant
3				Species Across All Strata: 4 (B)
4				Percent of Dominant Species
5				That Are OBL, FACW, or FAC:
6				Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
		= Total Co	ver	OBL species 0.00 x 1 = 0.00
Sapling/Shrub Stratum (Plot size: 15 )	4-			FACW species <u>65.00</u> x 2 = <u>130.00</u> FAC species <u>80.00</u> x 3 = <u>240.00</u>
1. <u>Cornus amomum</u>				FACU species 0.00 x4 = 0.00
2				UPL species x5 =0.00
3				Column Totals: <u>145.00</u> (A) <u>370.00</u> (B)
4				Prevalence Index = B/A = 2.55
5				
6				Hydrophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation
7				∠ 2 - Dominance Test is >50%
_	15	= Total Co	ver	✓ 3 - Prevalence Index is ≤3.0 <sup>1</sup>
Herb Stratum (Plot size: 5 )  1. Phalaris arundinacea	30	Y	FACW	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
2. <u>Solidago gigantea</u>		Y	FACW	✓ Problematic Hydrophytic Vegetation¹ (Explain)
3. Symphyotrichum sp.		N	FAC	
4				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5				Definitions of Vegetation Strata:
6				-
7				<b>Tree</b> – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
8				Sapling/shrub – Woody plants less than 3 in. DBH
9				and greater than or equal to 3.28 ft (1 m) tall.
10				Herb – All herbaceous (non-woody) plants, regardless
11				of size, and woody plants less than 3.28 ft tall.
12				<b>Woody vines</b> – All woody vines greater than 3.28 ft in height.
	<u>55</u>	= Total Co	ver	Norgh
Woody Vine Stratum (Plot size:)				
1. <u>Vitis riparia</u>	3	N	_FAC_	
2				
3	<u> </u>			Hydrophytic
4				
	3	= Total Co	ver	
3			· ——	Hydrophytic Vegetation Present?  Yes No

Sampling Point: WL M2

Depth	Matrix			x Features	3			
(inches)	Color (moist)	. <u>%</u> 95	Color (moist)	% 1 <i>5</i>	Type <sup>1</sup>	Loc <sup>2</sup>	Texture SL	Remarks  Prominent redex
<u>0-16</u>	101R 2/2		10YR 5/6			M/PL	SL	Prominent redox.
		· ——				· ——		
						<del></del>		
						·		
						·		
Type: C=C	oncentration. D=Dep	letion. RM	I=Reduced Matrix, MS	======================================	Sand G	rains.	<sup>2</sup> Location	: PL=Pore Lining, M=Matrix.
	Indicators:		· · · · · · · · · · · · · · · · · · ·					for Problematic Hydric Soils <sup>3</sup> :
Histosol			Polyvalue Belov		(S8) ( <b>LR</b>	R R,		Muck (A10) (LRR K, L, MLRA 149B)
	pipedon (A2) istic (A3)		MLRA 149B) Thin Dark Surfa		.RR R, M	ILRA 149B)		Prairie Redox (A16) ( <b>LRR K, L, R</b> )  Mucky Peat or Peat (S3) ( <b>LRR K, L, R</b> )
Hydroge	en Su <b>l</b> fide (A4)		Loamy Mucky N	/lineral (F1	) (LRR I		Dark S	Surface (S7) ( <b>LRR K, L</b> )
	d Layers (A5) d Below Dark Surfac	e (A11)	Loamy Gleyed   Depleted Matrix		)			alue Below Surface (S8) (LRR K, L) Park Surface (S9) (LRR K, L)
	ark Surface (A12)	C (/ (11)	Redox Dark Su					langanese Masses (F12) (LRR K, L, R)
	Mucky Mineral (S1)		Depleted Dark S		7)			ont Floodplain Soils (F19) (MLRA 149B)
	Gleyed Matrix (S4) Redox (S5)		<u> </u> Redox Depress	ions (F8)				Spodic (TA6) ( <b>MLRA 144A, 145, 149B</b> ) arent Material (F21)
	d Matrix (S6)							Shallow Dark Surface (TF12)
Dark Su	ırface (S7) ( <b>LRR R, N</b>	/ILRA 149	B)				Other	(Explain in Remarks)
Indicators c	f hydrophytic vegeta	tion and w	etland hydrology mus	t be prese	ent, unles	s disturbed	or prob <b>l</b> emati	С.
	Layer (if observed):							
Type:								
	ches):						Hydric Soil	Present? Yes <u>/</u> No
Remarks:								

Project/Site: Riverbend Wind	C	ity/County: Sanilac	Countv	Sampling Date: 2022-01-07	
Applicant/Owner: Liberty Power			•	gan Sampling Point: WL N1	
Investigator(s): C. LaRiccia, C. S			_	· -	
Landform (hillslope, terrace, etc.): Dep					
Subregion (LRR or MLRA): LRR L, MI					
Soil Map Unit Name: Parkhill loam	•	•			
Are climatic / hydrologic conditions on the					
Are Vegetation, Soil, or F					
Are Vegetation, Soil, or F	dydrology <u>✓</u> naturally probl	lematic? (If need	ded, explain any answe	ers in Remarks.)	
SUMMARY OF FINDINGS - At	tach site map showing s	sampling point loc	ations, transects	s, important features, etc.	
Hydrophytic Vegetation Present?	Yes _ ✔ _ No	Is the Sampled A			
Hydric Soil Present?	Yes No	within a Wetland	? Yes <u> </u>	No	
Wetland Hydrology Present?		If yes, optional We	etland Site ID:		
Remarks: (Explain alternative procedure PFO depression in woodlo	t	,			
HYDROLOGY					
Wetland Hydrology Indicators:			·	cators (minimum of two required)	
Primary Indicators (minimum of one is r			Surface Soil		
Surface Water (A1)	Water-Stained Le	, ,		atterns (B10)	
High Water Table (A2)	Aquatic Fauna (B		Moss Trim Lines (B16)		
Saturation (A3) Water Marks (B1)	Marl Deposits (B´ Hydrogen Sulfide		<ul><li>Dry-Season Water Table (C2)</li><li>Crayfish Burrows (C8)</li></ul>		
Sediment Deposits (B2)		pheres on Living Roots (		/isible on Aerial Imagery (C9)	
Drift Deposits (B3)	Presence of Redu			Stressed Plants (D1)	
Algal Mat or Crust (B4)		uction in Tilled Soils (C6			
Iron Deposits (B5)	Thin Muck Surfac		Shallow Aqu		
Inundation Visible on Aerial Imager	ry (B7) Other (Explain in	Remarks)		raphic Relief (D4)	
Sparsely Vegetated Concave Surfa	ace (B8)		_∠ FAC-Neutra	Il Test (D5)	
Field Observations:					
	No V Depth (inches):				
	No _ ✓ Depth (inches):		the table Book	N.	
Saturation Present? Yes (includes capillary fringe)	No Depth (inches):	O vvetia	and Hydrology Prese	nt? Yes <u> </u>	
Describe Recorded Data (stream gauge	e, monitoring well, aerial photos	, previous inspections),	if available:		
Remarks:					
Snow covered					

<b>VEGETATION</b> – Use scientific names of plants	<b>VEGETATION -</b>	Use scientific	names of plants
--	---------------------	----------------	-----------------

				Sampling Point: WL N1
Tree Stratum (Plot size:30)	Absolute % Cover		t Indicator Status	Dominance Test worksheet:
1. Acer rubrum		<u>Y</u>		Number of Dominant Species That Are OBL, FACW, or FAC:3(A)
2. <u>Ulmus americana</u>		Y_	<u>FACW</u>	Total Number of Dominant
3. <u>Carpinus caroliniana</u>			_FAC_	Species Across All Strata:3(B)
4				Percent of Dominant Species
5				That Are OBL, FACW, or FAC:
6				Prevalence Index worksheet:
7	<u> </u>			Total % Cover of: Multiply by:
	91	= Total Co	over	OBL species <u>0.00</u> x 1 = <u>0.00</u>
Sapling/Shrub Stratum (Plot size: 15 )				FACW species 75.00 x 2 = 150.00
1				FAC species 74.00 x 3 = 222.00 FACU species 0.00 x 4 = 0.00
2				UPL species x5 =0.00
3				Column Totals: <u>149.00</u> (A) <u>372.00</u> (B)
4				Prevalence Index = B/A = 2.5
5				
6				Hydrophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation
7	_			∠ 2 - Dominance Test is >50%
Hart Otation (District	0	= Total Co	over	3 - Prevalence Index is ≤3.0 <sup>1</sup>
Herb Stratum (Plot size: 5 )  1. Onoclea sensibilis	40	Υ	FACW	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
Phalaris arundinacea	10	N	FACW	✓ Problematic Hydrophytic Vegetation¹ (Explain)
3. Carex sp.			FACW	
4				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5				Definitions of Vegetation Strata:
6				•
7				Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
8				Sapling/shrub – Woody plants less than 3 in. DBH
9				and greater than or equal to 3.28 ft (1 m) tall.
10				Herb – All herbaceous (non-woody) plants, regardless
11				of size, and woody plants less than 3.28 ft tall.
12				Woody vines – All woody vines greater than 3.28 ft in height.
	55	= Total Co	over	neight.
Woody Vine Stratum (Plot size:)				
1. Vitis riparia	_ 3	N	_FAC_	
<u> </u>				
2				
•				Hydrophytic
2				Hydrophytic Vegetation Present? Yes <u>✓</u> No

Sampling Point: WL N1

Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.    Variable   Variabl		0/		x Features	<b>T</b> 2	T 1	Day 1
Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.  ydric Soil Indicators: Histosci (A1) Histosci (A1) Histosci Epipedon (A2) Histosci Epipedon (A2) MLRA 149B) Histosci Epipedon (A2) Histosci Ipinedon (A10) Histosci Epipedon (A2) Histosci Ipinedon (A2) Histosci Ipinedon (A10) Histosci Ipinedon (A10	<u>0-16</u> <u>10YR 3/1</u>	%	Color (moist)			<u>Texture</u>	Remarks
Histosol (A1) Polyvalue Below Surface (S8) (LRR R, 2 cm Muck (A10) (LRR K, L, MLRA 149B) Histic Epipedon (A2) MLRA 149B) Coast Prairie Redox (A16) (LRR K, L, R) Black Histic (A3) Thin Dark Surface (S9) (LRR R, MLRA 149B) 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) Hydrogen Sulfide (A4) Loamy Mucky Mineral (F1) (LRR K, L) Dark Surface (S7) (LRR K, L) Stratified Layers (A5) Loamy Gleyed Matrix (F2) Polyvalue Below Surface (S8) (LRR K, L) Depleted Below Dark Surface (A11) Depleted Matrix (F3) Thin Dark Surface (S9) (LRR K, L) Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Piedmont Floodplain Soils (F19) (MLRA 144A, 145, 149 Sandy Redox (S5) Stripped Matrix (S4) Redox Depressions (F8) Red Parent Material (F21) Stripped Matrix (S6) Dark Surface (S7) (LRR R, MLRA 149B)  Depleted Layer (if observed): Type:		_ <u>80</u>	10YR 5/6	20	<u>C</u> <u>M/PL</u>	SL	Prominent redox.
Indicators for Problematic Hydric Soils Histosol (A1) Polyvalue Below Surface (S8) (LRR R, 2 cm Muck (A10) (LRR K, L, MLRA 149B) Coast Prairie Redox (A16) (LRR K, L, R) Black Histic Epipedon (A2) MLRA 149B) 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) Black Histic (A3) Thin Dark Surface (S9) (LRR R, MLRA 149B) 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) Dark Surface (S7) (LRR K, L) Dark Surface (S7) (LRR K, L) Dark Surface (S7) (LRR K, L) Depleted Layers (A5) Loamy Mucky Mineral (F1) (LRR K, L) Polyvalue Below Surface (S8) (LRR K, L) Depleted Below Dark Surface (A11) Depleted Matrix (F3) Thin Dark Surface (A12) Redox Dark Surface (F6) Iron-Manganese Masses (F12) (LRR K, L, Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Piedmont Floodplain Soils (F19) (MLRA 144 Sandy Gleyed Matrix (S4) Redox Depressions (F8) Mesic Spodic (TA6) (MLRA 144A, 145, 149 Sandy Redox (S5) Red Parent Material (F21) Very Shallow Dark Surface (TF12) Dark Surface (S7) (LRR R, MLRA 149B)  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Type:							
Indicators for Problematic Hydric Soils : Histosol (A1)							
Indicators for Problematic Hydric Soils : Histosol (A1)							
Indicators for Problematic Hydric Soils Histosol (A1) Polyvalue Below Surface (S8) (LRR R, 2 cm Muck (A10) (LRR K, L, MLRA 149B) Coast Prairie Redox (A16) (LRR K, L, R) Black Histic Epipedon (A2) MLRA 149B) 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) Black Histic (A3) Thin Dark Surface (S9) (LRR R, MLRA 149B) 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) Dark Surface (S7) (LRR K, L) Dark Surface (S7) (LRR K, L) Dark Surface (S7) (LRR K, L) Depleted Layers (A5) Loamy Mucky Mineral (F1) (LRR K, L) Polyvalue Below Surface (S8) (LRR K, L) Depleted Below Dark Surface (A11) Depleted Matrix (F3) Thin Dark Surface (A12) Redox Dark Surface (F6) Iron-Manganese Masses (F12) (LRR K, L, Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Piedmont Floodplain Soils (F19) (MLRA 144 Sandy Gleyed Matrix (S4) Redox Depressions (F8) Mesic Spodic (TA6) (MLRA 144A, 145, 149 Sandy Redox (S5) Red Parent Material (F21) Very Shallow Dark Surface (TF12) Dark Surface (S7) (LRR R, MLRA 149B)  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Type:							
Indicators for Problematic Hydric Soils Histosol (A1) Polyvalue Below Surface (S8) (LRR R, 2 cm Muck (A10) (LRR K, L, MLRA 149B) Coast Prairie Redox (A16) (LRR K, L, R) Black Histic Epipedon (A2) MLRA 149B) 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) Black Histic (A3) Thin Dark Surface (S9) (LRR R, MLRA 149B) 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) Dark Surface (S7) (LRR K, L) Dark Surface (S7) (LRR K, L) Dark Surface (S7) (LRR K, L) Depleted Layers (A5) Loamy Mucky Mineral (F1) (LRR K, L) Polyvalue Below Surface (S8) (LRR K, L) Depleted Below Dark Surface (A11) Depleted Matrix (F3) Thin Dark Surface (A12) Redox Dark Surface (F6) Iron-Manganese Masses (F12) (LRR K, L, Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Piedmont Floodplain Soils (F19) (MLRA 144 Sandy Gleyed Matrix (S4) Redox Depressions (F8) Mesic Spodic (TA6) (MLRA 144A, 145, 149 Sandy Redox (S5) Red Parent Material (F21) Very Shallow Dark Surface (TF12) Dark Surface (S7) (LRR R, MLRA 149B)  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Type:			-				
Indicators for Problematic Hydric Soils : Histosol (A1)							
Indicators for Problematic Hydric Soils : Histosol (A1)							
Indicators for Problematic Hydric Soils : Histosol (A1)							
Indicators for Problematic Hydric Soils Histosol (A1) Polyvalue Below Surface (S8) (LRR R, 2 cm Muck (A10) (LRR K, L, MLRA 149B) Coast Prairie Redox (A16) (LRR K, L, R) Black Histic Epipedon (A2) MLRA 149B) 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) Black Histic (A3) Thin Dark Surface (S9) (LRR R, MLRA 149B) 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) Dark Surface (S7) (LRR K, L) Dark Surface (S7) (LRR K, L) Dark Surface (S7) (LRR K, L) Depleted Layers (A5) Loamy Mucky Mineral (F1) (LRR K, L) Polyvalue Below Surface (S8) (LRR K, L) Depleted Below Dark Surface (A11) Depleted Matrix (F3) Thin Dark Surface (A12) Redox Dark Surface (F6) Iron-Manganese Masses (F12) (LRR K, L, Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Piedmont Floodplain Soils (F19) (MLRA 144 Sandy Gleyed Matrix (S4) Redox Depressions (F8) Mesic Spodic (TA6) (MLRA 144A, 145, 149 Sandy Redox (S5) Red Parent Material (F21) Very Shallow Dark Surface (TF12) Dark Surface (S7) (LRR R, MLRA 149B)  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Type:							
Indicators for Problematic Hydric Soils : Histosol (A1)							
Indicators for Problematic Hydric Soils : Histosol (A1)							
Histosol (A1) Polyvalue Below Surface (S8) (LRR R, 2 cm Muck (A10) (LRR K, L, MLRA 149B) Histic Epipedon (A2) MLRA 149B) Coast Prairie Redox (A16) (LRR K, L, R) Black Histic (A3) Thin Dark Surface (S9) (LRR R, MLRA 149B) 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) Hydrogen Sulfide (A4) Loamy Mucky Mineral (F1) (LRR K, L) Dark Surface (S7) (LRR K, L) Stratified Layers (A5) Loamy Gleyed Matrix (F2) Polyvalue Below Surface (S9) (LRR K, L) Depleted Below Dark Surface (A11) Depleted Matrix (F3) Thin Dark Surface (A12) Redox Dark Surface (F6) Iron-Manganese Masses (F12) (LRR K, L, S) Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Piedmont Floodplain Soils (F19) (MLRA 144 Sandy Gleyed Matrix (S4) Redox Depressions (F8) Red Parent Material (F21) Sandy Redox (S5) Red Parent Material (F21) Very Shallow Dark Surface (TF12) Dark Surface (S7) (LRR R, MLRA 149B)  Depth (inches): Mydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Hydric Soil Present? Yes No							
Histosol (A1) Polyvalue Below Surface (S8) (LRR R, 2 cm Muck (A10) (LRR K, L, MLRA 149B) Histic Epipedon (A2) MLRA 149B) Coast Prairie Redox (A16) (LRR K, L, R) Black Histic (A3) Thin Dark Surface (S9) (LRR R, MLRA 149B) 5 cm Mucky Peat or Peat (S3) (LRR K, L, R) Hydrogen Sulfide (A4) Loamy Mucky Mineral (F1) (LRR K, L) Dark Surface (S7) (LRR K, L) Stratified Layers (A5) Loamy Gleyed Matrix (F2) Polyvalue Below Surface (S9) (LRR K, L) Depleted Below Dark Surface (A11) Depleted Matrix (F3) Thin Dark Surface (A12) Redox Dark Surface (F6) Iron-Manganese Masses (F12) (LRR K, L, S) Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Piedmont Floodplain Soils (F19) (MLRA 144 Sandy Gleyed Matrix (S4) Redox Depressions (F8) Red Parent Material (F21) Sandy Redox (S5) Red Parent Material (F21) Very Shallow Dark Surface (TF12) Dark Surface (S7) (LRR R, MLRA 149B)  Depth (inches): Mydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Hydric Soil Present? Yes No							
Histosol (A1) Polyvalue Below Surface (S8) (LRR R, 2 cm Muck (A10) (LRR K, L, MLRA 149B) Histic Epipedon (A2)		oletion, RM	I=Reduced Matrix, M	S=Masked S	and Grains.		
Histic Epipedon (A2)  MLRA 149B)  Coast Prairie Redox (A16) (LRR K, L, R)  Black Histic (A3)  Thin Dark Surface (S9) (LRR R, MLRA 149B)  Stratified (A4)  Stratified Layers (A5)  Depleted Below Dark Surface (A11)  Depleted Matrix (F2)  Depleted Below Dark Surface (S9) (LRR K, L)  Thick Dark Surface (A12)  Sandy Mucky Mineral (S1)  Depleted Dark Surface (F6)  Sandy Mucky Mineral (S1)  Sandy Gleyed Matrix (S4)  Sandy Redox (S5)  Stripped Matrix (S6)  Dark Surface (S9) (LRR K, L)  Redox Depressions (F8)  Mesic Spodic (TA6) (MLRA 144A, 145, 149)  Sandy Redox (S7) (LRR R, MLRA 149B)  Medicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Hydric Soil Present?  Yes No				0 6 (0	0) 4		
Black Histic (A3)	_ \ /				8) ( <b>LRR R,</b>		
Stratified Layers (A5) Loamy Gleyed Matrix (F2) Polyvalue Below Surface (S8) (LRR K, L) Depleted Below Dark Surface (A11) Depleted Matrix (F3) Thin Dark Surface (S9) (LRR K, L) Thick Dark Surface (A12) Redox Dark Surface (F6) Iron-Manganese Masses (F12) (LRR K, L, Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Piedmont Floodplain Soils (F19) (MLRA 144				•	R R, MLRA 149B		
Depleted Below Dark Surface (A11) Depleted Matrix (F3) Thin Dark Surface (S9) (LRR K, L) Thick Dark Surface (A12) Redox Dark Surface (F6) Iron-Manganese Masses (F12) (LRR K, L, I) Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Piedmont Floodplain Soils (F19) (MLRA 144, 145, 149) Sandy Gleyed Matrix (S4) Redox Depressions (F8) Mesic Spodic (TA6) (MLRA 144A, 145, 149) Sandy Redox (S5) Red Parent Material (F21) Stripped Matrix (S6) Person (S7) (LRR R, MLRA 149B)  Dark Surface (S7) (LRR R, MLRA 149B)  Depth (inches): Hydric Soil Present? Yes No Depression (P6)  Hydric Soil Present? Yes No Depression (P6)  Hydric Soil Present? Yes No Depression (P6)  Iron-Manganese Masses (F12) (LRR K, L, I) I					(LRR K, L)		
Thick Dark Surface (A12)		(0.44)					
Sandy Mucky Mineral (S1) Depleted Dark Surface (F7) Piedmont Floodplain Soils (F19) (MLRA 144 Sandy Gleyed Matrix (S4) Redox Depressions (F8) Mesic Spodic (TA6) (MLRA 144A, 145, 149 Red Parent Material (F21) Very Shallow Dark Surface (TF12) Very Shallow Dark Surface (TF12) Other (Explain in Remarks) Other (Explain in Remarks) Other (Explain in Remarks) Depth (inches): Hydric Soil Present? Yes No No		:e (АТТ)	•				
Sandy Redox (S5) Red Parent Material (F21) Very Shallow Dark Surface (TF12) Other (Explain in Remarks) Other	<del>-</del>						
Stripped Matrix (S6) Very Shallow Dark Surface (TF12) Other (Explain in Remarks)			✓ Redox Depress	sions (F8)			
Dark Surface (S7) (LRR R, MLRA 149B) Other (Explain in Remarks)  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.							
ndicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.  estrictive Layer (if observed):  Type:  Depth (inches): Hydric Soil Present? Yes No		MI RΔ 149	R)				
Depth (inches):   Hydric Soil Present? Yes No	Dank Gunade (67) (Erkit K,	MEICA 143	<b>D</b> )			01101	(Explain in Remarks)
Type:            Depth (inches):         Hydric Soil Present? Yes _ ν _ No			etland hydrology mus	st be present	, unless disturbed	l or problemati	c.
Depth (inches): No	estrictive Layer (if observed)	i:					
	Type:						
amarke:	Depth (inches):					Hydric Soi	Present? Yes <u> </u>
smarks.	emarks:						

