Little Muddy Wetland and Stream Mitigation Bank – Addendum 1

WETLANDS FOREVER, INC.

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Little Muddy River Wetland and Stream Mitigation Bank – Addendum 1

AQUATIC AND FORESTED WETLAND

INTRODUCTION

The proposed Little Muddy River Wetland and Stream Mitigation Bank Addendum 1 (LMWSMB-A1) is located in an unprotected floodplain of the Little Muddy River in Franklin and Perry Counties, Illinois. The bank site is a total of 158.5 acres situated on a parcel of land that consist of prior converted cropland, river channel and degraded wooded riparian corridor adjacent to the Little Muddy River and the existing Little Muddy Wetland and Stream Mitigation Bank.

The wetland mitigation bank plan will result in the restoration of streambank riparian forest buffer, in stream aquatic structures, emergent wetlands and forested wetland.

The Bank property was selected by the Sponsor because of its potential for beneficial water quality and wildlife habitat improvements to the watershed. Some of the attractive qualities of the Bank site as a mitigation parcel include: the long length of perennial stream channel that has a relatively thin riparian buffer, the low lying existing agricultural fields and adjacent to the existing wetland mitigation bank of Little Muddy Wetland and Stream Mitigation Bank.

The Bank site is ecologically suitable for wetland, emergent and aquatic and riparian buffer restoration. It contains a perennial stream (Little Muddy River) that has a very small riparian buffer. As a result, the parcel has great potential for increasing riparian buffer width along the stream system.

The bank site is ecologically suitable for wetland restoration. It is capable of supporting wetlands because there is sufficient hydrology that flows across the site and because of the dominance of hydric soils on the property.

The property's location along the Little Muddy River will create important benefits for the watershed as agricultural and highway runoff will be filtered as it flows across the Bank property. Additionally, occasional floodwaters from the Little Muddy will be filtered in the established wetlands which will also store flood waters and provide substantial wildlife benefits.

The onsite wetlands will decrease the amount of nutrients traveling to downstream waters and the expanded riparian buffers will reduce the amount of sediment moving through the system.

This area can be ecologically improved by removing early successional woody species in order to stimulate the growth of the existing and more ecologically valuable late successional woody

species and by the planting of tree and shrub species to increase species richness. Restoring wetland areas will also increase habitat opportunities for species that require or frequent shallow ephemeral wetlands that include reptiles, wading birds and waterfowl.

One of the most important components of the site is its direct connectivity with the Little Muddy River, within the Big Muddy watershed. Thus, this meets a need for sites mitigated in the regional watershed where impacts have been made and lost due to human activity.

GUIDELINES AND RESPONSIBILITIES

The following information is to establish guidelines and responsibilities for the establishment, use, operation, and maintenance of the Little Muddy Wetland and Stream Mitigation Bank Addendum 1(LMWSMB-A1) (hereinafter, the Bank). The Bank will be used for compensatory mitigation for unavoidable impacts to waters of the United States including wetlands which result from activities authorized under Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act, and other Federal, State or local wetland regulatory programs provided such use has met all applicable requirements and is authorized by the appropriate authority.

The Little Muddy Wetland and Stream Mitigation Bank – Addendum 1 is proposed on an 158.5 acre parcel situated on Little Muddy River in the Big Muddy watershed, Franklin and Perry Counties, Illinois. Wetlands Forever, Inc. will be the management company and perform the services specified herein for LMWSMB-A1.

The Bank is situated and developed to address the loss of wooded, emergent and stream riparian wetland habitat. The site is compatible with adjacent land use, contributes to important local stream, terrestrial and wooded forest functions, will be ecologically self-sustaining, and protected in perpetuity by an approved U.S. Army Corps of Engineers Conservation Easement.