Project/Site: Riverbend	Citv/County	: Sanilac County	Sampling Date: 2022-04-04
Applicant/Owner: Liberty		•	higan Sampling Point: WL P1
Investigator(s): J. Brown, K. Yantz, Atwell,			
Landform (hillslope, terrace, etc.): Depression			
•			
Subregion (LRR or MLRA): LRR L, MLRA 98 Lat:			
Soil Map Unit Name: Conover loam, 0 to 3 p	•		
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 Circumstanc	es" present? Yes No
Are Vegetation, Soil, or Hydrology	naturally problematic?	(If needed, explain any an	swers in Remarks.)
SUMMARY OF FINDINGS - Attach site ma	ap showing sampling	g point locations, transe	ects, important features, etc.
Hydrophytic Vegetation Present? Yes✓	No. Is th	ne Sampled Area	
	110		✓ No
		s, optional Wetland Site ID:	
Remarks: (Explain alternative procedures here or in a		o, optional Wotaria Cito IB.	
PEM/PSS wetland	, ,		
HYDROLOGY			
Wetland Hydrology Indicators:		Secondary Ir	ndicators (minimum of two required)
Primary Indicators (minimum of one is required; check	all that apply)		Soil Cracks (B6)
✓ Surface Water (A1)	Water-Stained Leaves (B9)		e Patterns (B10)
	Aquatic Fauna (B13)		im Lines (B16)
✓ Saturation (A3)	Marl Deposits (B15)	Dry-Sea	son Water Table (C2)
Water Marks (B1)	Hydrogen Sulfide Odor (C1	) Crayfish	Burrows (C8)
Sediment Deposits (B2)	Oxidized Rhizospheres on I	Living Roots (C3) Saturation	on Visible on Aerial Imagery (C9)
Drift Deposits (B3)	Presence of Reduced Iron (	(C4) Stunted	or Stressed Plants (D1)
Algal Mat or Crust (B4)	Recent Iron Reduction in Ti	illed Soils (C6) Geomor	phic Position (D2)
Iron Deposits (B5)	Thin Muck Surface (C7)	Shallow	Aquitard (D3)
Inundation Visible on Aerial Imagery (B7)	Other (Explain in Remarks)	) Microtop	ographic Relief (D4)
Sparsely Vegetated Concave Surface (B8)		FAC-Ne	utral Test (D5)
Field Observations:			
Surface Water Present? Yes ✓ No	Depth (inches): 2		
Water Table Present? Yes No	Depth (inches): 0		
Saturation Present? Yes _ ✓ No	Depth (inches): 0	Wetland Hydrology Pro	esent? Yes/ No
(includes capillary fringe)  Describe Recorded Data (stream gauge, monitoring wo	ell aerial photos previous	inspections) if available:	
Jesonies i tesonica Data (en eam gange, memering in	z., aa. p, p	mopositorio), il aramatici	
Remarks:			
Some standing water from recent rai	n events		

VEGETATION - Use scientific names of plants				Sampling Point: WL P1
Tree Stratum (Plot size:30)		Dominant		Dominance Test worksheet:
1		Species?		Number of Dominant Species That Are OBL, FACW, or FAC:3 (A)
2				Total Number of Dominant Species Across All Strata: (B)
4				Percent of Dominant Species That Are OBL, FACW, or FAC:
5				,
6				Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
Operation (Obserts Obserts on Chick Signs 15		= Total Co	ver	OBL species <u>5.00</u> x 1 = <u>5.00</u> FACW species <u>135.00</u> x 2 = <u>270.00</u>
Sapling/Shrub Stratum (Plot size: 15 )	40	V	E A O) A /	FAC species 15.00 x 3 = 45.00
1. <u>Spiraea alba</u>		<u>Y</u>	FACW	FACU species 0.00 x 4 = 0.00
2. <u>Cornus racemosa</u>	15	<u>Y</u>	FAC	UPL species 0.00 x 5 = 0.00
3. <u>Cornus alba</u>				Column Totals: <u>155.00</u> (A) <u>320.00</u> (B)
4				Prevalence Index = B/A = 2.06
5				Hydrophytic Vegetation Indicators:
				1 - Rapid Test for Hydrophytic Vegetation
7				2 - Dominance Test is >50%
-	00	= Total Co	ver	3 - Prevalence Index is ≤3.0 <sup>1</sup>
Herb Stratum (Plot size: 5 )  1. Phalaris arundinacea	85	Υ	FACW	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
2. Juncus effusus			OBL	✓ Problematic Hydrophytic Vegetation¹ (Explain)
3. Solidago gigantea			FACW	
4				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5				·
6.				Definitions of Vegetation Strata:
7				<b>Tree</b> – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
8			·	Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.
9				Herb – All herbaceous (non-woody) plants, regardless
11.				of size, and woody plants less than 3.28 ft tall.
12.				Woody vines – All woody vines greater than 3.28 ft in
		= Total Co	ver	height.
Woody Vine Stratum (Plot size: 30 )				
1				
2.				
3				Hydrophytic
4				Vegetation
		= Total Co		Present? Yes/ No
Remarks: (Include photo numbers here or on a separate		10101 00	VOI	
Tremains. (moduce prote numbers here of our a separate	Silect.)			

Sampling Point: WL P1

SOIL

inches)	Matrix Color (moist)	%	Color (moist)	x Features % T	ype <sup>1</sup> Loc <sup>2</sup>	Texture	Remarks
0.40						CI	
0-18	10YR 5/2	90_	10YR 4/6		C M	CL	Prominent redox.
		- ——					
				<del></del>			
						-	
	-						
-	-		-	<del></del>			
	-						
		letion, RM	l=Reduced Matrix, M	S=Masked Sa	ınd Grains.		n: PL=Pore Lining, M=Matrix.
	Indicators:						s for Problematic Hydric Soils <sup>3</sup> :
_ Histosol	(A1) pipedon (A2)		Polyvalue Belo		B) ( <b>LRR R</b> ,		Muck (A10) ( <b>LRR K, L, MLRA 149B</b> )  Prairie Redox (A16) ( <b>LRR K, L, R</b> )
_ Histic Ep _ Black Hi				•	R R, MLRA 149B		Mucky Peat or Peat (S3) ( <b>LRR K, L, R</b> )
	n Sulfide (A4)		Loamy Mucky I		LRR K, L)		Surface (S7) ( <b>LRR K, L</b> )
	d Layers (A5) d Below Dark Surfac	۵ (Δ11)	Loamy Gleyed  _✓ Depleted Matrix			-	alue Below Surface (S8) (LRR K, L) Dark Surface (S9) (LRR K, L)
	ark Surface (A12)	C (A11)	Redox Dark Su				Manganese Masses (F12) ( <b>LRR K, L, R</b>
-	lucky Mineral (S1)		Depleted Dark			Piedm	nont Floodplain Soils (F19) ( <b>MLRA 149</b>
	Gleyed Matrix (S4)		Redox Depress	sions (F8)			Spodic (TA6) ( <b>MLRA 144A, 145, 149E</b>
-	Redox (S5) Matrix (S6)						Parent Material (F21) Shallow Dark Surface (TF12)
	rface (S7) ( <b>LRR R, N</b>	/ILRA 149	<b>B</b> )			-	(Explain in Remarks)
adicators of	f hydrophytic yogotot	tion and w	etland hydrology mus	at he present	unloss disturbed	or problemati	0
	Layer (if observed):		eliand hydrology mus	st be present,	uniess disturbed	or probleman	<u>.                                    </u>
Туре:							
Depth (inc	ches):					Hydric Soi	l Present? Yes No
	,						

Project/Site: Riverbend		City/C	County: Sanilac Co	ountv s	Sampling Date: 2022-04-04
Applicant/Owner: Liberty				•	
Investigator(s): J. Brown, K					
Landform (hillslope, terrace, etc.)	•	•			
Subregion (LRR or MLRA): LRF	•				
Soil Map Unit Name: Parkhill					
Are climatic / hydrologic condition	,				
Are Vegetation, Soil					
Are Vegetation, Soil					
_					
SUMMARY OF FINDINGS	5 – Attach site	map snowing san	ipling point locati	ons, transects, i	important features, etc.
Hydrophytic Vegetation Presen		No	Is the Sampled Area		
Hydric Soil Present?		No	within a Wetland?	Yes <u>√</u>	. No
Wetland Hydrology Present?		No	If yes, optional Wetlan	d Site ID:	
Remarks: (Explain alternative   PSS wetland	procedures here or i	in a separate report.)			
F33 Welland					
HYDROLOGY					
Wetland Hydrology Indicators				-	rs (minimum of two required)
Primary Indicators (minimum of	•			Surface Soil Cr	
✓ Surface Water (A1)		Water-Stained Leave		Drainage Patte	
✓ High Water Table (A2)		Aquatic Fauna (B13)		Moss Trim Line	
✓ Saturation (A3)		Marl Deposits (B15)			ater Table (C2)
Water Marks (B1)		_ Hydrogen Sulfide Od		Crayfish Burrov	
Sediment Deposits (B2)		Oxidized Rhizospher			ble on Aerial Imagery (C9)
Drift Deposits (B3)		_ Presence of Reduced			essed Plants (D1)
Algal Mat or Crust (B4)		_ Recent Iron Reduction	` ,	Geomorphic Po	
Iron Deposits (B5)		Thin Muck Surface (0		Shallow Aquita	
Inundation Visible on Aeria		Other (Explain in Rer	marks)	Microtopograph	` '
Sparsely Vegetated Conca	ve Surface (B8)			FAC-Neutral Te	est (D5)
Field Observations:	Vac / No	Depth (inches): 1			
		Depth (inches): 0			
		Depth (inches): 0		Hydrology Present?	P Yes <u>√</u> No
(includes capillary fringe)					163 <u>v</u> 110
Describe Recorded Data (strea	m gauge, monitorin	g well, aerial photos, pre	evious inspections), if av	ailable:	
Remarks:					
Some standing water	from recent i	rain events			
1					

<b>VEGETATION</b> – Use scientific names of plants.				Sampling Point: WL P2
Tree Stratum (Plot size: 30 )		Dominant		Dominance Test worksheet:
		Species?		Number of Dominant Species
1				That Are OBL, FACW, or FAC:3(A)
2				Total Number of Dominant Species Across All Strata:  3 (B)
4				
5				Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)
6.				
7				Prevalence Index worksheet:
		= Total Cov		
Sapling/Shrub Stratum (Plot size:)				FACW species 120.00 x 2 = 240.00
1. Salix interior	90	Υ	FACW	FAC species <u>0.00</u> x 3 = <u>0.00</u>
2				FACU species <u>0.00</u> x 4 = <u>0.00</u>
3.				UPL species 0.00 x 5 = 0.00
4.				Column Totals: <u>120.00</u> (A) <u>240.00</u> (B)
5.				Prevalence Index = B/A = 2.0
6.				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
		= Total Cov	/er	∠ 2 - Dominance Test is >50%
Herb Stratum (Plot size:				3 - Prevalence Index is ≤3.0¹  1.7  1.7  1.7  1.7  1.7  1.7  1.7  1.
1. Phalaris arundinacea	20	Υ	FACW	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
2. Phragmites australis			FACW	✓ Problematic Hydrophytic Vegetation¹ (Explain)
3.				1
4				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5				Definitions of Vegetation Strata:
6				
7				<b>Tree</b> – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
8				Sapling/shrub – Woody plants less than 3 in. DBH
9				and greater than or equal to 3.28 ft (1 m) tall.
10				Herb – All herbaceous (non-woody) plants, regardless
11				of size, and woody plants less than 3.28 ft tall.
12				Woody vines – All woody vines greater than 3.28 ft in height.
	30	= Total Cov	/er	neight.
Woody Vine Stratum (Plot size:)				
1				
2				
3				Hydrophytic
4				Vegetation Present? Yes No
		= Total Cov	/er	
Remarks: (Include photo numbers here or on a separate s	sneet.)			

Sampling Point: WL P2

0-18	Color (moist)	0/_	Color (moist)	x Features	Type <sup>1</sup> Loc <sup>2</sup>	Texture	Remarks
<u>U-18</u> .	10VD E/0	<u>%</u>		<u>%</u>			
	10YR 5/2	90	10YR 4/6		<u>C</u> <u>M</u>	C	Prominent redox.
						<del></del>	
				- <u> </u>			
				·			
/pe: C=Cor	ncentration, D=Depl	etion, RM	=Reduced Matrix, M	S=Masked Sa	and Grains.		n: PL=Pore Lining, M=Matrix.
dric Soil In							s for Problematic Hydric Soils <sup>3</sup> :
Histosol (/	A1) pedon (A2)		Polyvalue Belo		8) ( <b>LRR R</b> ,		Muck (A10) ( <b>LRR K, L, MLRA 149B</b> )  Prairie Redox (A16) ( <b>LRR K, L, R</b> )
Black Hist				•	R R, MLRA 149B		Mucky Peat or Peat (S3) ( <b>LRR K, L, R</b> )
Hydrogen	Sulfide (A4)		Loamy Mucky I	Mineral (F1) (		Dark	Surface (S7) ( <b>LRR K, L</b> )
	Layers (A5)	- (0.44)	Loamy Gleyed			-	alue Below Surface (S8) (LRR K, L)
	Below Dark Surface k Surface (A12)	) (A11)	✓ Depleted Matrix Redox Dark Su				Dark Surface (S9) ( <b>LRR K, L</b> ) ⁄Ianganese Masses (F12) ( <b>LRR K, L, R</b>
	ucky Mineral (S1)		Depleted Dark				nont Floodplain Soils (F19) ( <b>MLRA 149</b> )
	eyed Matrix (S4)		Redox Depress	sions (F8)			Spodic (TA6) (MLRA 144A, 145, 149E
_ Sandy Re	edox (S5) Matrix (S6)						Parent Material (F21) Shallow Dark Surface (TF12)
	ace (S7) ( <b>LRR R, M</b>	ILRA 149	В)			-	(Explain in Remarks)
					1 P. C. I		
	nydropnytic vegetati ayer (if observed):		etland hydrology mus	st be present,	unless disturbed	or problemati	С.
Type:	ayer (ii observed).						
Depth (inch	nes).					Hydric Soi	I Present? Yes No
marks:							

Project/Site: Riverbend	City/County: Sanilac County Sampling Date: 2022-04							
pplicant/Owner: <u>Liberty</u> State: <u>Michigan</u> Sampling Point: <u>WL P3</u>								
•			on, Township, Range: <u>sec 35</u>					
				oncave Slope (%): <u>0-2</u>				
Subregion (LRR or MLRA): LRR L, MLRA 98 Lat: 43.173155 Long:82.664576 Datum: WGS84								
				/I classification: None				
		•	es No (If no, ex					
				stances" present? Yes ✓ No				
			atic? (If needed, explain a					
				ansects, important features, etc.				
Somman of The Division	5 - Attach site	map snowing san		misects, important reatures, etc.				
Hydrophytic Vegetation Preser		No	Is the Sampled Area within a Wetland?	es / No				
Hydric Soil Present?		No						
Wetland Hydrology Present?  Remarks: (Explain alternative		No	If yes, optional Wetland Site ID:					
Vegetation recently p	plowed and high	phly disturbed. P	PFO/PEM 80% 20%					
- 9		<b>,,</b>						
HYDROLOGY								
Wetland Hydrology Indicator	's:		Second	ary Indicators (minimum of two required)				
Primary Indicators (minimum o	f one is required; che	eck all that apply)	Sur	face Soil Cracks (B6)				
✓ Surface Water (A1)	_	_ Water-Stained Leave	s (B9) Dra	ainage Patterns (B10)				
✓ High Water Table (A2)	_	_ Aquatic Fauna (B13)	Mo:	ss Trim Lines (B16)				
✓ Saturation (A3)	_	_ Marl Deposits (B15)	Dry	y-Season Water Table (C2)				
Water Marks (B1)		_ Hydrogen Sulfide Ode		ayfish Burrows (C8)				
Sediment Deposits (B2)		<ul> <li>Oxidized Rhizosphere</li> </ul>		turation Visible on Aerial Imagery (C9)				
Drift Deposits (B3)		_ Presence of Reduced		inted or Stressed Plants (D1)				
Algal Mat or Crust (B4)		_ Recent Iron Reductio		omorphic Position (D2)				
Iron Deposits (B5)		_ Thin Muck Surface (C	· —	allow Aquitard (D3)				
✓ Inundation Visible on Aeria		_ Other (Explain in Ren		crotopographic Relief (D4)				
✓ Sparsely Vegetated Conca	ave Surface (B8)			C-Neutral Test (D5)				
Surface Water Present?	Ves / No	Depth (inches): 2						
Water Table Present?		Depth (inches): 0						
Saturation Present?		Depth (inches): 0	Wetland Hydrolog	gy Present? Yes _ ✓ No				
(includes capillary fringe)		_ , , ,		, y . resent: 165 <u>v</u> . Re <u></u>				
Describe Recorded Data (stream	am gauge, monitoring	g well, aerial photos, pre	vious inspections), if available:					
Remarks:								
remarks.								
				· · · · · · · · · · · · · · · · · · ·				

<b>VEGETATION</b> – Use scientific names of plants.				Sampling Point: WL P3
Tree Stratum (Plot size:30)	Absolute % Cover	Dominant Species?		Dominance Test worksheet:
1. Populus deltoides			FAC	Number of Dominant Species That Are OBL, FACW, or FAC:7 (A)
2. Fraxinus pennsylvanica			FACW	
3. <u>Ulmus americana</u>			FACW	Total Number of Dominant Species Across All Strata:7(B)
4. Acer saccharinum				Percent of Dominant Species
5				That Are OBL, FACW, or FAC: 100.00 (A/B)
6				Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
	80	= Total Cov	/er	OBL species <u>0.00</u> x 1 = <u>0.00</u>
Sapling/Shrub Stratum (Plot size:)				FACW species 70.00 x 2 = 140.00
1. <u>Populus balsamifera</u>	5	Y	<u>FACW</u>	FACULTURE
2. Salix interior	5	<u> </u>	<u>FACW</u>	FACU species 0.00 x 4 = 0.00 UPL species 0.00 x 5 = 0.00
3				Column Totals: 110.00 (A) 260.00 (B)
4				
5				Prevalence Index = B/A = 2.36
6				Hydrophytic Vegetation Indicators:
7				<ul><li>1 - Rapid Test for Hydrophytic Vegetation</li><li>2 - Dominance Test is &gt;50%</li></ul>
_	10	= Total Cov	/er	✓ 3 - Prevalence Index is ≤3.0 <sup>1</sup>
Herb Stratum (Plot size: 5	40	V	E 4 0) 4 /	4 - Morphological Adaptations <sup>1</sup> (Provide supporting
1. Phalaris arundinacea				data in Remarks or on a separate sheet)  Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
2. <u>Apocynum cannabinum</u>				Froblematic Hydrophytic Vegetation (Explain)
3.				<sup>1</sup> Indicators of hydric soil and wetland hydrology must
4				be present, unless disturbed or problematic.
5				Definitions of Vegetation Strata:
6				<b>Tree</b> – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
8				
0				Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.
10	·			Herb – All herbaceous (non-woody) plants, regardless
11.				of size, and woody plants less than 3.28 ft tall.
12.				Woody vines – All woody vines greater than 3.28 ft in
		= Total Cov		height.
Woody Vine Stratum (Plot size: 30 )				
1				
2				
3				Hydrophytic
4				Vegetation Present? Yes ✓ No
		= Total Cov	/er	
Remarks: (Include photo numbers here or on a separate s	heet.)			

Profile Desc	cription: (Describe	to the dep	th needed	to docun	nent the i	ndicator	or confirm	the absence	of indicators.)	
Depth (inches)	Matrix Color (moist)	%	Color (n		x Features %	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks	
0-6	10YR 5/2	100	(11	ioistj		С	M	CI	Kemans	
	'		10VD	1/6	3		M	C	Distinct raday	
6-18	10YR 5/2	97	<u>10YR</u>	4/0		C	IVI	C	Distinct redox.	
					. ——					
					· ——					
					·					
	-									
	oncentration, D=Dep	letion, RM	=Reduced N	Matrix, MS	S=Masked	Sand Gr	ains.		n: PL=Pore Lining, M=Matrix.	
Hydric Soil			Dahara	lua Dalai	Cfa.a.a	(CO) (I D	. D		for Problematic Hydric Soils <sup>3</sup> :	
Histosol	oipedon (A2)			iue Belov <b>RA 149B</b> )	v Surface	(58) ( <b>LK</b> )	κк,		Muck (A10) ( <b>LRR K, L, MLRA 149B</b> ) Prairie Redox (A16) ( <b>LRR K, L, R</b> )	
Black Hi	stic (A3)						LRA 149B)	5 cm N	Mucky Peat or Peat (S3) (LRR K, L, R)	
	en Sulfide (A4) d Layers (A5)				/lineral (F1 Matrix (F2)		(, L)	<ul> <li>Dark Surface (S7) (LRR K, L)</li> <li>Polyvalue Below Surface (S8) (LRR K, L)</li> <li>Thin Dark Surface (S9) (LRR K, L)</li> </ul>		
	d Below Dark Surfac	e (A11)	Loaniy	-						
	ark Surface (A12)				rface (F6)				langanese Masses (F12) ( <b>LRR K, L, R</b> )	
	Mucky Mineral (S1) Bleyed Matrix (S4)				Surface (Fi ions (F8)	7)		Piedmont Floodplain Soils (F19) (MLRA 149B)		
	Redox (S5)		Nedox	Debiess	ions (Fo)			Mesic Spodic (TA6) (MLRA 144A, 145, 149B) Red Parent Material (F21)		
Stripped	Matrix (S6)							Very S	Shallow Dark Surface (TF12)	
Dark Su	rface (S7) ( <b>LRR R, N</b>	/ILRA 149	<b>B</b> )					Other	(Explain in Remarks)	
<sup>3</sup> Indicators of	f hydrophytic vegeta	tion and w	etland hydro	logy mus	t be prese	nt, unles	s disturbed	or problemati	c.	
Restrictive I	Layer (if observed):									
Type:										
	ches):							Hydric Soil	Present? Yes No	
Remarks:	اماما ماماما	ficantly	ر مان مئی بیام	a al						
Recently	plowed, signi	licantiy	aisturb	ea						

Project/Site: Riverbend	City/County: Sanilac Cou	ntv Sampling Date: 2022-04-04			
Applicant/Owner: Liberty		State: Michigan Sampling Point: WL R1			
Investigator(s): J. Brown, K. Yantz, Atwell, LLC					
Landform (hillslope, terrace, etc.): Other					
Subregion (LRR or MLRA): LRR L, MLRA 99 Lat: 43.					
Soil Map Unit Name: Parkhill loam, 0 to 1 perce	•				
Are climatic / hydrologic conditions on the site typical for this					
Are Vegetation, Soil, or Hydrology si	gnificantly disturbed? Are "Normal of	Circumstances" present? Yes No			
Are Vegetation, Soil, or Hydrology na	aturally problematic? (If needed, ex	plain any answers in Remarks.)			
SUMMARY OF FINDINGS - Attach site map s	showing sampling point location	ns, transects, important features, etc.			
Hydrophytic Vegetation Present? Yes <u>✓</u> No	Is the Sampled Area				
Hydric Soil Present? Yes ✓ No.	· · · · · · · · · · · · · · · · · · ·	Yes No			
Wetland Hydrology Present? Yes ✓ No.		Site ID:			
Remarks: (Explain alternative procedures here or in a sepa					
PFO floodplain wetland.	,				
'					
HYDROLOGY					
Wetland Hydrology Indicators:	<u> </u>	Secondary Indicators (minimum of two required)			
Primary Indicators (minimum of one is required; check all the	nat apply)	Surface Soil Cracks (B6)			
Variace Water (A1) Water		Drainage Patterns (B10)			
· ·	tic Fauna (B13)	Moss Trim Lines (B16)			
	Deposits (B15)	Dry-Season Water Table (C2)			
Water Marks (B1) Hydr	ogen Sulfide Odor (C1)	Crayfish Burrows (C8)			
Sediment Deposits (B2) Oxidi	zed Rhizospheres on Living Roots (C3)	Saturation Visible on Aerial Imagery (C9)			
Drift Deposits (B3) Prese	ence of Reduced Iron (C4)	Stunted or Stressed Plants (D1)			
	ent Iron Reduction in Tilled Soils (C6)	✓ Geomorphic Position (D2)			
	Muck Surface (C7)	Shallow Aquitard (D3)			
	r (Explain in Remarks)	Microtopographic Relief (D4)			
Sparsely Vegetated Concave Surface (B8)	-	FAC-Neutral Test (D5)			
Field Observations:					
Surface Water Present? Yes No Dep					
Water Table Present? Yes ✓ No Dep		advada va Bura and O. Mar			
Saturation Present? Yes _ ✓ No Dep (includes capillary fringe)	tn (inches): U wetland Hy	/drology Present? Yes/ No			
Describe Recorded Data (stream gauge, monitoring well, a	erial photos, previous inspections), if avail	able:			
Remarks:					
Tromano.					

Free Stratum (Plot size: 30 )	Absolute % Cover	Dominant Species?		Dominance Test worksheet:
Fraxinus pennsylvanica		Υ	FACW	Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)
Acer saccharinum		Y	FACW	
Ulmus americana		N	FACW	Total Number of Dominant Species Across All Strata: 6 (B)
				Percent of Dominant Species
				That Are OBL, FACW, or FAC: 83.33 (A/B)
				Prevalence Index worksheet:
				Total % Cover of: Multiply by:
	35	= Total Cov	/er	OBL species x 1 = 25.00
apling/Shrub Stratum (Plot size: 15 )				FACW species <u>55.00</u> x 2 = <u>110.00</u>
Cornus racemosa	10	Y	FAC	FAC species <u>15.00</u> x 3 = <u>45.00</u>
				FACU species <u>15.00</u> x 4 = <u>60.00</u>
				UPL species <u>0.00</u> x 5 = <u>0.00</u> Column Totals: <u>110.00</u> (A) <u>240.00</u> (B)
				Prevalence Index = B/A = 2.18
	_			Hydrophytic Vegetation Indicators:
				1 - Rapid Test for Hydrophytic Vegetation
	10	= Total Cov	/er	∠ 2 - Dominance Test is >50%     ∠ 3 - Prevalence Index is ≤3.0¹
lerb Stratum (Plot size:5				4 - Morphological Adaptations¹ (Provide supporting
Carex lacustris	20	<u>Y</u>	OBL	data in Remarks or on a separate sheet)
Phalaris arundinacea	20	<u> </u>	<u>FACW</u>	
. Rosa multiflora		<u> </u>	<u>FACU</u>	<sup>1</sup> Indicators of hydric soil and wetland hydrology must
. <u>Angelica atropurpurea</u>		_N_	OBL	be present, unless disturbed or problematic.
. <u>Urtica dioica</u>	5	<u>N</u>	<u>FAC</u>	Definitions of Vegetation Strata:
•				Tree – Woody plants 3 in. (7.6 cm) or more in diameter
•				at breast height (DBH), regardless of height.
				Sapling/shrub – Woody plants less than 3 in. DBH
				and greater than or equal to 3.28 ft (1 m) tall.
0				<b>Herb</b> – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
1				
2				<b>Woody vines</b> – All woody vines greater than 3.28 ft in height.
20	65	= Total Cov	/er	
Voody Vine Stratum (Plot size:30)				
				Hydrophytic Vegetation
				Present? Yes/ No
Remarks: (Include photo numbers here or on a separate		= Total Cov	/er	

Sampling Point: WL R1

SOIL

Depth	cription: (Describe Matrix	to the dep	om needed		x Features		or commi	tile abselic	e of indicators.)	
(inches)	Color (moist)	%	Color (m		%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks	
8-0	10YR 3/2	100				C	M	CL	·	
8-18	10YR 4/2	<u> 97</u> —	10YR	4/6	3	<u>C</u>	<u>M</u>	C	Prominent redox.	
Type: C=C	Concentration, D=Dep	letion RM	=Reduced M	Matrix MS	=	Sand Gr	ains	<sup>2</sup> l ocatio	n: PL=Pore Lining, M=Matrix.	
Hydric Soil  Histoso  Histic E  Black H  Hydroge Stratifie  Deplete Thick D  Sandy N  Sandy F  Stripped Dark Su	Indicators: I (A1) Ipipedon (A2) Isitic (A3) Indicators: Indicator	e (A11) <b>ILRA 149</b> ion and w	Polyva MLF Thin D Loamy Loamy Peplet Redox Redox	lue Belov RA 149B) ark Surfa Mucky M Gleyed I ed Matrix Dark Sur ed Dark S Depress	v Surface ce (S9) ( <b>L</b> dineral (F <sup>2</sup> Matrix (F2 (F3) face (F6) Surface (F ions (F8)	(S8) ( <b>LRI</b> LRR R, MI I) ( <b>LRR K</b> )	R R, _RA 149B) , L)	Indicator  2 cm Coas 5 cm Dark Polyv Thin Iron-I Piedr Mesic Red I Very Other	s for Problematic Hydric Soils <sup>3</sup> :  Muck (A10) (LRR K, L, MLRA 149B) t Prairie Redox (A16) (LRR K, L, R)  Mucky Peat or Peat (S3) (LRR K, L, R) Surface (S7) (LRR K, L) value Below Surface (S8) (LRR K, L)  Dark Surface (S9) (LRR K, L)  Manganese Masses (F12) (LRR K, L, R) mont Floodplain Soils (F19) (MLRA 149B) c Spodic (TA6) (MLRA 144A, 145, 149B) Parent Material (F21) Shallow Dark Surface (TF12) r (Explain in Remarks)	
Remarks:										

Project/Site: Riverbend		City/C	county: Sanilac County	Sampling Date: 2022-04-04				
			•	te: Michigan Sampling Point: WL R2				
Investigator(s): J. Brown, k								
				Concave Slope (%): <u>3-7</u>				
				3354 Datum: WGS84				
				NWI classification: PFO/PSS				
Are climatic / hydrologic conditio								
· -		-		mstances" present? Yes ✓ No				
Are Vegetation, Soil								
_								
SUMMARY OF FINDING	5 – Attach Site	e map snowing sam	ipling point locations, t	ransects, important features, etc.				
Hydrophytic Vegetation Preser	nt? Yes	✓ No	Is the Sampled Area					
Hydric Soil Present?		✓ No	within a Wetland?					
Wetland Hydrology Present?		✓ No	If yes, optional Wetland Site I	D:				
Remarks: (Explain alternative Naturally problematic	procedures here or c due to out c	r in a separate report.) of growing seasor	n. PFO floodplain wet	tland.				
Tratarany propromitation	, and to out o	a growing codes.	o noouplant no					
HYDROLOGY								
Wetland Hydrology Indicator				ndary Indicators (minimum of two required)				
Primary Indicators (minimum o								
Surface Water (A1)		Water-Stained Leave		Drainage Patterns (B10)				
High Water Table (A2)		Aquatic Fauna (B13)		Moss Trim Lines (B16)				
✓ Saturation (A3)		Marl Deposits (B15)		Ory-Season Water Table (C2)				
Water Marks (B1)		<ul><li>Hydrogen Sulfide Ode</li><li>Oxidized Rhizosphere</li></ul>		Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (C9)				
Sediment Deposits (B2) Drift Deposits (B3)		Oxidized Knizosphere Presence of Reduced	- · · · · · · · · · · · · · · · · · · ·	Stunted or Stressed Plants (D1)				
Algal Mat or Crust (B4)		Recent Iron Reductio		Geomorphic Position (D2)				
Iron Deposits (B5)		Thin Muck Surface (C						
Inundation Visible on Aeria		Other (Explain in Ren		Shallow Aquitard (D3)  Microtopographic Relief (D4)				
Sparsely Vegetated Conca				FAC-Neutral Test (D5)				
Field Observations:	( - /			- ( /				
Surface Water Present?	Yes No	✓ Depth (inches):						
Water Table Present?	Yes No	✓ Depth (inches):						
Saturation Present?	Yes No	Depth (inches): 0	Wetland Hydrol	ogy Present? Yes/ No				
(includes capillary fringe)  Describe Recorded Data (streat	am gauge monitoriu	ng well, aerial photos, pre	vious inspections) if available:					
Booding Hoderada Bata (offor	an gaage, memen	ig won, donar priotoc, pro	viodo inopositorio), il dvalidoro.					
Remarks:								
				ļ				

	Absolute	Dominant In	dicator	Dominance Test worksheet:
Tree Stratum (Plot size: 30 )	% Cover		Status_	Number of Dominant Species
1. <u>Acer negundo</u>	20	<u>Y</u> _ J	FAC_	That Are OBL, FACW, or FAC: (A)
2. <u>Ulmus americana</u>	15	<u>Y</u> F	<u>ACW</u>	Total Number of Dominant
3. Acer saccharinum	10	<u>N</u> F	<u>ACW</u>	Species Across All Strata: (B)
4. Fraxinus pennsylvanica	5	<u>N</u> F	<u>ACW</u>	Percent of Dominant Species
5. Salix nigra	5	<u>N</u> (	OBL	That Are OBL, FACW, or FAC: 50.00 (A/B)
6				Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
		= Total Cover		OBL species x1 =
Sapling/Shrub Stratum (Plot size:		rotal Gover		FACW species 30.00 x 2 = 60.00
				FAC species 20.00 x 3 = 60.00
1				FACU species 15.00 x 4 = 60.00
2				UPL species <u>0.00</u> x 5 = <u>0.00</u>
3				Column Totals: <u>70.00</u> (A) <u>185.00</u> (B)
4				Prevalence Index = B/A = 2.64
5				
6				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
	0	= Total Cover		2 - Dominance Test is >50%  √ 3 - Prevalence Index is ≤3.0¹
Herb Stratum (Plot size:)				4 - Morphological Adaptations <sup>1</sup> (Provide supporting
1. <u>Rosa multiflora</u>	15	<u>Y</u> F	<u>ACU</u>	data in Remarks or on a separate sheet)
2. Aster sp.	5	<u> </u>		✓ Problematic Hydrophytic Vegetation¹ (Explain)
3				1
4.				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5				·
6				Definitions of Vegetation Strata:
7				<b>Tree</b> – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
8				Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.
9				
10				Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
11				
12				Woody vines – All woody vines greater than 3.28 ft in height.
	20	= Total Cover		
Woody Vine Stratum (Plot size:)				
1				
2				
3				Hydrophytic
4				Vegetation Present? Yes ✓ No
		= Total Cover		riesent: Tes v No v
Remarks: (Include photo numbers here or on a separate s	sheet.)			

Sampling Point: WL R2

SOIL

Depth	cription: (Describe Matrix	to the dep	om needed		x Features		or commi	tile abselic	e of indicators.)	
(inches)	Color (moist)	%	Color (m		%	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks	
8-0	10YR 3/2	100				C	M	CL	·	
8-18	10YR 4/2	<u> 97</u> —	10YR	4/6	3	<u>C</u>	<u>M</u>	C	Prominent redox.	
Type: C=C	Concentration, D=Dep	letion RM	=Reduced M	Matrix MS	=	Sand Gr	ains	<sup>2</sup> l ocatio	n: PL=Pore Lining, M=Matrix.	
Hydric Soil  Histoso  Histic E  Black H  Hydroge Stratifie  Deplete Thick D  Sandy N  Sandy F  Stripped Dark Su	Indicators: I (A1) Ipipedon (A2) Isitic (A3) Indicators: Indicator	e (A11) <b>ILRA 149</b> ion and w	Polyva MLF Thin D Loamy Loamy Peplet Redox Redox	lue Belov RA 149B) ark Surfa Mucky M Gleyed I ed Matrix Dark Sur ed Dark S Depress	v Surface ce (S9) ( <b>L</b> dineral (F <sup>2</sup> Matrix (F2 (F3) face (F6) Surface (F ions (F8)	(S8) ( <b>LRI</b> LRR R, MI I) ( <b>LRR K</b> )	R R, _RA 149B) , L)	Indicator  2 cm Coas 5 cm Dark Polyv Thin Iron-I Piedr Mesic Red I Very Other	s for Problematic Hydric Soils <sup>3</sup> :  Muck (A10) (LRR K, L, MLRA 149B) t Prairie Redox (A16) (LRR K, L, R)  Mucky Peat or Peat (S3) (LRR K, L, R) Surface (S7) (LRR K, L) value Below Surface (S8) (LRR K, L)  Dark Surface (S9) (LRR K, L)  Manganese Masses (F12) (LRR K, L, R) mont Floodplain Soils (F19) (MLRA 149B) c Spodic (TA6) (MLRA 144A, 145, 149B) Parent Material (F21) Shallow Dark Surface (TF12) r (Explain in Remarks)	
Remarks:										

Project/Site: Riverbend W	ind	City/County: Sanilac County Sampling Date: 2022-04					
Applicant/Owner: Liberty	iberty State: Michigan Sampling Point: WL S1						
nvestigator(s): David Nigro Section, Township, Range: sec 15 T009N R015E							
Landform (hillslope, terrace, etc.							
Subregion (LRR or MLRA): LRI	•						
Soil Map Unit Name: Parkhil							
Are climatic / hydrologic conditio	-						
Are Vegetation, Soil							
Are Vegetation, Soil		-					
SUMMARY OF FINDINGS							
	J – Allacii sili	e map snowing san		- Hansects,	important leatures, etc.		
Hydrophytic Vegetation Presen		✓ No	Is the Sampled Area within a Wetland?	Yes <u>√</u>	No		
Hydric Soil Present?		✓ No					
Wetland Hydrology Present?  Remarks: (Explain alternative		✓ No	If yes, optional Wetland	d Site ID:			
, ,	procedures here of	r in a separate report.)					
PFO							
HYDROLOGY							
Wetland Hydrology Indicator	<u></u>			Secondary Indicato	ors (minimum of two required)		
Primary Indicators (minimum o		heck all that apply)		•	Surface Soil Cracks (B6)		
✓ Surface Water (A1)	-	Water-Stained Leave		Drainage Patterns (B10)			
High Water Table (A2)		Aquatic Fauna (B13)		Moss Trim Lines (B16)			
Saturation (A3)		Marl Deposits (B15)		Dry-Season Water Table (C2)			
Water Marks (B1)		Hydrogen Sulfide Oc		Crayfish Burrows (C8)			
Sediment Deposits (B2)		Oxidized Rhizospher					
✓ Drift Deposits (B3)		Presence of Reduce	d Iron (C4)	Stunted or Stressed Plants (D1)			
Algal Mat or Crust (B4)		Recent Iron Reduction	on in Tilled Soils (C6)	✓ Geomorphic P	Position (D2)		
Iron Deposits (B5)		Thin Muck Surface (	C7)	Shallow Aquitard (D3)			
Inundation Visible on Aeria	al Imagery (B7)	Other (Explain in Re	marks)	Microtopographic Relief (D4)			
✓ Sparsely Vegetated Conca	ave Surface (B8)			✓ FAC-Neutral T	est (D5)		
Field Observations:							
Surface Water Present?	Yes✓ No	Depth (inches): <u>2</u>					
Water Table Present?	Yes No _	✓ Depth (inches):					
Saturation Present?	Yes No	✓ Depth (inches):	Wetland Hydrology Present? Yes✓ No				
(includes capillary fringe)  Describe Recorded Data (streat	m gauge monitori	ng well aerial photos pre	evious inspections) if ava	ailable:			
Beschibe Recorded Bala (street	an gaage, monton	rig won, donar priotos, pre	ovious inopositorio), ii uve	andbio.			
Remarks:							

	Absolute	Dominant	Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 30 )		Species?		Number of Dominant Species
1. Quercus alba	10	Y	<u>FACU</u>	That Are OBL, FACW, or FAC:6 (A)
2. Acer saccharinum	10	Y	<u>FACW</u>	Total Number of Dominant
3. Populus deltoides	10	Y	FAC	Species Across All Strata: (B)
4. Quercus rubra	5	N	<b>FACU</b>	Percent of Dominant Species
5. <u>Carpinus caroliniana</u>		N	FAC	That Are OBL, FACW, or FAC: 85.71 (A/B)
6.				Dunivalen en la descripción de
7				Prevalence Index worksheet:  Total % Cover of: Multiply by:
		= Total Co		
Carling/Charle Charles (Diet sing)	_40_	- Total Co	vei	FACW species 25.00 x 2 = 50.00
Sapling/Shrub Stratum (Plot size: 15 )	_	V	E A O\A/	FAC species 40.00 x 3 = 120.00
1. <u>Cornus alba</u>				FACU species
2				UPL species x 5 =0.00
3				Column Totals: 80,00 (A) 230.00 (B)
4				5
5				Prevalence Index = B/A = 2.88
6				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
	5	= Total Co	ver	∠ 2 - Dominance Test is >50%
Herb Stratum (Plot size:)	-			3 - Prevalence Index is ≤3.0¹
1. Elymus curvatus	20	Υ	FAC	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
2. Carex grayi		Y		Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
3				<sup>1</sup> Indicators of hydric soil and wetland hydrology must
4				be present, unless disturbed or problematic.
5				Definitions of Vegetation Strata:
6	<del>-</del>			Tree – Woody plants 3 in. (7.6 cm) or more in diameter
7				at breast height (DBH), regardless of height.
8	<u> </u>			Sapling/shrub – Woody plants less than 3 in. DBH
9				and greater than or equal to 3.28 ft (1 m) tall.
10				Herb – All herbaceous (non-woody) plants, regardless
11				of size, and woody plants less than 3.28 ft tall.
12				Woody vines – All woody vines greater than 3.28 ft in
	30	= Total Co	ver	height.
Woody Vine Stratum (Plot size:30)				
1. Vitis riparia	5	Y	FAC	
2				
3				Hydrophytic Vegetation
4	_			Present? Yes No
December (Include that works to be a second to the second		= Total Co	ver	
Remarks: (Include photo numbers here or on a separate s	sneet.)			