BANK DEVELOPMENT

The entire property consists of hydric soils and lies within the floodplain of Little Muddy River. A wetland site evaluation was conducted by a wetland biologist and determined that the soils were hydric and the farmed portion is a prior converted cropland area. Historically, this property was and is hydrologically connected over a wide range of storm events to Little Muddy River within the Little Muddy River watershed. The site will be developed with multiple types of habitat features: hardwood bottomland forest, stream riparian corridor, enhanced forested wetlands, and preservation of forested wetlands. The bank will be established in two phases. The Phase 1 (South) acreage will equate to 107.50 acres and will be developed along the Little Muddy River comprising 35.50 acres of forested wetlands, 51.0 acres of streambank riparian corridor and improved stream aquatics, 8.0 acres of emergent wetlands, 13.0 acres of preservation forested wetlands. The Phase 2 (North) acreage equate to 51.00 acres and will be

developed along the Little Muddy River comprising of 20.0 acres of forested wetlands, 2.0 acres of emergent, 22.0 acres of streambank riparian corridor and improved stream aquatics and 7.0 acres of forested preservation. The forested wetlands will consist of a total of 55.5 acres of hard and soft mast trees. The vegetation types will follow very gentle grades that both exist and are to be created. Forrest Keeling Nursery, RPM trees will be used to promote a hardmast producing hardwood bottomland forest. The stream bank will consist of 73.0 acres of restored wooded buffer and enhanced aquatic river channel. A total of 10.0 acres of emergent wetland will be restored and will consist of very shallow basin that will support a variety of herbaceous vegetation throughout the year and may support migratory and endemic wetland species along the Little Muddy River.

The hydrology of the site is intended to mirror the existing hydraulic regime. The depth, duration, and extent of flooding in the restored wetland will primarily be driven by flood pulses from the Little Muddy River. Flood entry followed by seasonal drying through the summer and fall will sustain productivity by recycling vegetation and nutrients. The current plan will result in the re-creation of a diverse wooded and emergent wetland adjacent to a stream riparian corridor to enhance ecological functions and values for the Little Muddy River.

OPERATION AND LONG-TERM MANAGEMENT

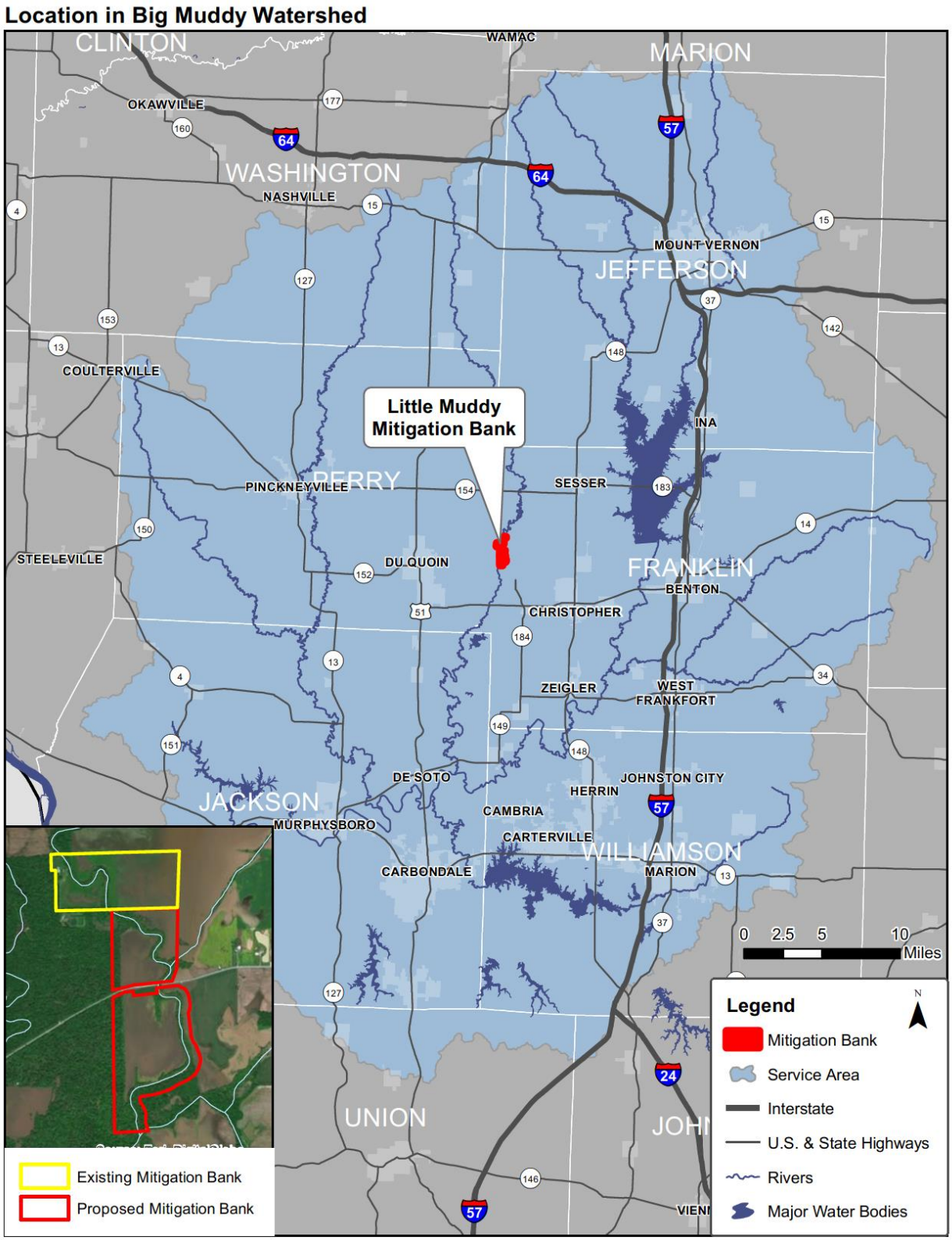
The Bank type is considered Private commercial (Entrepreneurial). The Bank ownership requests that the bank be State of Illinois certified. The long-term management of the Bank will be managed by Wetlands Forever, Inc. and Heartlands Conservancy, and is intended to be self-sustaining due to its location and design. The enhancements made to the property will ensure hydrologic connectivity.