Sampling Point: WL S1

cription: (Describe	to the dep	th needed	to docun	nent the in	ndicator	or confirm	the absence	of indicators.)
Matrix	0/	Calar (m				1 2	Tanduna	Damada
		Color (m	10IST)	<u> </u>	<u>Type</u>	LOC	<u>I exture</u>	Remarks
10YR 3/2		10YR	5/6	15	С	M	SCL	Prominent redox.
10YR 3/2	50	10YR	5/6	30	C	М	SCI	Prominent redox.
					ח			
10YR 6/2	60			40	С		COSL	Prominent redox.
	etion, RM	=Reduced M	/latrix, MS	=Masked	Sand Gra	ains.		: PL=Pore Lining, M=Matrix.  for Problematic Hydric Soils <sup>3</sup> :
ark Surface (A12) Mucky Mineral (S1) Gleyed Matrix (S4) Redox (S5) I Matrix (S6) rface (S7) (LRR R, N	ILRA 149	MLF Thin D Loamy Loamy Deplete _✓ Redox Deplete Redox	RA 149B) ark Surfa Mucky M Gleyed M ed Matrix Dark Sur ed Dark S Depressi	ce (S9) ( <b>L</b> flineral (F1 Matrix (F2) (F3) face (F6) Surface (F ons (F8)	RR R, MI ) (LRR K	.RA 149B) , L)	Coast  5 cm N  Dark S  Polyva  Thin D  Iron-M  Piedm  Mesic  Red P: Very S  Other	Muck (A10) (LRR K, L, MLRA 149B) Prairie Redox (A16) (LRR K, L, R) Mucky Peat or Peat (S3) (LRR K, L, R) Surface (S7) (LRR K, L) slue Below Surface (S8) (LRR K, L) sark Surface (S9) (LRR K, L) sanganese Masses (F12) (LRR K, L, R) ont Floodplain Soils (F19) (MLRA 149B) Spodic (TA6) (MLRA 144A, 145, 149B) sarent Material (F21) Shallow Dark Surface (TF12) (Explain in Remarks)
ches):							Hydric Soil	Present? Yes/_ No
	Matrix Color (moist)  10YR 3/2  10YR 3/2  10YR 3/2  10YR 3/2  10YR 6/2  10YR 6/2	Matrix Color (moist) % 10YR 3/2 100 10YR 3/2 85 10YR 3/2 50  10YR 6/2 60  10YR 6/2 60  10YR 6/2 61  10YR 6/2	Matrix	Matrix	Matrix Color (moist) % Color (moist) %  10YR 3/2 100  10YR 3/2 85 10YR 5/6 15  10YR 5/6 30  10YR 6/2 20  10YR 6/2 60 10YR 5/6 40  10YR 5/6 40  10YR 5/6 40  10YR 6/2 10YR 5/6 40  10YR 6/2 20  10YR 6/2 10YR 5/6 40  10YR 6/2 10YR 5/6 30  10YR 6/2 10YR 5/6 40  10YR 6/2 10YR 5/6  10Y	Matrix	Matrix	Color (moist)

Project/Site: Riverbend Wind	City/County: Sanilac County Sampling Date: 2022-04-05
	State: Michigan Sampling Point: Wetland T1
Investigator(s): Eric Rademacher , Ernest Schenk	
	ocal relief (concave, convex, none): Concave Slope (%): 0-2
·	04 Long:82.850748 Datum: WGS84
•	NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of y	
Are Vegetation, Soil, or Hydrology significantl	y disturbed? Are "Normal Circumstances" present? Yes ✓ No
Are Vegetation, Soil, or Hydrology naturally p	roblematic? (If needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS - Attach site map showin	g sampling point locations, transects, important features, etc.
Lludronhutia Vagatation Propent?	Is the Sampled Area
Hydrophytic Vegetation Present? Yes ✓ No Hydric Soil Present? Yes ✓ No	within a Westland? Year / No.
Wetland Hydrology Present? Yes ✓ No	
Remarks: (Explain alternative procedures here or in a separate rep	
PEM	'
LIVERGLOOV	
HYDROLOGY Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
Wetland Hydrology Indicators:	
Primary Indicators (minimum of one is required; check all that apply	
✓ Surface Water (A1) Water-Stained	
High Water Table (A2)  Aquatic Fauna  Aguatic Fauna  And Deposite	
✓ Saturation (A3)       Marl Deposits       Water Marks (B1)       Hydrogen Sul	
Oxidized Ritiz	
<u> </u>	leduced Iron (C4) Stunted or Stressed Plants (D1) eduction in Tilled Soils (C6) Geomorphic Position (D2)
Iron Deposits (B5) Thin Muck Su	
Indit Deposits (B3) Thirt Muck Su Inundation Visible on Aerial Imagery (B7) Other (Explain	
Sparsely Vegetated Concave Surface (B8)	FAC-Neutral Test (D5)
Field Observations:	<u>√</u> TAC-Neutral Test (D3)
Surface Water Present? Yes _ ✓ No Depth (inche	s)· 3
Water Table Present? Yes No _✓ Depth (inche	
Saturation Present? Yes   ✓ No Depth (inche	· ————
(includes capillary fringe)	
Describe Recorded Data (stream gauge, monitoring well, aerial pho	tos, previous inspections), if available:
Remarks:	
Ponding from recent rain	

**VEGETATION** – Use scientific names of plants.

				Sampling Point: <u>Wetland T1</u>
Tree Stratum (Plot size: 30 )	Absolute % Cover		Indicator Status	Dominance Test worksheet:
1. Acer negundo	1	N	FAC	Number of Dominant Species That Are OBL, FACW, or FAC:  (A)
2				Total Number of Dominant
3				Species Across All Strata:3(B)
4				Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)
5				
6 7				Prevalence Index worksheet:
· ·		= Total Co		
Sapling/Shrub Stratum (Plot size: 15 )		rotal oc	***	FACW species 10.00 x 2 = 20.00
1. <i>Salix sp.</i>	5	Υ	FACW	FAC species <u>51.00</u> x 3 = <u>153.00</u>
2				FACU species <u>0.00</u> x 4 = <u>0.00</u>
3				UPL species <u>0.00</u> x 5 = <u>0.00</u> Column Totals: <u>61.00</u> (A) <u>173.00</u> (B)
4				Column Totals. <u>61.00</u> (A) <u>173.00</u> (B)
5				Prevalence Index = B/A = 2.84
6		-		Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
	5	= Total Co	ver	∠ 2 - Dominance Test is >50%     ∠ 3 - Prevalence Index is ≤3.0¹
Herb Stratum (Plot size:5				4 - Morphological Adaptations <sup>1</sup> (Provide supporting
1. <u>Apocynum cannabinum</u>			FAC	data in Remarks or on a separate sheet)
2. <u>Symphyotrichum lateriflorum</u>			<u>FAC</u>	✓ Problematic Hydrophytic Vegetation¹ (Explain)
3. <u>Epilobium ciliatum</u>			FACW	<sup>1</sup> Indicators of hydric soil and wetland hydrology must
4				be present, unless disturbed or problematic.
5				Definitions of Vegetation Strata:
6.				Tree – Woody plants 3 in. (7.6 cm) or more in diameter
7				at breast height (DBH), regardless of height.
8 9				Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.
10				Herb – All herbaceous (non-woody) plants, regardless
11				of size, and woody plants less than 3.28 ft tall.
12.				Woody vines – All woody vines greater than 3.28 ft in
		= Total Co	ver	height.
00				
Woody Vine Stratum (Plot size: 30 )				
· · · · · · · · · · · · · · · · · · ·				
1				
<u>Woody Vine Stratum</u> (Plot size:30)  1  2  3			·	Hydrophytic
1 2			·	Hydrophytic Vegetation Present? Yes No

SOIL Sampling Point: Wetland T1

	cription: (Describe t	to the depth			cator or confirn	n the absence o	of indicators.)
Depth (inches)	Matrix Color (moist)	%	Color (moist)	Features T	ype <sup>1</sup> Loc <sup>2</sup>	Texture	Remarks
0-18	10YR 2/2	100				MMI	
	<u> </u>						
			_				
							_
						-	
			_				_
			_				_
	oncentration, D=Depl	etion, RM=R	Reduced Matrix, MS	=Masked Sa	ınd Grains.		PL=Pore Lining, M=Matrix.
Hydric Soil				0 ( (0)			or Problematic Hydric Soils <sup>3</sup> :
Histosol	(A1) pipedon (A2)	_	Polyvalue Below MLRA 149B)	Surface (St	B) (LRR R,		uck (A10) ( <b>LRR K, L, MLRA 149B</b> ) rairie Redox (A16) ( <b>LRR K, L, R</b> )
	stic (A3)		_ Thin Dark Surfac	e (S9) ( <b>LRF</b>	R R, MLRA 149B		ucky Peat or Peat (S3) (LRR K, L, R)
Hydroge	en Sulfide (A4)		Loamy Mucky M	ineral (F1) (I		Dark Su	ırface (S7) ( <b>LRR K, L</b> )
	d Layers (A5)		_ Loamy Gleyed M				ue Below Surface (S8) (LRR K, L)
	d Below Dark Surface ark Surface (A12)	÷ (A11)	<ul><li>Depleted Matrix</li><li>Redox Dark Surf</li></ul>				rk Surface (S9) ( <b>LRR K, L</b> ) nganese Masses (F12) ( <b>LRR K, L, R</b> )
	Mucky Mineral (S1)	_	Redox Dark Sun Depleted Dark S				nt Floodplain Soils (F19) (MLRA 149B)
-	Gleyed Matrix (S4)	_	Redox Depression				podic (TA6) ( <b>MLRA 144A, 145, 149B</b> )
-	Redox (S5)						rent Material (F21)
	Matrix (S6)						allow Dark Surface (TF12)
Dark Su	rface (S7) (LRR R, M	ILRA 149B)				Other (E	Explain in Remarks)
<sup>3</sup> Indicators of	f hydrophytic vegetati	ion and wetla	and hydrology must	be present,	unless disturbed	l or problematic.	
	Layer (if observed):						
Type:							
Depth (inc	ches):					Hydric Soil F	Present? Yes <u>√</u> No
Remarks:							

Project/Site: Riverbend Wind	City/County: Sa	nilac County	Sampling Date: <u>2022-04-05</u>
Applicant/Owner: Liberty Power		State: Mi	chigan Sampling Point: Wetland T2
Investigator(s): Eric Rademacher, Ernest	Schenk Section, Townsh	p, Range: sec 29 T0	09N R014E
Landform (hillslope, terrace, etc.): Depression			
Subregion (LRR or MLRA): LRR L, MLRA 98 Lat:			
Soil Map Unit Name: Parkhill loam, 0 to 1 pe			
· '	•		
Are climatic / hydrologic conditions on the site typical fo			
Are Vegetation, Soil, or Hydrology			
Are Vegetation, Soil, or Hydrology	naturally problematic?	(If needed, explain any a	nswers in Remarks.)
SUMMARY OF FINDINGS - Attach site m	ap showing sampling po	int locations, trans	ects, important features, etc.
Hydrophytic Vegetation Present? Yes✓	No Is the Sar	mpled Area	
	No within a V	Vetland? Yes _	No
Wetland Hydrology Present? Yes✓		ional Wetland Site ID:	
Remarks: (Explain alternative procedures here or in a		-	
PEM			
LIVEROLOGY			
HYDROLOGY Wetland Hydrology Indicators:		Secondary	Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check	( all that annly)	•	e Soil Cracks (B6)
	Water-Stained Leaves (B9)		ge Patterns (B10)
	Aquatic Fauna (B13)		rim Lines (B16)
	Marl Deposits (B15)		ason Water Table (C2)
	Hydrogen Sulfide Odor (C1)		h Burrows (C8)
			tion Visible on Aerial Imagery (C9)
	Presence of Reduced Iron (C4)		d or Stressed Plants (D1)
Algal Mat or Crust (B4)	Recent Iron Reduction in Tilled S	Soils (C6) <u>√</u> Geomo	orphic Position (D2)
Iron Deposits (B5)	Thin Muck Surface (C7)	Shallow	v Aquitard (D3)
	Other (Explain in Remarks)		ppographic Relief (D4)
✓ Sparsely Vegetated Concave Surface (B8)		FAC-Ne	eutral Test (D5)
Field Observations:			
Surface Water Present? Yes _ ✓ No			
Water Table Present? Yes No _✓			
Saturation Present? Yes _ ✓ No (includes capillary fringe)	Depth (inches): 0	Wetland Hydrology P	resent? Yes No
Describe Recorded Data (stream gauge, monitoring w	vell, aerial photos, previous inspe	ctions), if available:	
Danielle			
Remarks:   Ponding from recent rain, farmed po	ortion is sparsely veget	ated	
l craing nom recent rain, rainiea pe	There is spansory region		

**VEGETATION** – Use scientific names of plants.

	Dominant Species?		Dominance Test worksheet:
		FAC	Number of Dominant Species That Are OBL, FACW, or FAC: 7 (A)
			Total Number of Dominant
			Species Across All Strata: (B)
			Percent of Dominant Species
			That Are OBL, FACW, or FAC:100.00_ (A/B)
			Prevalence Index worksheet:
			Total % Cover of: Multiply by:
_5_=	= Total Co	ver	OBL species <u>20.00</u> x 1 = <u>20.00</u>
			FACW species 30.00 x 2 = 60.00 FAC species 25.00 x 3 = 75.00
			FACU species <u>23.00</u> x3 = <u>73.00</u> FACU species <u>0.00</u> x4 = <u>0.00</u>
			UPL species 0.00 x 5 = 0.00
			Column Totals: 75.00 (A) 155.00 (B)
			Prevalence Index = B/A = 2.07
			Hydrophytic Vegetation Indicators:
			1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50%
20_:	= Total Co	ver	✓ 3 - Prevalence Index is ≤3.0 <sup>1</sup>
20	V	OBL	4 - Morphological Adaptations¹ (Provide supporting
			data in Remarks or on a separate sheet)  Problematic Hydrophytic Vegetation¹ (Explain)
			Troblemado Frydrophydio Vogotation (Explain)
			<sup>1</sup> Indicators of hydric soil and wetland hydrology must
			be present, unless disturbed or problematic.
			Definitions of Vegetation Strata:
			<b>Tree</b> – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
			Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.
			Herb – All herbaceous (non-woody) plants, regardless
			of size, and woody plants less than 3.28 ft tall.
			Woody vines – All woody vines greater than 3.28 ft in
50 :	= Total Co	ver	height.
<u> </u>			
			Hydrophytic
			Vegetation Present? Yes No
	= Total Co		Fleseili:   les v NO
	5 = 15 = 5 = 20 = 10 = 10 = 10 = 50 = 50 = 50	5 = Total Cov  15 Y 5 Y  20 = Total Cov  20 Y 10 Y 10 Y 10 Y 10 = Total Cov	5 Y FACW  20 = Total Cover  20 Y OBL 10 Y FAC 10 Y FAC 10 Y FACW

SOIL Sampling Point: Wetland T2

Profile Desc	cription: (Describe	to the dept	h needed to docur	nent the i	ndicator	or confirm	the absence of i	ndicators.)
Depth	Matrix	0/		x Features		1 2	T	Damada
(inches)	Color (moist)		Color (moist)	%	Type'	Loc <sup>2</sup>	Texture	Remarks
0-18	10YR 2/2	100					_MMI	
				·				
						-		
				· ——				
						-		
1			Deduced 84-fate 846				21	I - Dana Lining Manhartin
Hydric Soil	oncentration, D=Depl Indicators:	etion, RM=	Reduced Matrix, MS	>=iviasked	Sand Gra	ains.		L=Pore Lining, M=Matrix.  Problematic Hydric Soils <sup>3</sup> :
Histosol			Polyvalue Belov	v Surface	(S8) ( <b>LRF</b>	R R.		(A10) (LRR K, L, MLRA 149B)
	pipedon (A2)	•	MLRA 149B)		() (	,		rie Redox (A16) ( <b>LRR K, L, R</b> )
	stic (A3)		Thin Dark Surfa					ky Peat or Peat (S3) ( <b>LRR K, L, R</b> )
	en Sulfide (A4)		✓ Loamy Mucky N			, <b>L</b> )		Relaw Surface (SS) (LRR K, L)
	d Layers (A5) d Below Dark Surface	e (A11)	<ul><li>Loamy Gleyed</li><li>Depleted Matrix</li></ul>		)			Below Surface (S8) ( <b>LRR K, L</b> ) Surface (S9) ( <b>LRR K, L</b> )
	ark Surface (A12)		Redox Dark Su					anese Masses (F12) (LRR K, L, R)
Sandy N	Mucky Mineral (S1)		Depleted Dark	Surface (F			Piedmont	Floodplain Soils (F19) (MLRA 149B)
-	Gleyed Matrix (S4)		Redox Depress	ions (F8)				dic (TA6) (MLRA 144A, 145, 149B)
-	Redox (S5)							nt Material (F21)
	l Matrix (S6) rface (S7) ( <b>LRR R, N</b>	II RA 149R	)					ow Dark Surface (TF12) olain in Remarks)
Bank Ga	naoc (or) (Entrice, ii	ILIVA 140B	,				Outer (Exp	Jan III Kemano)
	f hydrophytic vegetat		land hydrology mus	t be prese	ent, unless	disturbed	or problematic.	
Restrictive	Layer (if observed):							
Type:								
Depth (in	ches):						Hydric Soil Pre	esent? Yes/ No
Remarks:							•	

Project/Site: Riverbend Wind	City/County: Sa	nilac County	Sampling Date: <u>2022-04-05</u>
Applicant/Owner: Liberty Power		State: Michig	gan Sampling Point: Wetland T3
Investigator(s): Eric Rademacher, Ernest	Schenk Section, Township	o, Range: <b>sec 29 T009</b>	N R014E
Landform (hillslope, terrace, etc.): Depression			
Subregion (LRR or MLRA): LRR L, MLRA 98 Lat:			
Soil Map Unit Name: Parkhill loam, 0 to 1 pe			
•	•		
Are climatic / hydrologic conditions on the site typical for			
Are Vegetation, Soil, or Hydrology			
Are Vegetation, Soil, or Hydrology	naturally problematic?	(If needed, explain any answ	ers in Remarks.)
SUMMARY OF FINDINGS - Attach site m	nap showing sampling po	nt locations, transect	s, important features, etc.
Hydrophytic Vegetation Present? Yes✓	No Is the San	pled Area	
	No within a W	/etland? Yes <u>√</u>	No
Wetland Hydrology Present? Yes✓		onal Wetland Site ID:	
Remarks: (Explain alternative procedures here or in			
PEM			
HYDROLOGY			
Wetland Hydrology Indicators:		Secondary Indi	cators (minimum of two required)
Primary Indicators (minimum of one is required; check	k all that apply)	Surface Sc	
	Water-Stained Leaves (B9)	Drainage F	
	Aquatic Fauna (B13)	Moss Trim	
	Marl Deposits (B15)		n Water Table (C2)
Water Marks (B1)	Hydrogen Sulfide Odor (C1)	Crayfish Bu	ırrows (C8)
Sediment Deposits (B2)	Oxidized Rhizospheres on Living	Roots (C3) Saturation	Visible on Aerial Imagery (C9)
1 — · · · · · —	Presence of Reduced Iron (C4)		Stressed Plants (D1)
	Recent Iron Reduction in Tilled S		
	Thin Muck Surface (C7)	Shallow Ac	
	Other (Explain in Remarks)		raphic Relief (D4)
✓ Sparsely Vegetated Concave Surface (B8)		FAC-Neutr	al Test (D5)
Field Observations:	Double (inches), 2		
Surface Water Present? Yes _ ✓ No Water Table Present? Yes No _ ✓			
Water Table Present? Yes No ✓ Saturation Present? Yes ✓ No ✓	. , ,	Watland Hydrology Droo	ant? Van / Na
(includes capillary fringe)		Wetland Hydrology Pres	ent? Yes <u>√</u> No
Describe Recorded Data (stream gauge, monitoring v	vell, aerial photos, previous inspec	tions), if available:	
Remarks:			
Ponding from recent rain, farmed po	ortion is sparsely		
vegetated	, ,		

**VEGETATION –** Use scientific names of plants.

<b>/EGETATION –</b> Use scientific names of plants		Sampling Point: Wetland T3
Tree Stratum (Plot size:30)	Absolute Dominant Indicator % Cover Species? Status	Dominance Test worksheet:
1	<del></del>	Number of Dominant Species That Are OBL, FACW, or FAC:1 (A)
2		Total Number of Dominant Species Across All Strata:1 (B)
4		Percent of Dominant Species
5		That Are OBL, FACW, or FAC: 100.00 (A/B)
6.		Prevalence Index worksheet:
7		Total % Cover of: Multiply by:
	0 = Total Cover	OBL species x 1 =
Sapling/Shrub Stratum (Plot size:15 )		FACW species <u>0.00</u> x 2 = <u>0.00</u>
1		FAC species 0.00 x 3 = 0.00
2		FACU species <u>0.00</u> x 4 = <u>0.00</u>
3		UPL species 0.00 x 5 = 0.00
		Column Totals: <u>5.00</u> (A) <u>5.00</u> (B)
4		Prevalence Index = B/A = 1.0
5		
6		Hydrophytic Vegetation Indicators:
7	- <u> </u>	✓ 1 - Rapid Test for Hydrophytic Vegetation
	= Total Cover	✓ 2 - Dominance Test is >50%
Herb Stratum (Plot size:5		3 - Prevalence Index is ≤3.0¹     4 - Morphological Adaptations¹ (Provide supporting)
1. <u>Carex lacustris</u>		data in Remarks or on a separate sheet)  Problematic Hydrophytic Vegetation¹ (Explain)
2		(,
3 4		<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5		Definitions of Vegetation Strata:
6		Tree – Woody plants 3 in. (7.6 cm) or more in diameter
7 8		at breast height (DBH), regardless of height.
9		Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.
10		<b>Herb</b> – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
11		
12		Woody vines – All woody vines greater than 3.28 ft in height.
	5 = Total Cover	noight.
Woody Vine Stratum (Plot size:)		
1		
2.		
3		Hydrophytic Vegetation
4		Present? Yes No
	= Total Cover	
Remarks: (Include photo numbers here or on a separate Out of growing season	sheet.)	