TABLE 1

Proposed Condition:

Description	Total Acres	North Phase	South Phase	Wetland Parcel
Emergent	10.0	2.0	8.0	10.0
Forested	55.5	20.0	35.5	55.5
Stream Riparian	73.0	22.0	51.0	73.0
Preservation	20.0	7.0	13.0	20.0
Total	158.50	51.0	107.5	158.50

Figure 1


Location in Big Muddy Watershed
Little Muddy Mitigation Bank
CLINTON
WAMAC
MARION
OKAWVILLE
WASHINGTON
NASHVILLE
MOUNT VERNON
JEFFERSON
COULTERVILLE
INA
PERRY
PINCKNEYVILLE
SESSER
STEELEVILLE
DU QUOIN
FRANKLIN
BENTON
CHRISTOPHER
ZEIGLER
WEST FRANKFORT
DE SOTO
JOHNSTON CITY
HERRIN
JACKSON
CAMBRIA
MURPHYSBORO
CARTERVILLE
WILLIAMSON
CARBONDALE
MARION
UNION
0 2.5 5 10
Miles
Legend
Mitigation Bank
Service Area
Interstate
U.S. & State Highways
Rivers
Major Water Bodies
Existing Mitigation Bank
Proposed Mitigation Bank

Watershed Approach to Mitigation Bank

The Little Muddy River is a major tributary to the Big Muddy River in Southern Illinois, Reference Figure 2 "Watershed". Through the utilization of multiple documents from the State of Illinois, the USGS and the EPA, the following review has led to the identification of wetland type and location for wetland restoration efforts associated with the Big Muddy River watershed for future wetlands mitigation impacts.

A. Little Muddy River Historic Review and Losses:

The mitigation bank site is situated in the Big Muddy Watershed, which includes the floodplain and terraces of the river. Pre-settlement natural features included mesic to wet prairie, bottom land and upland forests, marshes, sloughs, islands, sand and mud bars, oxbow ponds and rivers. Bedrock is generally covered by alluvial deposits. The area has distinct aquatic flora and fauna and many species are restricted to it.