SOIL Sampling Point: Wetland T3

	cription: (Describe t	to the depth			cator or confirn	n the absence o	of indicators.)
Depth (inches)	Matrix Color (moist)	%	Color (moist)	Features T	ype <sup>1</sup> Loc <sup>2</sup>	Texture	Remarks
0-18	10YR 2/2	100				MMI	
	<u> </u>						
			_				
							_
						-	
			_				_
			_				_
	oncentration, D=Depl	etion, RM=R	Reduced Matrix, MS	=Masked Sa	ınd Grains.		PL=Pore Lining, M=Matrix.
Hydric Soil				0 ( (0)			or Problematic Hydric Soils <sup>3</sup> :
Histosol	(A1) pipedon (A2)	_	Polyvalue Below MLRA 149B)	Surface (St	B) (LRR R,		uck (A10) ( <b>LRR K, L, MLRA 149B</b> ) rairie Redox (A16) ( <b>LRR K, L, R</b> )
	stic (A3)		_ Thin Dark Surfac	e (S9) ( <b>LRF</b>	R R, MLRA 149B		ucky Peat or Peat (S3) (LRR K, L, R)
Hydroge	en Sulfide (A4)		Loamy Mucky M	ineral (F1) (I		Dark Su	ırface (S7) ( <b>LRR K, L</b> )
	d Layers (A5)		Loamy Gleyed M				ue Below Surface (S8) (LRR K, L)
	d Below Dark Surface ark Surface (A12)	÷ (A11)	<ul><li>Depleted Matrix</li><li>Redox Dark Surf</li></ul>				rk Surface (S9) ( <b>LRR K, L</b> ) nganese Masses (F12) ( <b>LRR K, L, R</b> )
	Mucky Mineral (S1)	_	Redox Dark Sun Depleted Dark S				nt Floodplain Soils (F19) (MLRA 149B)
-	Gleyed Matrix (S4)	_	_ Redox Depression				podic (TA6) ( <b>MLRA 144A, 145, 149B</b> )
-	Redox (S5)						rent Material (F21)
	Matrix (S6)						allow Dark Surface (TF12)
Dark Su	rface (S7) (LRR R, M	ILRA 149B)				Other (E	Explain in Remarks)
<sup>3</sup> Indicators of	f hydrophytic vegetati	ion and wetla	and hydrology must	be present,	unless disturbed	l or problematic.	
	Layer (if observed):						
Type:							
Depth (inc	ches):					Hydric Soil F	Present? Yes <u>√</u> No
Remarks:							

Project/Site: Riverbend Wind	City/County: Sai	nilac County	Sampling Date: <u>2022-04-05</u>
Applicant/Owner: Liberty Power		State: Michig	an Sampling Point: Wetland T4
Investigator(s): Ernest Schenk, Eric Rade	macher Section, Township	o, Range: sec 29 T009	N R014E
Landform (hillslope, terrace, etc.): Depression			
Subregion (LRR or MLRA): LRR L, MLRA 98 Lat:			
Soil Map Unit Name: Parkhill loam, 0 to 1 pe	•		
Are climatic / hydrologic conditions on the site typical fo			
Are Vegetation, Soil, or Hydrology	significantly disturbed?	Are "Normal Circumstances"	present? Yes ✓ No
Are Vegetation, Soil, or Hydrology	naturally problematic?	(If needed, explain any answe	ers in Remarks.)
SUMMARY OF FINDINGS - Attach site m	ap showing sampling poi	nt locations, transects	s, important features, etc.
Hydrophytic Vegetation Present? Yes✓	No Is the Sam	pled Area	
	No within a W	etland? Yes <u>√</u>	No
Wetland Hydrology Present? Yes   ✓		onal Wetland Site ID:	
Remarks: (Explain alternative procedures here or in a			
PEM/PSS			
1 2.1111 00			
HYDROLOGY			
Wetland Hydrology Indicators:		Secondary Indic	ators (minimum of two required)
Primary Indicators (minimum of one is required; check	all that apply)	Surface Soi	l Cracks (B6)
	Water-Stained Leaves (B9)	Drainage Pa	
	Aquatic Fauna (B13)	Moss Trim L	
	Marl Deposits (B15)		Water Table (C2)
	Hydrogen Sulfide Odor (C1)	Crayfish Bu	
	Oxidized Rhizospheres on Living		
	Presence of Reduced Iron (C4)		Stressed Plants (D1)
	Recent Iron Reduction in Tilled So Thin Muck Surface (C7)	oils (C6) <u>/</u> Geomorphio Shallow Aqu	
	Other (Explain in Remarks)		raphic Relief (D4)
✓ Sparsely Vegetated Concave Surface (B8)	Other (Explain in Remarks)	Microtopogr	
Field Observations:		<u> </u>	1 1051 (20)
Surface Water Present? Yes _ ✓ No	Depth (inches): 3		
Water Table Present? Yes No _✓			
Saturation Present? Yes ✓ No	. ,	Wetland Hydrology Prese	nt? Yes ✓ No
(includes capillary fringe)			
Describe Recorded Data (stream gauge, monitoring w	ell, aerial photos, previous inspec	tions), if available:	
Remarks:			
Ponding from recent rain, farmed po	rtion is sparsely		
vegetated			

**VEGETATION –** Use scientific names of plants.

Dominance Test worksheet:  Number of Dominant Species That Are OBL, FACW, or FAC:4
Number of Dominant Species That Are OBL, FACW, or FAC:
Species Across All Strata:
Percent of Dominant Species That Are OBL, FACW, or FAC:    100.00
Prevalence Index worksheet:  Total % Cover of:  OBL species 20.00 x1 = 20.00  FACW species 95.00 x2 = 190.00  FAC species 10.00 x3 = 30.00  FACU species 0.00 x4 = 0.00  UPL species 0.00 x5 = 0.00  Column Totals: 125.00 (A) 240.00 (B)  Prevalence Index = B/A = 1.92  Hydrophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation  2 - Dominance Test is >50%  3 - Prevalence Index is $\leq 3.0^1$ 4 - Morphological Adaptations (Provide supporting)
Total % Cover of: Multiply by:  OBL species $20.00 \times 1 = 20.00$ FACW species $95.00 \times 2 = 190.00$ FAC species $10.00 \times 3 = 30.00$ FACU species $0.00 \times 4 = 0.00$ UPL species $0.00 \times 5 = 0.00$ Column Totals: $125.00 \times 5 = 0.00$ Column Totals: $125.00 \times 5 = 0.00$ Prevalence Index $0.00 \times 5 = 0.00$ Hydrophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation  2 - Dominance Test is >50%  3 - Prevalence Index is $0.00 \times 5 = 0.00 \times 5 = 0.00$
OBL species
FAC species $10.00 \times 3 = 30.00$ FACU species $0.00 \times 4 = 0.00$ UPL species $0.00 \times 5 = 0.00$ Column Totals: $125.00 \times 5 = 0.00$ Prevalence Index $0.00 \times 5 = 0.00$ Hydrophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is $0.00 \times 5 = 0.00$ 4 - Morphological Adaptations (Provide supporting
FACU species 0.00 x 4 = 0.00  UPL species 0.00 x 5 = 0.00  Column Totals: 125.00 (A) 240.00 (B)  Prevalence Index = B/A = 1.92  Hydrophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation  2 - Dominance Test is >50%  3 - Prevalence Index is ≤3.0¹  4 - Morphological Adaptations¹ (Provide supporting)
FACU species $0.00 \times 4 = 0.00$ UPL species $0.00 \times 5 = 0.00$ Column Totals: $125.00 \times 5 = 0.00$ Prevalence Index = B/A = $1.92$ Hydrophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation  2 - Dominance Test is >50%  3 - Prevalence Index is $\leq 3.0^1$ 4 - Morphological Adaptations (Provide supporting
Column Totals: 125.00 (A) 240.00 (B)  Prevalence Index = B/A = 1.92  Hydrophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation  ✓ 2 - Dominance Test is >50%  ✓ 3 - Prevalence Index is ≤3.0¹  4 - Morphological Adaptations¹ (Provide supporting
Prevalence Index = B/A = 1.92  Hydrophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation  2 - Dominance Test is >50%  3 - Prevalence Index is ≤3.0¹  4 - Morphological Adaptations¹ (Provide supporting)
Hydrophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0¹  4 - Morphological Adaptations¹ (Provide supporting)
1 - Rapid Test for Hydrophytic Vegetation  2 - Dominance Test is >50%  3 - Prevalence Index is ≤3.0¹  4 - Morphological Adaptations¹ (Provide supporting
<ul> <li>2 - Dominance Test is &gt;50%</li> <li>3 - Prevalence Index is ≤3.0¹</li> <li>4 - Morphological Adaptations¹ (Provide supporting)</li> </ul>
<ul> <li>✓ 3 - Prevalence Index is ≤3.0¹</li> <li>4 - Morphological Adaptations¹ (Provide supporting)</li> </ul>
4 - Morphological Adaptations <sup>1</sup> (Provide supporting
data in Remarks or on a separate sheet)
Problematic Hydrophytic Vegetation¹ (Explain)
¹Indicators of hydric soil and wetland hydrology must
be present, unless disturbed or problematic.  Definitions of Vegetation Strata:
Definitions of Vegetation Strata:
Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.
Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
Woody vines – All woody vines greater than 3.28 ft in height.
neight.
Hydrophytic
Vegetation
Present? Yes/_ No

SOIL Sampling Point: Wetland T4

	cription: (Describe t	to the depth				r confirm	the absence	of indicators.)	
Depth (inches)	Matrix Color (moist)	%	Color (moist)	Features %	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks	
0-18	10YR 2/2	100					MMI		
					<del></del>				
			_						
			_						
	oncentration, D=Depl	etion, RM=R	Reduced Matrix, MS	=Masked	Sand Gra	ins.		: PL=Pore Lining, M=Matrix	
Hydric Soil			Dale 1 D 1	. 0	(00) (1 ==	_		for Problematic Hydric So	
Histosol	(A1) pipedon (A2)	_	Polyvalue Below MLRA 149B)	Surface (	(S8) ( <b>LRR</b>	R,		luck (A10) ( <b>LRR K, L, MLR</b> Prairie Redox (A16) ( <b>LRR K</b>	
Black Hi			_ Thin Dark Surfac	ce (S9) ( <b>L</b> l	RR R, ML	RA 149B)		lucky Peat or Peat (S3) ( <b>LR</b>	
Hydroge	en Sulfide (A4)		_ Loamy Mucky M	ineral (F1)	) (LRR K,		Dark Surface (S7) (LRR K, L)		
	d Layers (A5)		_ Loamy Gleyed N					lue Below Surface (S8) (LR	
	d Below Dark Surface ark Surface (A12)	e (A11) _	<ul><li>Depleted Matrix</li><li>Redox Dark Surf</li></ul>					ark Surface (S9) ( <b>LRR K, L</b> ) anganese Masses (F12) ( <b>LF</b>	
	Mucky Mineral (S1)	_	Redox Dark Sun Depleted Dark S		7)			ont Floodplain Soils (F19) ( <b>N</b>	
	Gleyed Matrix (S4)	_	_ Redox Depression		,			Spodic (TA6) ( <b>MLRA 144A</b> ,	
	Redox (S5)							arent Material (F21)	
	Matrix (S6)					Very Shallow Dark Surface (TF12) Other (Explain in Remarks)			
Dark Su	rface (S7) (LRR R, M	ILRA 149B)					Other (	Explain in Remarks)	
<sup>3</sup> Indicators o	f hydrophytic vegetati	ion and wetla	and hydrology must	be prese	nt, unless	disturbed	or problematic	i.	
Restrictive	Layer (if observed):								
Type:			<u></u> ,						
Depth (in	ches):						Hydric Soil	Present? Yes <u>√</u>	No
Remarks:							1		

Applicant/Owner: Liberty Power  Investigator(s): Ernest Schenk , Eric Rade  Landform (hillslope, terrace, etc.): Depression  Subregion (LRR or MLRA): LRR L, MLRA 98 Lat:  Soil Map Unit Name: Parkhill loam, 0 to 1 per  Are climatic / hydrologic conditions on the site typical for Are Vegetation, Soil, or Hydrology  Are Vegetation, Soil, or Hydrology	emacher Section, Township, Local relief (concave, concave,	re "Normal Circumstances" present? Yes No			
Hydrophytic Vegetation Present? Yes   Hydric Soil Present? Yes   Wetland Hydrology Present? Yes   Remarks: (Explain alternative procedures here or in a PEM	No If yes, option	led Area tland? Yes _ ✓ No al Wetland Site ID:			
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) Marl Deposits (B15) Hydrogen Sulfide Odor (C1)	Secondary Indicators (minimum of two required)  Surface Soil Cracks (B6)  Drainage Patterns (B10)  Moss Trim Lines (B16)  Dry-Season Water Table (C2)  Crayfish Burrows (C8)  Roots (C3)  Saturation Visible on Aerial Imagery (C9)  Stunted or Stressed Plants (D1)  Geomorphic Position (D2)  Shallow Aquitard (D3)  Microtopographic Relief (D4)  FAC-Neutral Test (D5)			
Field Observations: Surface Water Present? Yes✓_ No	Depth (inches): Depth (inches): 0	Wetland Hydrology Present? Yes No			

Dominance Test worksheet:         Number of Dominant Species         That Are OBL, FACW, or FAC:       1       (A)         Total Number of Dominant Species Across All Strata:       1       (B)         Percent of Dominant Species That Are OBL, FACW, or FAC:       100.00       (A/B)         Prevalence Index worksheet:         Total % Cover of:       Multiply by:         OBL species       0.00       x 1 = 0.00         FACW species       0.00       x 2 = 0.00         FACU species       0.00       x 3 = 15.00         FACU species       0.00       x 4 = 0.00         UPL species       0.00       x 5 = 0.00         Column Totals:       5.00       (A)       15.00       (B)         Prevalence Index = B/A = 3.0         Hydrophytic Vegetation Indicators:         1 - Rapid Test for Hydrophytic Vegetation         ✓ 2 - Dominance Test is >50%         ✓ 3 - Prevalence Index is ≤3.0¹         — 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)         ✓ Problematic Hydrophytic Vegetation¹ (Explain)
That Are OBL, FACW, or FAC: (A)  Total Number of Dominant Species Across All Strata: 1 (B)  Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)  Prevalence Index worksheet: Multiply by: OBL species 0.00 x 1 = 0.00 FACW species 0.00 x 2 = 0.00 FACW species 0.00 x 3 = 15.00 FACU species 0.00 x 4 = 0.00 UPL species 0.00 x 5 = 0.00 Column Totals: 5.00 (A) 15.00 (B)  Prevalence Index = B/A =
Species Across All Strata:1 (B)  Percent of Dominant Species That Are OBL, FACW, or FAC:100.00 (A/B)  Prevalence Index worksheet:
Percent of Dominant Species That Are OBL, FACW, or FAC:
Prevalence Index worksheet:
Total % Cover of: Multiply by:  OBL species $0.00 \times 1 = 0.00$ FACW species $0.00 \times 2 = 0.00$ FAC species $5.00 \times 3 = 15.00$ FACU species $0.00 \times 4 = 0.00$ UPL species $0.00 \times 5 = 0.00$ Column Totals: $5.00 \times 5 = 0.00$ Column Totals: $5.00 \times 5 = 0.00$ Hydrophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation  2 - Dominance Test is >50%  3 - Prevalence Index is ≤3.0¹  4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
OBL species $0.00 \times 1 = 0.00$ FACW species $0.00 \times 2 = 0.00$ FAC species $5.00 \times 3 = 15.00$ FACU species $0.00 \times 4 = 0.00$ UPL species $0.00 \times 5 = 0.00$ Column Totals: $5.00 \times 5 = 0.00$ Column Totals: $5.00 \times 5 = 0.00$ Hydrophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation  2 - Dominance Test is >50%  3 - Prevalence Index is $\le 3.0^1$ 4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)
FACW species $0.00 \times 2 = 0.00$ FAC species $5.00 \times 3 = 15.00$ FACU species $0.00 \times 4 = 0.00$ UPL species $0.00 \times 5 = 0.00$ Column Totals: $5.00 \times 5 = 0.00$ Prevalence Index $0.00 \times 5 = 0.00$ Hydrophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation  2 - Dominance Test is $0.00 \times 5 = 0.00$ 3 - Prevalence Index is $0.00 \times 5 = 0.00$ 4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)
FAC species $\underline{5.00}$ $\times 3 = \underline{15.00}$ FACU species $\underline{0.00}$ $\times 4 = \underline{0.00}$ UPL species $\underline{0.00}$ $\times 5 = \underline{0.00}$ Column Totals: $\underline{5.00}$ (A) $\underline{15.00}$ (B)  Prevalence Index = B/A = $\underline{3.0}$ Hydrophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is $\leq 3.0^1$ 4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
FACU species $0.00 \times 4 = 0.00$ UPL species $0.00 \times 5 = 0.00$ Column Totals: $5.00 \times 5 = 0.00$ Prevalence Index $= B/A = 3.0$ Hydrophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation  2 - Dominance Test is >50%  3 - Prevalence Index is $\le 3.0^1$ 4 - Morphological Adaptations (Provide supporting data in Remarks or on a separate sheet)
UPL species0.00 x 5 =0.00
Column Totals:
Prevalence Index = B/A = 3.0  Hydrophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation  2 - Dominance Test is >50%  3 - Prevalence Index is ≤3.0¹  4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
Hydrophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation  2 - Dominance Test is >50%  3 - Prevalence Index is ≤3.0¹  4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
Hydrophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation  2 - Dominance Test is >50%  3 - Prevalence Index is ≤3.0¹  4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
1 - Rapid Test for Hydrophytic Vegetation     2 - Dominance Test is >50%     3 - Prevalence Index is ≤3.0¹     4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
2 - Dominance Test is >50%     3 - Prevalence Index is ≤3.0¹     4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
3 - Prevalence Index is ≤3.0¹     4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
· · · · · · · · · · · · · · · · · · ·
<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
Definitions of Vegetation Strata:
Tree – Woody plants 3 in. (7.6 cm) or more in diameter
at breast height (DBH), regardless of height.
Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.
Herb – All herbaceous (non-woody) plants, regardless
of size, and woody plants less than 3.28 ft tall.
Woody vines – All woody vines greater than 3.28 ft in
height.
Hydrophytic Vegetation
Present? Yes/ No

SOIL Sampling Point: Wetland T5

	cription: (Describe t	to the depth			cator or confirn	n the absence o	of indicators.)
Depth (inches)	Matrix Color (moist)	%	Color (moist)	Features T	ype <sup>1</sup> Loc <sup>2</sup>	Texture	Remarks
0-18	10YR 2/2	100				MMI	
	<u> </u>						
			_				
							_
						-	
			_				_
			_				_
	oncentration, D=Depl	etion, RM=R	Reduced Matrix, MS	=Masked Sa	ınd Grains.		PL=Pore Lining, M=Matrix.
Hydric Soil				0 ( (0)			or Problematic Hydric Soils <sup>3</sup> :
Histosol	(A1) pipedon (A2)	_	Polyvalue Below MLRA 149B)	Surface (St	B) (LRR R,		uck (A10) ( <b>LRR K, L, MLRA 149B</b> ) rairie Redox (A16) ( <b>LRR K, L, R</b> )
	stic (A3)		Thin Dark Surfac	e (S9) ( <b>LRF</b>	R R, MLRA 149B		ucky Peat or Peat (S3) (LRR K, L, R)
Hydroge	en Sulfide (A4)		Loamy Mucky M	ineral (F1) (I		Dark Su	ırface (S7) ( <b>LRR K, L</b> )
	d Layers (A5)		Loamy Gleyed M				ue Below Surface (S8) (LRR K, L)
	d Below Dark Surface ark Surface (A12)	÷ (A11)	<ul><li>Depleted Matrix</li><li>Redox Dark Surf</li></ul>				rk Surface (S9) ( <b>LRR K, L</b> ) nganese Masses (F12) ( <b>LRR K, L, R</b> )
	Mucky Mineral (S1)	_	Redox Dark Sun Depleted Dark S				nt Floodplain Soils (F19) (MLRA 149B)
-	Gleyed Matrix (S4)	_	_ Redox Depression				podic (TA6) ( <b>MLRA 144A, 145, 149B</b> )
-	Redox (S5)						rent Material (F21)
	Matrix (S6)						allow Dark Surface (TF12)
Dark Su	rface (S7) (LRR R, M	ILRA 149B)				Other (E	Explain in Remarks)
<sup>3</sup> Indicators of	f hydrophytic vegetati	ion and wetla	and hydrology must	be present,	unless disturbed	l or problematic.	
	Layer (if observed):						
Type:							
Depth (inc	ches):					Hydric Soil F	Present? Yes <u>√</u> No
Remarks:							

Project/Site: Riverbend V	Vind	City/County:	Sanilac County	Sampling Date: <u>2022-04-05</u>
Applicant/Owner: Liberty P			•	chigan Sampling Point: Wetland T6
Investigator(s): Ernest Sch				
				ave Slope (%): <u>0-2</u>
	•			Datum: WGS84
				ssification:
Are climatic / hydrologic condition	•	•	•	
				ces" present? Yes ✓ No
Are Vegetation, Soil				
				ects, important features, etc.
				ots, important reatures, etc.
Hydrophytic Vegetation Prese		_ '''	Sampled Area a Wetland? Yes	✓ No
Hydric Soil Present?				
Wetland Hydrology Present?  Remarks: (Explain alternative			optional Wetland Site ID:	
PSS/PEM				
HYDROLOGY				
Wetland Hydrology Indicato	rs:		Secondary II	ndicators (minimum of two required)
Primary Indicators (minimum o		k all that apply)		Soil Cracks (B6)
Surface Water (A1)	-	Water-Stained Leaves (B9)	· · · · · · · · · · · · · · · · · · ·	e Patterns (B10)
High Water Table (A2)		Aquatic Fauna (B13)		rim Lines (B16)
✓ Saturation (A3)		Marl Deposits (B15)		ason Water Table (C2)
Water Marks (B1)	_	Hydrogen Sulfide Odor (C1)	Crayfish	n Burrows (C8)
Sediment Deposits (B2)			- : :	on Visible on Aerial Imagery (C9)
Drift Deposits (B3)		Presence of Reduced Iron (0		or Stressed Plants (D1)
Algal Mat or Crust (B4)		Recent Iron Reduction in Till		rphic Position (D2)
Iron Deposits (B5) Inundation Visible on Aeri		Thin Muck Surface (C7) Other (Explain in Remarks)		v Aquitard (D3) pographic Relief (D4)
Sparsely Vegetated Cond		Other (Explain in Nemarks)		eutral Test (D5)
Field Observations:	ave currace (Bo)		<u> </u>	didi rest (56)
Surface Water Present?	Yes No ✓	Depth (inches):		
Water Table Present?	· · · · · · · · · · · · · · · · · · ·	Depth (inches):		
Saturation Present? (includes capillary fringe)		Depth (inches): 0		resent? Yes No
Describe Recorded Data (stre	am gauge, monitoring	well, aerial photos, previous in	spections), if available:	
Remarks:				
rtomanto.				

<b>VEGETATION</b> – Use scientific names of plants				Sampling Point: Wetland T6
Tree Stratum (Plot size:30)	Absolute		Indicator	Dominance Test worksheet:
1	% Cover			Number of Dominant Species That Are OBL, FACW, or FAC: (A)
2				Total Number of Dominant Species Across All Strata: 2 (B)
4				Percent of Dominant Species
5				That Are OBL, FACW, or FAC:100.00_ (A/B)
7				Prevalence Index worksheet:
r		= Total Co		
0 1: /0: 1 0: 1 / (D.1.)		- Total Co	ver	FACW species 0.00 x 2 = 0.00
Sapling/Shrub Stratum (Plot size: 15 )				FAC species 50.00 x2 = 0.00 FAC species 50.00 x3 = 150.00
1. <u>Cornus racemosa</u>	50	Y	FAC	
2				FACU species 0.00 x 4 = 0.00
3				UPL species 0.00 x 5 = 0.00
4.				Column Totals: <u>70.00</u> (A) <u>170.00</u> (B)
				Prevalence Index = B/A = 2.43
5				
6	_	-		Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
	_50	= Total Co	ver	∠ 2 - Dominance Test is >50%
Herb Stratum (Plot size:5				✓ 3 - Prevalence Index is ≤3.0 <sup>1</sup>
1. Carex lacustris	_20_	Y	OBL	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
2				Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
3				<sup>1</sup> Indicators of hydric soil and wetland hydrology must
4.         5.				be present, unless disturbed or problematic.  Definitions of Vegetation Strata:
6				
7				<b>Tree</b> – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
8 9				Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.
10				Herb – All herbaceous (non-woody) plants, regardless
11				of size, and woody plants less than 3.28 ft tall.
12				<b>Woody vines</b> – All woody vines greater than 3.28 ft in
	20	= Total Co	ver	height.
Woody Vine Stratum (Plot size:)				
1				
2			· ——	
3			· ——	Hydrophytic
4				Vegetation Present? Yes ✓ No
		= Total Co	ver	<u>.</u>
Remarks: (Include photo numbers here or on a separate Out of growing season	sheet.)			

SOIL Sampling Point: Wetland T6

	cription: (Describe t	to the depth			cator or confirn	n the absence o	of indicators.)
Depth (inches)	Matrix Color (moist)	%	Color (moist)	Features T	ype <sup>1</sup> Loc <sup>2</sup>	Texture	Remarks
0-18	10YR 2/2	100				MMI	
	<u> </u>						
			_				
							_
						-	
			_				_
			_				_
	oncentration, D=Depl	etion, RM=R	Reduced Matrix, MS	=Masked Sa	ınd Grains.		PL=Pore Lining, M=Matrix.
Hydric Soil				0 ( (0)			or Problematic Hydric Soils <sup>3</sup> :
Histosol	(A1) pipedon (A2)	_	Polyvalue Below MLRA 149B)	Surface (St	B) (LRR R,		uck (A10) ( <b>LRR K, L, MLRA 149B</b> ) rairie Redox (A16) ( <b>LRR K, L, R</b> )
	stic (A3)		Thin Dark Surfac	e (S9) ( <b>LRF</b>	R R, MLRA 149B		ucky Peat or Peat (S3) (LRR K, L, R)
Hydroge	en Sulfide (A4)		Loamy Mucky M	ineral (F1) (I		Dark Su	ırface (S7) ( <b>LRR K, L</b> )
	d Layers (A5)		_ Loamy Gleyed M				ue Below Surface (S8) (LRR K, L)
	d Below Dark Surface ark Surface (A12)	÷ (A11)	<ul><li>Depleted Matrix</li><li>Redox Dark Surf</li></ul>				rk Surface (S9) ( <b>LRR K, L</b> ) nganese Masses (F12) ( <b>LRR K, L, R</b> )
	Mucky Mineral (S1)	_	Redox Dark Sun Depleted Dark S				nt Floodplain Soils (F19) (MLRA 149B)
-	Gleyed Matrix (S4)	_	Redox Depression				podic (TA6) ( <b>MLRA 144A, 145, 149B</b> )
-	Redox (S5)						rent Material (F21)
	Matrix (S6)						allow Dark Surface (TF12)
Dark Su	rface (S7) (LRR R, M	ILRA 149B)				Other (E	Explain in Remarks)
<sup>3</sup> Indicators of	f hydrophytic vegetati	ion and wetla	and hydrology must	be present,	unless disturbed	l or problematic.	
	Layer (if observed):						
Type:							
Depth (inc	ches):					Hydric Soil F	Present? Yes <u>√</u> No
Remarks:							

Project/Site: Riverbend Wind	City/County: Sanilac	County Samp	ling Date: 2022-04-05
Applicant/Owner: Liberty Power		•	
Investigator(s): Ernest Schenk , Eric Radema			
Landform (hillslope, terrace, etc.): Depression			
Subregion (LRR or MLRA): LRR L, MLRA 98 Lat: 43			
Soil Map Unit Name: Conover loam, 0 to 3 per			
Are climatic / hydrologic conditions on the site typical for thi	•		
Are Vegetation, Soil, or Hydrology			
Are Vegetation, Soil, or Hydrologyı			
SUMMARY OF FINDINGS – Attach site map	showing sampling point loo	cations, transects, impe	ortant features, etc.
Hydrophytic Vegetation Present? Yes ✓ N	Is the Sampled A	ırea	
Hydric Soil Present? Yes ✓ N		? Yes <u>√</u> No	<u> </u>
Wetland Hydrology Present? Yes <u>✓</u> N		etland Site ID:	
Remarks: (Explain alternative procedures here or in a se	parate report.)	-	
PSS			
HYDROLOGY			
Wetland Hydrology Indicators:		Secondary Indicators (m	ninimum of two required)
Primary Indicators (minimum of one is required; check all	that apply)	Surface Soil Cracks	(B6)
✓ Surface Water (A1) Wat	er-Stained Leaves (B9)	Drainage Patterns (I	B10)
High Water Table (A2) Aqu	atic Fauna (B13)	Moss Trim Lines (B	16)
	I Deposits (B15)	Dry-Season Water 1	Table (C2)
	rogen Sulfide Odor (C1)	Crayfish Burrows (C	
	dized Rhizospheres on Living Roots		n Aerial Imagery (C9)
	sence of Reduced Iron (C4)	Stunted or Stressed	
	ent Iron Reduction in Tilled Soils (C6		
	Muck Surface (C7)	Shallow Aquitard (D	·
	er (Explain in Remarks)	Microtopographic Re	
Sparsely Vegetated Concave Surface (B8)  Field Observations:		FAC-Neutral Test (□	J5)
	pth (inches): 3		
	pth (inches):		
		and Hydrology Present? Ye	es √ No
(includes capillary fringe)			
Describe Recorded Data (stream gauge, monitoring well,	aerial photos, previous inspections),	if available:	
Remarks:			
Ponding from recent rain			

minance Test worksheet: mber of Dominant Species at Are OBL, FACW, or FAC:
tal Are OBL, FACW, or FAC:2 (A)  tal Number of Dominant ecies Across All Strata:3 (B)  recent of Dominant Species at Are OBL, FACW, or FAC:66.67 (A/B)  evalence Index worksheet:  Total % Cover of: Multiply by:
ecies Across All Strata:
rcent of Dominant Species at Are OBL, FACW, or FAC: 66.67 (A/B)  evalence Index worksheet:  Total % Cover of: Multiply by:  BL species 0.00 x1 = 0.00  CW species 0.00 x2 = 0.00  CU species 70.00 x3 = 210.00  CU species 0.00 x4 = 0.00  PL species 0.00 x5 = 0.00  Jumn Totals: 70.00 (A) 210.00 (B)  Prevalence Index = B/A = 3.0  drophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation  2 - Dominance Test is >50%  3 - Prevalence Index is ≤3.0¹  4 - Morphological Adaptations¹ (Provide supporting)
evalence Index worksheet:  Total % Cover of:  BL species $0.00 \times 1 = 0.00$ CW species $0.00 \times 2 = 0.00$ C species $0.00 \times 3 = 210.00$ CU species $0.00 \times 4 = 0.00$ PL species $0.00 \times 5 = 0.00$ Fulumn Totals: $0.00 \times 5 = 0.00$ Fulumn Total
Total % Cover of:  BL species $0.00$ x 1 = $0.00$ CW species $0.00$ x 2 = $0.00$ C species $0.00$ x 3 = $0.00$ CU species $0.00$ x 4 = $0.00$ CU species $0.00$ x 5 = $0.00$ Cumn Totals: $0.00$ x 5 = $0.0$
BL species $0.00 \times 1 = 0.00$ CW species $0.00 \times 2 = 0.00$ C species $70.00 \times 3 = 210.00$ CU species $0.00 \times 4 = 0.00$ CL species $0.00 \times 5 = 0.00$ Blumn Totals: $0.00 \times 5 = 0.00$ Brevalence Index $0.00 \times 5 = 0.00$ CHOUSE $0.00 \times 5 = 0.00$ Blumn Totals: $0.00 \times 5 = 0.00$ Brevalence Index $0.00 \times 5 = 0.00$ CHOUSE $0.00 \times 5 = 0.00$ Brevalence Index $0.00 \times 5 = 0.00$ Brevalence
CW species $0.00 \times 2 = 0.00$ C species $70.00 \times 3 = 210.00$ CU species $0.00 \times 4 = 0.00$ CL species $0.00 \times 5 = 0.00$ Clumn Totals: $70.00 \times 5 = 0.00$ Cumn Totals: $1.00 \times 5 = 0.00$ Cum
C species $70.00$ $\times 3 = 210.00$ $\times 4 = 0.00$ $\times 4 = 0.00$ $\times 5 = 0.0$
PL species $0.00 \times 5 = 0.00$ Humn Totals: $70.00 \times 5 = 0.00$ Prevalence Index = B/A = $3.0$ drophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation  2 - Dominance Test is >50%  3 - Prevalence Index is $\leq 3.0^1$ 4 - Morphological Adaptations <sup>1</sup> (Provide supporting
lumn Totals:70,00 (A)210,00 (B)  Prevalence Index = B/A = _3.0  drophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0¹ 4 - Morphological Adaptations¹ (Provide supporting
Prevalence Index = B/A = 3.0  drophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation  2 - Dominance Test is >50%  3 - Prevalence Index is ≤3.0¹  4 - Morphological Adaptations¹ (Provide supporting
drophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation  2 - Dominance Test is >50%  3 - Prevalence Index is ≤3.0¹  4 - Morphological Adaptations¹ (Provide supporting
drophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation  2 - Dominance Test is >50%  3 - Prevalence Index is ≤3.0¹  4 - Morphological Adaptations¹ (Provide supporting
1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0¹ 4 - Morphological Adaptations¹ (Provide supporting
2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0¹ 4 - Morphological Adaptations¹ (Provide supporting
3 - Prevalence Index is ≤3.0 <sup>1</sup> 4 - Morphological Adaptations <sup>1</sup> (Provide supporting
4 - Morphological Adaptations <sup>1</sup> (Provide supporting
Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
dicators of hydric soil and wetland hydrology must present, unless disturbed or problematic.
finitions of Vegetation Strata:
ee – Woody plants 3 in. (7.6 cm) or more in diameter breast height (DBH), regardless of height.
pling/shrub – Woody plants less than 3 in. DBH
d greater than or equal to 3.28 ft (1 m) tall.
rb – All herbaceous (non-woody) plants, regardless size, and woody plants less than 3.28 ft tall.
pody vines – All woody vines greater than 3.28 ft in
ight.
drophytic
getation esent? Yes √ No
<del></del>
į

SOIL Sampling Point: Wetland T7

	cription: (Describe t	to the depth			cator or confirn	n the absence o	of indicators.)
Depth (inches)	Matrix Color (moist)	%	Color (moist)	Features T	ype <sup>1</sup> Loc <sup>2</sup>	Texture	Remarks
0-18	10YR 2/2	100				MMI	
	<u> </u>						
			_				
							_
						-	
			_				_
			_				_
	oncentration, D=Depl	etion, RM=R	Reduced Matrix, MS	=Masked Sa	ınd Grains.		PL=Pore Lining, M=Matrix.
Hydric Soil				0 ( (0)			or Problematic Hydric Soils <sup>3</sup> :
Histosol	(A1) pipedon (A2)	_	Polyvalue Below MLRA 149B)	Surface (St	B) (LRR R,		uck (A10) ( <b>LRR K, L, MLRA 149B</b> ) rairie Redox (A16) ( <b>LRR K, L, R</b> )
	stic (A3)		Thin Dark Surfac	e (S9) ( <b>LRF</b>	R R, MLRA 149B		ucky Peat or Peat (S3) (LRR K, L, R)
Hydroge	en Sulfide (A4)		Loamy Mucky M	ineral (F1) (I		Dark Su	ırface (S7) ( <b>LRR K, L</b> )
	d Layers (A5)		_ Loamy Gleyed M				ue Below Surface (S8) (LRR K, L)
	d Below Dark Surface ark Surface (A12)	÷ (A11)	<ul><li>Depleted Matrix</li><li>Redox Dark Surf</li></ul>				rk Surface (S9) ( <b>LRR K, L</b> ) nganese Masses (F12) ( <b>LRR K, L, R</b> )
	Mucky Mineral (S1)	_	Redox Dark Sun Depleted Dark S				nt Floodplain Soils (F19) (MLRA 149B)
-	Gleyed Matrix (S4)	_	Redox Depression				podic (TA6) ( <b>MLRA 144A, 145, 149B</b> )
-	Redox (S5)						rent Material (F21)
	Matrix (S6)						allow Dark Surface (TF12)
Dark Su	rface (S7) (LRR R, M	ILRA 149B)				Other (E	Explain in Remarks)
<sup>3</sup> Indicators of	f hydrophytic vegetati	ion and wetla	and hydrology must	be present,	unless disturbed	l or problematic.	
	Layer (if observed):						
Type:							
Depth (inc	ches):					Hydric Soil F	Present? Yes <u>√</u> No
Remarks:							

Project/Site: Riverbend W	Vind	City/Co	ounty: Sanilac	County	Sampling Date: <u>2(</u>	022-04-05
Applicant/Owner: Liberty P				•	igan Sampling Point:	
Investigator(s): Ernest Sch						
Landform (hillslope, terrace, etc						
Subregion (LRR or MLRA): LR	•					
Soil Map Unit Name: Parkhi						
Are climatic / hydrologic condition	ons on the site typical f	or this time of year? Ye	es ✓ No	(If no, explain ir	ı Remarks.)	
Are Vegetation, Soil						No
Are Vegetation, Soil						
SUMMARY OF FINDING						ures. etc.
			Is the Sampled A			
Hydrophytic Vegetation Prese Hydric Soil Present?		140		i? Yes	✓ No	
Wetland Hydrology Present?			If wes ontional W	etland Site ID:		
Remarks: (Explain alternative			ii yes, optional vv	eliand one ib.		
HYDROLOGY						
Wetland Hydrology Indicato	rs:			Secondary Ind	licators (minimum of two	o required)
Primary Indicators (minimum o	of one is required; chec	k all that apply)		<del></del>	oil Cracks (B6)	
✓ Surface Water (A1)		Water-Stained Leaves	s (B9)	Drainage		
High Water Table (A2)		Aquatic Fauna (B13)		Moss Trim		
✓ Saturation (A3)		Marl Deposits (B15)	r (C1)		on Water Table (C2)	
Water Marks (B1) Sediment Deposits (B2)		Hydrogen Sulfide Odol Oxidized Rhizospheres		Crayfish E		ery (CQ)
Orift Deposits (B3)		Presence of Reduced			r Stressed Plants (D1)	siy (09)
Algal Mat or Crust (B4)		Recent Iron Reduction	` '		nic Position (D2)	
Iron Deposits (B5)		Thin Muck Surface (C7		Shallow A		
Inundation Visible on Aeri	al Imagery (B7)	Other (Explain in Rema	arks)	Microtopo	graphic Relief (D4)	
Sparsely Vegetated Conc	ave Surface (B8)			FAC-Neut	ral Test (D5)	
Field Observations:		•				
Surface Water Present?	Yes _ ✓ No					
Water Table Present?		Depth (inches):		land III alaala aa Baa	40 V ( 1	N-
Saturation Present? (includes capillary fringe)	Yes _ ✓ No	Depth (inches): 0	weti	iand Hydrology Pres	sent? Yes <u>√</u> N	40 <u> </u>
Describe Recorded Data (stre	am gauge, monitoring	well, aerial photos, prev	vious inspections),	if available:		
Remarks:						
Ponding from recent	rain					

<b>/EGETATION –</b> Use scientific names of plants				Sampling Point: Wetland T8
Tree Stratum (Plot size: 30 )			t Indicator Status	Dominance Test worksheet:
1				Number of Dominant Species That Are OBL, FACW, or FAC: (A)
2.	_			Total Number of Dominant
3				Species Across All Strata:3 (B)
4	_			Percent of Dominant Species
5				That Are OBL, FACW, or FAC: 66.67 (A/B)
5				Prevalence Index worksheet:
7				Total % Cover of: Multiply by:
45	0	= Total Co	over	OBL species 0.00 x 1 = 0.00
Sapling/Shrub Stratum (Plot size:15)				FACW species 20.00 x 2 = 40.00 FAC species 20.00 x 3 = 60.00
l				FACU species 30.00 x 4 = 120.00
2				UPL species <u>0.00</u> x 5 = <u>0.00</u>
3				Column Totals: <u>70.00</u> (A) <u>220.00</u> (B)
l				Prevalence Index = B/A = 3.14
5				Hydrophytic Vegetation Indicators:
5				1 - Rapid Test for Hydrophytic Vegetation
7	_			✓ 2 - Dominance Test is >50%
Josh Stratum (Dietaire) 5		= Total Co	over	3 - Prevalence Index is ≤3.0 <sup>1</sup>
Herb Stratum (Plot size: <u>5</u> ) 1. <i>Elymus repens</i>	30	Y	FACU	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
2. <u>Symphyotrichum lateriflorum</u>		Y	FAC	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
3. <i>Phalaris arundinacea</i>	_20	Y	<u>FACW</u>	<sup>1</sup> Indicators of hydric soil and wetland hydrology must
4				be present, unless disturbed or problematic.
5				Definitions of Vegetation Strata:
6				Tree – Woody plants 3 in. (7.6 cm) or more in diameter
7				at breast height (DBH), regardless of height.
3				Sapling/shrub – Woody plants less than 3 in. DBH
9				and greater than or equal to 3.28 ft (1 m) tall.
10				<b>Herb</b> – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
11				Woody vines – All woody vines greater than 3.28 ft in
12		= Total Co		height.
Noody Vine Stratum (Plot size:30)		= Total Co	over	
1				
2				Lhudronhudio
4				Hydrophytic Vegetation
T-		= Total Co	over	Present? Yes ✓ No
Remarks: (Include photo numbers here or on a separate Out of growing season	sheet.)			

SOIL Sampling Point: Wetland T8

	cription: (Describe t	to the depth			cator or confirn	n the absence o	of indicators.)
Depth (inches)	Matrix Color (moist)	%	Color (moist)	Features T	ype <sup>1</sup> Loc <sup>2</sup>	Texture	Remarks
0-18	10YR 2/2	100				MMI	
	<u> </u>						
			_				
							_
						-	
			_				_
			_				_
	oncentration, D=Depl	etion, RM=R	Reduced Matrix, MS	=Masked Sa	ınd Grains.		PL=Pore Lining, M=Matrix.
Hydric Soil				0 ( (0)			or Problematic Hydric Soils <sup>3</sup> :
Histosol	(A1) pipedon (A2)	_	Polyvalue Below MLRA 149B)	Surface (St	B) (LRR R,		uck (A10) ( <b>LRR K, L, MLRA 149B</b> ) rairie Redox (A16) ( <b>LRR K, L, R</b> )
	stic (A3)		Thin Dark Surfac	e (S9) ( <b>LRF</b>	R R, MLRA 149B		ucky Peat or Peat (S3) (LRR K, L, R)
Hydroge	en Sulfide (A4)		Loamy Mucky M	ineral (F1) (I		Dark Su	ırface (S7) ( <b>LRR K, L</b> )
	d Layers (A5)		_ Loamy Gleyed M				ue Below Surface (S8) (LRR K, L)
	d Below Dark Surface ark Surface (A12)	÷ (A11)	<ul><li>Depleted Matrix</li><li>Redox Dark Surf</li></ul>				rk Surface (S9) ( <b>LRR K, L</b> ) nganese Masses (F12) ( <b>LRR K, L, R</b> )
	Mucky Mineral (S1)	_	Redox Dark Sun Depleted Dark S				nt Floodplain Soils (F19) (MLRA 149B)
-	Gleyed Matrix (S4)	_	Redox Depression				podic (TA6) ( <b>MLRA 144A, 145, 149B</b> )
-	Redox (S5)						rent Material (F21)
	Matrix (S6)						allow Dark Surface (TF12)
Dark Su	rface (S7) (LRR R, M	ILRA 149B)				Other (E	Explain in Remarks)
<sup>3</sup> Indicators of	f hydrophytic vegetati	ion and wetla	and hydrology must	be present,	unless disturbed	l or problematic.	
	Layer (if observed):						
Type:							
Depth (inc	ches):					Hydric Soil F	Present? Yes <u>√</u> No
Remarks:							

Project/Site: Riverbend W	Vind	City/C	County: Sanilac	County	Sampling	Date: <u>2022-04-06</u>
Applicant/Owner: Liberty				State: Mic	chigan Samplin	ig Point: WL U1
Investigator(s): David Nigr	о	Section	on, Township, Rang	ge: <u>sec 26 T0</u>	09N R014E	
Landform (hillslope, terrace, etc						
Subregion (LRR or MLRA): LR						
Soil Map Unit Name: Parkhi						
Are climatic / hydrologic condition	•					
Are Vegetation, Soil						es / No
Are Vegetation, Soil		-				
_						
SUMMARY OF FINDING	S – Attach sit	e map showing san	npling point lo	cations, transe	ects, importa	int features, etc.
Hydrophytic Vegetation Prese	nt? Yes	✓ No	Is the Sampled A			
Hydric Soil Present?		✓ No	within a Wetland	i? Yes_	No	<del></del>
Wetland Hydrology Present?		✓ No	If yes, optional We	etland Site ID:		
Remarks: (Explain alternative	procedures here o	or in a separate report.)				
PFO						
HYDROLOGY						
Wetland Hydrology Indicato	rs:			Secondary I	Indicators (minim	um of two required)
Primary Indicators (minimum o	of one is required; o	check all that apply)		Surface	e Soil Cracks (B6	)
Surface Water (A1)		Water-Stained Leave			ge Patterns (B10)	)
✓ High Water Table (A2)		Aquatic Fauna (B13)			rim Lines (B16)	
✓ Saturation (A3)		Marl Deposits (B15)		-	ason Water Table	e (C2)
Water Marks (B1)		Hydrogen Sulfide Od			h Burrows (C8)	
Sediment Deposits (B2)		Oxidized Rhizospher	_			rial Imagery (C9)
Drift Deposits (B3)		Presence of Reduce	` '		d or Stressed Plan	
Algal Mat or Crust (B4)		Recent Iron Reduction			orphic Position (D:	2)
Iron Deposits (B5)		Thin Muck Surface (0			v Aquitard (D3)	(5.1)
Inundation Visible on Aeri		Other (Explain in Rer	marks)		pographic Relief	` '
Sparsely Vegetated Conc	ave Surface (B8)		1	FAC-Ne	eutral Test (D5)	
Field Observations: Surface Water Present?	Ves No	✓ Depth (inches):				
Water Table Present?		Depth (inches): 3				
Saturation Present?		Depth (inches): 0		land Hydrology Pr	resent? Yes	√ No
(includes capillary fringe)						<u> </u>
Describe Recorded Data (stre	am gauge, monitor	ing well, aerial photos, pre	evious inspections),	if available:		
Remarks:						

Trac Christians (Districts 20	Absolute		t Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: 30 )		Species?		Number of Dominant Species
1. <u>Ulmus americana</u>		<u>Y</u>		That Are OBL, FACW, or FAC:4 (A)
2. Populus deltoides				Total Number of Dominant
3. <u>Fagus grandifolia</u>				Species Across All Strata:4 (B)
4. Quercus alba				Percent of Dominant Species
5				That Are OBL, FACW, or FAC:100.00_ (A/B)
6			<del> </del>	Prevalence Index worksheet:
7		-		Total % Cover of: Multiply by:
	30	= Total Co	ver	OBL species <u>0.00</u> x 1 = <u>0.00</u>
Sapling/Shrub Stratum (Plot size: 15 )				FACW species <u>37.00</u> x 2 = <u>74.00</u>
1				FAC species 10.00 x 3 = 30.00
2				FACU species 10.00 x 4 = 40.00
3				UPL species 0.00 x 5 = 0.00 (A) 144.00 (B)
4				Column Totals: <u>57.00</u> (A) <u>144.00</u> (B)
5				Prevalence Index = B/A = 2.53
6.				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation
		= Total Co		∠ 2 - Dominance Test is >50%
Herb Stratum (Plot size: 5 )		- Total Co	ivei	3 - Prevalence Index is ≤3.0¹
1. Carex grayi	15	Υ	FACW	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
2. Poa palustris			FACW	Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)
3. Agrostis stolonifera	2	N	FACW	
				¹Indicators of hydric soil and wetland hydrology must
4				be present, unless disturbed or problematic.
5				Definitions of Vegetation Strata:
6.				Tree – Woody plants 3 in. (7.6 cm) or more in diameter
7				at breast height (DBH), regardless of height.
8				Sapling/shrub – Woody plants less than 3 in. DBH
9				and greater than or equal to 3.28 ft (1 m) tall.
10				Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
11		-		
12		-		<b>Woody vines</b> – All woody vines greater than 3.28 ft in height.
	27	= Total Co	ver	S .
Woody Vine Stratum (Plot size:)				
1				
2			<u> </u>	
3				Hydrophytic
4		-		Vegetation Present? Yes ✓ No
		= Total Co	ver	163 <u>v</u> No
Remarks: (Include photo numbers here or on a separate	sheet.)			

Sampling Point: WL U1

SOIL

			to the dep	oth needed				or confirm	the absence	e of indicators.)	
Depth (inches)	Color (r	Matrix noist)	%	Color (n		x Features	_Type <sup>1</sup> _	Loc <sup>2</sup>	Texture	Remarks	
0-3	<u>10YR</u>	3/2	100						SCL		
3-8	<u>10YR</u>	3/2	95	10YR	5/6	_5	C	_M_	SCL	Distinct redox.	
8-18	10YR	5/6	50	10YR	6/2	30	D	M	CL	Mixed Matrix	
			-	10YR	3/3	20	С	М	CL	Distinct redox.	
				-							
¹Type: C=C	oncentration	ı, D=Dep	letion, RM	=Reduced N	/latrix, MS	=Masked	Sand Gra	ains.	<sup>2</sup> Location	n: PL=Pore Lining, M=Matrix.	
Hydric Soil										s for Problematic Hydric Soils <sup>3</sup> :	
Histosol		`			llue Belov RA 149B)	v Surface	(S8) ( <b>LRF</b>	RR,		Muck (A10) (LRR K, L, MLRA 149B)	
	pipedon (A2 istic (A3)	)			,		RR R. MI	_RA 149B)		: Prairie Redox (A16) ( <b>LRR K, L, R</b> ) Mucky Peat or Peat (S3) ( <b>LRR K, L, R</b> )	
Hydroge	en Sulfide (A			Loamy	Mucky M	lineral (F1	) (LRR K		Dark	Surface (S7) (LRR K, L)	
	d Layers (A5 d Below Dar		o (A11)	-	<sup>,</sup> Gleyed N ed Matrix	Matrix (F2)	)		Polyvalue Below Surface (S8) (LRR K, L)		
	ark Surface		e (ATT)			face (F6)			Thin Dark Surface (S9) (LRR K, L) Iron-Manganese Masses (F12) (LRR K, L, R)		
Sandy N	Mucky Miner	al (S1)		Deplet	ed Dark S	Surface (F	7)		Piedmont Floodplain Soils (F19) (MLRA 149B)		
	Gleyed Matri	x (S4)		Redox	Depressi	ions (F8)			Mesic Spodic (TA6) (MLRA 144A, 145, 149B)		
	Redox (S5) d Matrix (S6)	)							Red Parent Material (F21) Very Shallow Dark Surface (TF12)		
	ırface (S7) (I		/ILRA 149	<b>B</b> )						(Explain in Remarks)	
<sup>3</sup> Indicators o	of hydronhyti	c venetal	tion and w	etland hydro	loav mus	t he nrese	nt unles	disturbed	or problemati	ic	
Restrictive				etiana nyara	nogy mus	t be prese	int, unico	s disturbed	or probleman	о.	
Туре:											
Depth (in	iches):								Hydric Soi	I Present? Yes No	
Remarks:									I		

Project/Site: Riverbend Wind	City/County: Sanilac County Sampling Date: 2022-04-06
	State: Michigan Sampling Point: Wetland W1
•	Section, Township, Range: Sec 31 T009N R014E
	cal relief (concave, convex, none): Concave Slope (%): 0-2
•	1 Long: -82.860705 Datum: WGS84
	2 percent slopes NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of ye	
Are Vegetation, Soil, or Hydrology significantly	disturbed? Are "Normal Circumstances" present? Yes✓ No
Are Vegetation, Soil, or Hydrology naturally pro	blematic? (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
Hydric Soil Present? Yes ✓ No	within a Wetland? Yes No
Wetland Hydrology Present? Yes   ✓ No	If yes, optional Wetland Site ID:
Remarks: (Explain alternative procedures here or in a separate repor	
PEM	
HYDROLOGY	
Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)	Surface Soil Cracks (B6)
✓ Surface Water (A1) Water-Stained I	
High Water Table (A2) Aquatic Fauna And Reposite (A2)	
✓ Saturation (A3) Marl Deposits (I	
Water Marks (B1) Hydrogen Sulfice Sediment Deposits (B2) Oxidized Rhizon	de Odor (C1) Crayfish Burrows (C8) spheres on Living Roots (C3) Saturation Visible on Aerial Imagery (C9)
Sediment Deposits (B2) Oxidized Kritzos Drift Deposits (B3) Presence of Re	
	duction in Tilled Soils (C6)   Geomorphic Position (D2)
Iron Deposits (B5) Thin Muck Surfa	
Instruction Visible on Aerial Imagery (B7) Other (Explain in	· · · · · · · · · · · · · · · · · · ·
Sparsely Vegetated Concave Surface (B8)	FAC-Neutral Test (D5)
Field Observations:	
Surface Water Present? Yes _ ✓ No Depth (inches)	: 3
Water Table Present? Yes No _ ✓ Depth (inches)	
Saturation Present? Yes _ / No Depth (inches)	
(includes capillary fringe)	
Describe Recorded Data (stream gauge, monitoring well, aerial photo	s, previous inspections), if available:
Remarks:	
Ponding from recent rain	

<b>/EGETATION –</b> Use scientific names of plants				Sampling Point: Wetland W1
Tree Stratum (Plot size:30)	Absolute		t Indicator	Dominance Test worksheet:
1			Status	Number of Dominant Species That Are OBL, FACW, or FAC:1 (A)
2				Total Number of Dominant
3				Species Across All Strata: (B)
4				Percent of Dominant Species That Are OBL, FACW, or FAC:
5				
6				Prevalence Index worksheet:
		= Total Co	over	
Sapling/Shrub Stratum (Plot size: 15 )		. Total Oc	3401	FACW species x2 =
				FAC species 10.00 x 3 = 30.00
1				FACU species 30.00 x 4 = 120.00
2.				UPL species <u>0.00</u> x 5 = <u>0.00</u>
3				Column Totals: <u>60.00</u> (A) <u>190.00</u> (B)
4.				Prevalence Index = B/A = 3.17
6.				Hydrophytic Vegetation Indicators:
				1 - Rapid Test for Hydrophytic Vegetation
7	_	= Total Co		2 - Dominance Test is >50%
Hart Otation (Blatains E		_ Total Ct	ovei	3 - Prevalence Index is ≤3.0¹
Herb Stratum (Plot size: 5 )  1. Elymus repens	30	Υ	FACU	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
2. Phalaris arundinacea		Υ	FACW	✓ Problematic Hydrophytic Vegetation¹ (Explain)
3. Symphyotrichum lateriflorum		N	FAC	1
4				<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5				Definitions of Vegetation Strata:
6				Tree – Woody plants 3 in. (7.6 cm) or more in diameter
7	_			at breast height (DBH), regardless of height.
8		-		Sapling/shrub – Woody plants less than 3 in. DBH
				and greater than or equal to 3.28 ft (1 m) tall.
10				Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
11.				Woody vines – All woody vines greater than 3.28 ft in
12		= Total Co		height.
Woody Vine Stratum (Plot size:30)		- Total Ct	ovei	
1				
2				
3				Undranhatia
4				Hydrophytic Vegetation
		= Total Co	over	Present? Yes ✓ No
Remarks: (Include photo numbers here or on a separate		•		<u> </u>
Out of growing season; we assume ve	•	to be h	ydric du	ring growing season.
,			,	

SOIL Sampling Point: Wetland W1

	cription: (Describe	to the de	oth needed				or confirm	the absence	of indicators.)			
Depth (inches)	Matrix Color (moist)	%	Color (n		x Feature: %	s _Type <sup>1</sup> _	Loc <sup>2</sup>	Texture	Remarks			
0-3	10YR 4/1	100		,								
3-18	10YR 4/3	50	10YR	1/6	50		M		Distinct rodox			
3-10	101K 4/3	_50_	TUTK	4/0	_50_	C	IVI		Distinct redox.			
<sup>1</sup> Type: C=Co	oncentration, D=Depl	letion RM	=Reduced N	Matrix MS	S=Masker	Sand Gr	ains	<sup>2</sup> l ocation	n: PL=Pore Lining, M=Matrix.			
Hydric Soil		iction, raiv	-rtcaacca ii	iatrix, ivic	J-Maskec	d Carla Cit	all io.		s for Problematic Hydric Soils <sup>3</sup> :			
Histosol			-			(S8) ( <b>LRI</b>	RR,		Muck (A10) ( <b>LRR K, L, MLRA 149B</b> )			
	oipedon (A2)			RA 149B)		DD D M	DA 440D)		Prairie Redox (A16) (LRR K, L, R)			
Black Hi Hvdroge	en Sulfide (A4)					-RR R, IVII 1) (LRR K	_RA 149B) . L)		Mucky Peat or Peat (S3) (LRR K, L, R) Surface (S7) (LRR K, L)			
Stratified	d Layers (A5)		Loamy	Gleyed I	Matrix (F2		, ,	Polyvalue Below Surface (S8) (LRR K, L)				
-	d Below Dark Surface	e (A11)		ed Matrix					Dark Surface (S9) (LRR K, L)			
	ark Surface (A12) lucky Mineral (S1)				rface (F6) Surface (F				Manganese Masses (F12) ( <b>LRR K, L, R</b> ) nont Floodplain Soils (F19) ( <b>MLRA 149B</b> )			
-	Gleyed Matrix (S4)		Redox			.,		Mesic Spodic (TA6) (MLRA 144A, 145, 149B)				
Sandy R	Redox (S5)							Red P	Parent Material (F21)			
	Matrix (S6)	#L DA 440	<b>D</b> \						Shallow Dark Surface (TF12)			
Dark Su	rface (S7) ( <b>LRR R, N</b>	ILKA 149	<b>D</b> )					Other	(Explain in Remarks)			
	f hydrophytic vegetat		etland hydro	logy mus	t be prese	ent, unless	disturbed	or problemati	c.			
Restrictive I	_ayer (if observed):											
Type:												
. ,	ches):							Hydric Soi	I Present? Yes No			
Remarks:												

Project/Site: Riverbend W	/ind	City/County:	Sanilac County	Sampling Date: <u>2022-04-06</u>			
Applicant/Owner: Liberty P			•	gan Sampling Point: Wetland W2			
•			ship, Range: <u>sec 32 T009</u>				
				e Slope (%): <u>3-7</u>			
				Datum: WGS84			
				fication: N/A			
Are climatic / hydrologic condition	ons on the site typical f	or this time of year? Yes✓	No (If no, explain in	Remarks.)			
				" present? Yes No			
			(If needed, explain any answ				
				ts, important features, etc.			
			Sampled Area				
Hydrophytic Vegetation Prese				′ No			
Hydric Soil Present? Wetland Hydrology Present?		_ 110					
Remarks: (Explain alternative			optional Wetland Site ID:				
HYDROLOGY							
Wetland Hydrology Indicato				cators (minimum of two required)			
Primary Indicators (minimum o	-		<del></del>				
Surface Water (A1)		Water-Stained Leaves (B9)	<u>✓</u> Drainage P				
High Water Table (A2)		Aquatic Fauna (B13)		Moss Trim Lines (B16)			
✓ Saturation (A3)       Water Marks (B1)		Marl Deposits (B15) Hydrogen Sulfide Odor (C1)	Dry-Seaso	n Water Table (C2)			
Sediment Deposits (B2)			ing Roots (C3) Saturation				
Drift Deposits (B3)		Presence of Reduced Iron (C		Stressed Plants (D1)			
Algal Mat or Crust (B4)		Recent Iron Reduction in Tille	,				
Iron Deposits (B5)		Thin Muck Surface (C7)	Shallow Ac				
Inundation Visible on Aeri	al Imagery (B7)	Other (Explain in Remarks)	Microtopog	graphic Relief (D4)			
Sparsely Vegetated Conc	ave Surface (B8)		FAC-Neutr	al Test (D5)			
Field Observations:							
Surface Water Present?		Depth (inches):					
Water Table Present?		Depth (inches):					
Saturation Present? (includes capillary fringe)	Yes ✓ No	Depth (inches): 0	Wetland Hydrology Prese	ent? Yes <u>√</u> No			
Describe Recorded Data (stre	am gauge, monitoring v	well, aerial photos, previous in:	pections), if available:				
Remarks:							
Remarks.							

/EGETATION – Use scientific names of plants				Sampling Point: Wetland W2
Tree Stratum (Plot size:30)			t Indicator Status	Dominance Test worksheet:
1				Number of Dominant Species That Are OBL, FACW, or FAC:1 (A)
2				Total Number of Dominant Species Across All Strata: (B)
3 4				Percent of Dominant Species
5				That Are OBL, FACW, or FAC: 50.00 (A/B)
6	_	-		Prevalence Index worksheet:
7		· ·		Total % Cover of: Multiply by:
	0	= Total Co	over	OBL species 0.00 x 1 = 0.00
Sapling/Shrub Stratum (Plot size: 15 )				FACW species 20.00 x 2 = 40.00
1				FAC species 10.00 x 3 = 30.00
2				FACU species 30.00 x 4 = 120.00
3				UPL species $0.00 \times 5 = 0.00$
4.				Column Totals: <u>60.00</u> (A) <u>190.00</u> (B)
				Prevalence Index = B/A = 3.17
5				
6				Hydrophytic Vegetation Indicators:
7				1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50%
	0	= Total Co	over	3 - Prevalence Index is ≤3.0¹
Herb Stratum (Plot size: 5	20	V	FACII	4 - Morphological Adaptations <sup>1</sup> (Provide supporting
1. Elymus repens			FACU	data in Remarks or on a separate sheet)
2. <u>Phalaris arundinacea</u>			FACW	✓ Problematic Hydrophytic Vegetation¹ (Explain)
3. <u>Symphyotrichum lateriflorum</u> 4			<u>FAC</u>	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5.				Definitions of Vegetation Strata:
6	_			Tree – Woody plants 3 in. (7.6 cm) or more in diameter
7				at breast height (DBH), regardless of height.
8				Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.
10.				Herb – All herbaceous (non-woody) plants, regardless
11	_			of size, and woody plants less than 3.28 ft tall.
12				Woody vines – All woody vines greater than 3.28 ft in height.
	60	= Total Co	over	
Woody Vine Stratum (Plot size: 30 )				
1	_			
2				
3	_			Hydrophytic
4	_			Vegetation Present? Yes ✓ No
		= Total Co	over	riesent: res v no vo
Remarks: (Include photo numbers here or on a separate	sheet.)			
Out of growing season; assume vegeta	ation to b	oe hydr	ic during	growing season.

SOIL Sampling Point: Wetland W2

Profile Des	cription: (Describe t	o the dep	th needed	to docun	nent the i	ndicator	or confirm	the absence	of indicators.)	
Depth	Matrix				x Features	-	. 2			
(inches)	Color (moist) 10YR 4/1	100	Color (m	noist)	%	Type'	Loc <sup>2</sup>	Texture I	Remarks	
			40)(D	4.10				<del></del> _		
3-18	10YR 4/3	_50_	<u>10YR</u>	4/6	_50_	<u>C</u>	M	L	Distinct redox.	
<sup>1</sup> Type: C=C	concentration, D=Depl	etion, RM	=Reduced M	latrix, MS	S=Masked	Sand Gra	ains.	<sup>2</sup> Location	n: PL=Pore Lining, M=Matrix.	
Hydric Soil	Indicators:							Indicators	for Problematic Hydric Soils <sup>3</sup> :	
Histoso				lue Belov RA 149B)	v Surface	(S8) ( <b>LRI</b>	RR,		Muck (A10) (LRR K, L, MLRA 149B)	
	pipedon (A2) istic (A3)			,		.RR R, MI	LRA 149B)		Prairie Redox (A16) ( <b>LRR K, L, R</b> )  Mucky Peat or Peat (S3) ( <b>LRR K, L, R</b> )	
	en Sulfide (A4)		Loamy	Mucky N	/lineral (F1	) (LRR K		Dark S	Surface (S7) (LRR K, L)	
	d Layers (A5) d Below Dark Surface	(Δ11)	-	Gleyed I ed Matrix	Matrix (F2	)			alue Below Surface (S8) ( <b>LRR K, L</b> ) Park Surface (S9) ( <b>LRR K, L</b> )	
-	ark Surface (A12)	(7,11)			face (F6)			Iron-Manganese Masses (F12) (LRR K, L, R)		
-	Mucky Mineral (S1)				Surface (F	7)		Piedmont Floodplain Soils (F19) (MLRA 149B)		
-	Gleyed Matrix (S4) Redox (S5)		/ Redox	Depress	ions (F8)			Mesic Spodic (TA6) (MLRA 144A, 145, 149B) Red Parent Material (F21)		
-	d Matrix (S6)								Shallow Dark Surface (TF12)	
	ırface (S7) ( <b>LRR R, M</b>	LRA 149	3)						(Explain in Remarks)	
<sup>3</sup> Indicators o	of hydrophytic vegetati	on and w	etland hydro	logy mus	t be prese	ent, unless	s disturbed	or problemati	C.	
	Layer (if observed):									
Type:										
	ches):							Hydric Soil	Present? Yes No	
Remarks:										

Project/Site: Riverbend Wind	City/County: Sanilac County Sampling Date: 2022-04-06
	State: Michigan Sampling Point: Wetland W3
	Section, Township, Range: <u>sec 28 T009N R014E</u>
	Local relief (concave, convex, none): Concave Slope (%): 3-7
· · · · · · · · · · · · · · · · · · ·	36 Long: -82.840329 Datum: WGS84
	pes NWI classification: N/A
Are climatic / hydrologic conditions on the site typical for this time of years.	
Are Vegetation, Soil, or Hydrology significantly	tly disturbed? Are "Normal Circumstances" present? Yes No
Are Vegetation, Soil, or Hydrology naturally pr	problematic? (If needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS - Attach site map showing	ng sampling point locations, transects, important features, etc.
Hydrophytic Vegetation Present?  Hydric Soil Present?  Yes   ✓ No  Yes   ✓ No	within a Wetland? Yes No
Wetland Hydrology Present? Yes No  Remarks: (Explain alternative procedures here or in a separate repo	
PEM	
HYDROLOGY	
Wetland Hydrology Indicators:	Secondary Indicators (minimum of two required)
Primary Indicators (minimum of one is required; check all that apply)	
✓ Surface Water (A1) Water-Stained	
High Water Table (A2) Aquatic Fauna April Deposits	
✓ Saturation (A3) Marl Deposits Water Marks (B1) Hydrogen Sulf	
	zospheres on Living Roots (C3) Saturation Visible on Aerial Imagery (C9)
Drift Deposits (B3) Presence of R	
	Reduction in Tilled Soils (C6) Geomorphic Position (D2)
Iron Deposits (B5) Thin Muck Sur	urface (C7) Shallow Aquitard (D3)
Inundation Visible on Aerial Imagery (B7) Other (Explain	
Sparsely Vegetated Concave Surface (B8)	FAC-Neutral Test (D5)
Field Observations:	
Surface Water Present? Yes _ ✓ No Depth (inches	
Water Table Present? Yes No ✓ Depth (inches	
Saturation Present? Yes _ ✓ No Depth (inches (includes capillary fringe)	es): <u>0</u> Wetland Hydrology Present? Yes No
Describe Recorded Data (stream gauge, monitoring well, aerial phot	otos, previous inspections), if available:
Remarks:	
Water drains through wetland	
1	

				Sampling Point: Wetland W3
Tree Stratum (Plot size: 30 )	Absolute % Cover	Dominan		Dominance Test worksheet:
1		-		Number of Dominant Species That Are OBL, FACW, or FAC: (A)
2.				Total Number of Dominant
i.				Species Across All Strata: (B)
1 5				Percent of Dominant Species That Are OBL, FACW, or FAC: 100.00 (A/B)
5				Prevalence Index worksheet:
7				Total % Cover of:Multiply by:
	0	= Total Co	ver	OBL species <u>40.00</u> x 1 = <u>40.00</u>
Sapling/Shrub Stratum (Plot size: 15 )				FACW species 15.00 x 2 = 30
1. <u>Cornus amomum</u>	5	N	FACW	FAC species <u>25.00</u> x 3 = <u>75.00</u> FACU species <u>0.00</u> x 4 = <u>0.00</u>
2				UPL species 0.00 x 5 = 0.00
3			·	Column Totals: 80.00 (A) 145 (B)
l				Prevalence Index = B/A = 1.81
5				
5				Hydrophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation
7				✓ 2 - Dominance Test is >50%
_	5	= Total Co	ver	✓ 3 - Prevalence Index is ≤3.0 <sup>1</sup>
Herb Stratum (Plot size: 5 )  1. Ranunculus sceleratus	30	Υ	OBL	4 - Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)
2. <u>Barbarea vulgaris</u>		Y	FAC	✓ Problematic Hydrophytic Vegetation¹ (Explain)
3. <u>Phalaris arundinacea</u>		N	FACW	
4. <u>Juncus effusus</u>			OBL	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
5. <u>Symphyotrichum lateriflorum</u>			FAC	Definitions of Vegetation Strata:
6				
7				<b>Tree</b> – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
8.				Sapling/shrub – Woody plants less than 3 in. DBH
9			·	and greater than or equal to 3.28 ft (1 m) tall.
10 11			<u> </u>	<b>Herb</b> – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
12				Woody vines – All woody vines greater than 3.28 ft in
	75	= Total Co	ver	height.
2.2				
Woody Vine Stratum (Plot size: 30 )				
· · · · · · · · · · · · · · · · · · ·				
1				
Woody Vine Stratum         (Plot size:			·	Hydrophytic
1			·	Hydrophytic Vegetation Present? Yes No

SOIL Sampling Point: Wetland W3

	cription: (Describe	to the de	oth needed				or confirm	the absence	of indicators.)			
Depth (inches)	Matrix Color (moist)	%	Color (n		x Feature: %	sType <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks			
0-3	10YR 4/1	100		,								
3-18	10YR 4/3	50	10YR	1/6	50		M		Distinct rodox			
3-10	101K 4/3	_50_	TUTK	4/0	_50_	C	IVI		Distinct redox.			
<sup>1</sup> Type: C=Co	oncentration, D=Depl	letion RM	=Reduced N	Matrix MS	S=Masker	Sand Gr	ains	<sup>2</sup> l ocation	n: PL=Pore Lining, M=Matrix.			
Hydric Soil		iction, raiv	-reduced is	iatrix, ivic	J-Maskec	d Carla Cit	all io.		s for Problematic Hydric Soils <sup>3</sup> :			
Histosol			-			(S8) ( <b>LRI</b>	RR,		Muck (A10) ( <b>LRR K, L, MLRA 149B</b> )			
	oipedon (A2)			RA 149B)		DD D M	DA 440D)		Prairie Redox (A16) (LRR K, L, R)			
Black Hi Hvdroge	en Sulfide (A4)					-RR R, IVII 1) (LRR K	_RA 149B) . L)		Mucky Peat or Peat (S3) (LRR K, L, R) Surface (S7) (LRR K, L)			
Stratified	d Layers (A5)		Loamy	Gleyed I	Matrix (F2		, ,	Polyvalue Below Surface (S8) (LRR K, L)				
-	d Below Dark Surface	e (A11)		ed Matrix					Dark Surface (S9) (LRR K, L)			
	ark Surface (A12) lucky Mineral (S1)				rface (F6) Surface (F				Manganese Masses (F12) ( <b>LRR K, L, R</b> ) nont Floodplain Soils (F19) ( <b>MLRA 149B</b> )			
-	Gleyed Matrix (S4)		Redox			.,		Mesic Spodic (TA6) (MLRA 144A, 145, 149B)				
Sandy R	Redox (S5)							Red P	Parent Material (F21)			
	Matrix (S6)	#L DA 440	<b>D</b> \						Shallow Dark Surface (TF12)			
Dark Su	rface (S7) ( <b>LRR R, N</b>	ILKA 149	<b>D</b> )					Other	(Explain in Remarks)			
	f hydrophytic vegetat		etland hydro	logy mus	t be prese	ent, unless	disturbed	or problemati	c.			
Restrictive I	_ayer (if observed):											
Type:												
. ,	ches):							Hydric Soi	I Present? Yes No			
Remarks:												

Project/Site: Riverbend		City/County: Sar	nilac County	Sampling Date: 2	<u>2022-04-04</u>		
Applicant/Owner: Liberty			•				
Investigator(s): J. Brown, K. Ya							
Landform (hillslope, terrace, etc.): De	·				e (%): <b>0-2</b>		
Subregion (LRR or MLRA): LRR L, N	•						
Soil Map Unit Name: Conover loa							
Are climatic / hydrologic conditions on	•	•					
Are Vegetation, Soil, or					No		
Are Vegetation, Soil, oil, oil					110		
		•		•	4		
SUMMARY OF FINDINGS – A	Attach site map show	ing sampling pol	nt locations, trans	ects, important fea	itures, etc.		
Hydrophytic Vegetation Present?	Yes <u></u> ✓ No			, N			
Hydric Soil Present?	Yes ✓ No	<del></del>	etland? Yes_				
Wetland Hydrology Present?		, ,	onal Wetland Site ID:				
Remarks: (Explain alternative proced Naturally problematic due			etland				
reading problemate and	, to out of growing t		o ti di l'u				
HYDROLOGY							
Wetland Hydrology Indicators:			Secondary	Indicators (minimum of tw	vo required)		
Primary Indicators (minimum of one is	s required; check all that app	oly)		e Soil Cracks (B6)			
✓ Surface Water (A1)		ned Leaves (B9)		ge Patterns (B10)			
High Water Table (A2)	Aquatic Fau		Moss Trim Lines (B16)				
✓ Saturation (A3)	Marl Depos		Dry-Season Water Table (C2)				
Water Marks (B1)		Sulfide Odor (C1)		th Burrows (C8)	(CO)		
Sediment Deposits (B2)		hizospheres on Living f Reduced Iron (C4)		tion Visible on Aerial Imag			
Drift Deposits (B3) Algal Mat or Crust (B4)	<del></del>	Reduction in Tilled So		d or Stressed Plants (D1) orphic Position (D2)			
Iron Deposits (B5)	Thin Muck S		. ,				
Inundation Visible on Aerial Imag		ain in Remarks)	Shallow Aquitard (D3) Microtopographic Relief (D4)				
Sparsely Vegetated Concave Su		a r torria		eutral Test (D5)			
Field Observations:			<u> </u>				
Surface Water Present? Yes _	✓ No Depth (incl	hes): <u>1</u>					
	✓ No Depth (incl						
Saturation Present? Yes _	✓ No Depth (incl		Wetland Hydrology P	resent? Yes <u>√</u>	No		
(includes capillary fringe)  Describe Recorded Data (stream gau	uge monitoring well aerial n'	hotos previous inspec	tions) if available:				
Describe Necorded Data (stream gate	ge, monitoring wen, acriai pi	notos, previous inspec	dons, il avallable.				
Remarks:							

1. Acer saccharinum 80 Y FACW

2. Quercus bicolor 5 N FACW

Tree Stratum (Plot size: 30

FACW species
FACU species 0.00 x 4 = 0.00  UPL species 0.00 x 5 = 0.00  Column Totals: 185.00 (A) 370.00 (B)  Prevalence Index = B/A = 2.0  Hydrophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation  2 - Dominance Test is >50%  3 - Prevalence Index is ≤3.0¹  4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)  ✓ Problematic Hydrophytic Vegetation¹ (Explain)
FACU species
UPL species 0.00 x 5 = 0.00 Column Totals: 185.00 (A) 370.00 (B)  Prevalence Index = B/A = 2.0  Hydrophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0¹ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet) Problematic Hydrophytic Vegetation¹ (Explain)
Prevalence Index = B/A = 2.0  Hydrophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation  _ 2 - Dominance Test is >50%  _ 3 - Prevalence Index is ≤3.0¹  _ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)  _ Problematic Hydrophytic Vegetation¹ (Explain)
Hydrophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0¹ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet) Problematic Hydrophytic Vegetation¹ (Explain)
Hydrophytic Vegetation Indicators:  1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0¹ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet) Problematic Hydrophytic Vegetation¹ (Explain)
1 - Rapid Test for Hydrophytic Vegetation 2 - Dominance Test is >50% 3 - Prevalence Index is ≤3.0¹ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet) Problematic Hydrophytic Vegetation¹ (Explain)
∠ 2 - Dominance Test is >50%     ∠ 3 - Prevalence Index is ≤3.0¹     ∠ 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)     ∠ Problematic Hydrophytic Vegetation¹ (Explain)
3 - Prevalence Index is ≤3.0¹     4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)     ✓ Problematic Hydrophytic Vegetation¹ (Explain)
<ul> <li>4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)</li> <li>✓ Problematic Hydrophytic Vegetation¹ (Explain)</li> </ul>
✓ Problematic Hydrophytic Vegetation¹ (Explain)
1
Indicators of hydric soil and wetland hydrology must
be present, unless disturbed or problematic.
Definitions of Vegetation Strata:
Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
Sapling/shrub – Woody plants less than 3 in. DBH
and greater than or equal to 3.28 ft (1 m) tall.
Herb – All herbaceous (non-woody) plants, regardless
of size, and woody plants less than 3.28 ft tall.
Woody vines – All woody vines greater than 3.28 ft in
height.
Hydrophytic Vegetation
Present? Yes/ No

Absolute Dominant Indicator

% Cover Species? Status

Sampling Point: WL Y1

inches)	Matrix Color (moist)	%	Color (moist)	x Features %	Type <sup>1</sup>	Loc <sup>2</sup>	Texture	Remarks
$\Lambda$			•	20			CI	
0-18	10YR 5/2	80	10YR 4/6		<u>C</u>	M	CL	Prominent redox.
		<del>.</del>						
		<u> </u>						
	-							
	-		-					
	-							
/pe: C=Co	oncentration, D=Dep	letion, RM	l=Reduced Matrix, M	S=Masked \$	Sand Gra	ins.	<sup>2</sup> Location	n: PL=Pore Lining, M=Matrix.
	Indicators:							for Problematic Hydric Soils <sup>3</sup> :
_ Histosol	(A1) pipedon (A2)	Polyvalue Belo MLRA 149B		S8) ( <b>LRR</b>	! <b>R</b> ,		Muck (A10) ( <b>LRR K, L, MLRA 149B</b> ) Prairie Redox (A16) ( <b>LRR K, L, R</b> )	
_ Histic Ep _ Black His			Thin Dark Surfa	•	RR R, ML	.RA 149B)		Mucky Peat or Peat (S3) (LRR K, L, R)
Hydroge	n Sulfide (A4)	Loamy Mucky l	Mineral (F1)			Dark S	Surface (S7) (LRR K, L)	
	d Layers (A5) d Below Dark Surface	o (A11)	Loamy Gleyed ✓ Depleted Matri:				-	alue Below Surface (S8) (LRR K, L)
	ark Surface (A12)	5 (A11)	Redox Dark Su					oark Surface (S9) ( <b>LRR K, L</b> ) langanese Masses (F12) ( <b>LRR K, L, R</b>
Sandy Mucky Mineral (S1)			Depleted Dark	Surface (F7	<b>'</b> )			ont Floodplain Soils (F19) (MLRA 149)
	Gleyed Matrix (S4)		Redox Depress	sions (F8)				Spodic (TA6) (MLRA 144A, 145, 149E
	Redox (S5) Matrix (S6)							arent Material (F21) Shallow Dark Surface (TF12)
	rface (S7) ( <b>LRR R</b> , <b>N</b>	/ILRA 149	<b>B</b> )					(Explain in Remarks)
adioatora of	f bydrophytic yegotot	tion and w	etland hydrology mu	ot ha pragar	at unloco	disturbed	or problemati	^
	Layer (if observed):		eliand hydrology mu	st be preser	ii, uiiless	disturbed	or probleman	U.
Type:	,							
Depth (inc	ches):						Hydric Soil	Present? Yes No
	,							