The soils on flood plains formed in alluvium, or water laid material that is Wisconsinan in age or younger. The alluvium ranges from silt loam to silty clay. Belknap and Bonnie soils formed in silty alluvium. In the southern part of Perry County, lacustrine sediments were deposited on terraces along the Little Muddy River during the latter part of the Wisconsinan Glaciation. The Big Muddy River was blocked and the resulting slack-water lake backed up water into parts of the floodplains along the Little Muddy River. The lacustrine sediments are generally clayey and are blanketed with as much as 2-feet of loess. Hurst and Colp soils formed in loess and the underlying lacustrine sediments. Illinois General Soil Map divided Illinois into soil associations' groups. They are Deep Loess, Loess over Illinoisan drift, Loess over Wisconsinan Drift, Wisconsinan Drift, Wisconsinan Outwash, Wisconsinan Lacustrine, Residuum, and Alluvium.

The majority of the challenges associated to the watershed focus on destruction through drainage/filling, fragmentation and disturbance/hydrology. Although greater than 90% of Illinois wetlands have already been lost, continued loss is an issue in many areas. This pressure largely stems from agricultural production and continued urban/suburban expansion. Continued pressure from agricultural producers often focusses on removing any standing water from the landscape that could hinder crop production, such as delaying working ground in the spring due to wet conditions, or allowing water to pool while crops are standing. Unfortunately, these actions taken by producers are still viewed as "land improvements" and are not only allowed, but often encouraged to bolster land values and crop production potential. Fiscal and societal barriers to restoration/rehabilitation include monetary land values are high in many areas and land use pressure (i.e., use for other purposes, particularly agriculture and development) prevents further restoration/rehabilitation, or costs are prohibitive to large scale wetland projects. This varies regionally, often by land value and dominant land use. The areas with the greatest barriers to restoration or rehabilitation are also the areas with the greatest need for wetlands, in terms of habitat for wildlife, and to provide societal benefits (e.g., flood storage, ground water recharge, nutrient sequestration).

Wetland degradation, or loss of wetland quality, continues to be a problem in many areas. Wetlands remain intact, but either some function is lost/limited, or habitat changes which limit suitability, prevents use by some species, or makes them less attractive. Such issues include unnatural hydrology (growing season flooding, prolonged flooding, lack of drying), water quality

(clarity, oxygen saturation, temperature, etc.), invasive species (fisheries and herbaceous), and sedimentation (clarity, depth, substrate firmness). Pollution stressors include, sediment carried from uplands and stream bank and bed instability in runoff continues to increase siltation, reductions in depth, clarity, substrate firmness and ability of submersed and emergent vegetation to establish roots in many wetlands. Thermal pollution causes include, warm water inflows from many sources that degrade or change wetland systems. Chemical pollution such as direct point source pollution as well as non-point source chemicals entering wetlands degrade systems and negatively impact wetland dependent species.

B. Major Goals of the Watershed

The long term needs of the watershed are identified generally by the Illinois Department of Natural Resources and its Critical Trends Assessment Program (CTAP). The Little Muddy River and its tributaries are part of the state overall goals that recommend and increased Habitat Quality Assessment via the reduction of fragmentation and increased wooded riparian corridors.

State watershed needs identified wetland quality has likely declined statewide over the course of several decades (Stafford et al. 2010). These declines are not consistent throughout the state and among natural divisions; they are exacerbated by many factors along large rivers (Mills et al. 1966, Bellrose et al. 1979, 1983), but may impact all wetland systems. Thus these restoration features support a more productive wetland community:

- Manage wetlands to promote native plant communities by removing, reducing or controlling invasive species, especially: Phragmites, purple loosestrife, reed canary-grass, Eurasian water milfoil, water hyacinth, narrow-leaf cattail, and others;

- Timber stand improvement of bottomland forest through reduced shade tolerant soft woods (i.e., cottonwood, green ash, silver maple, willow)

- Increase mast producing hardwoods (i.e., oak, hickory, pecan) within floodplain sites that will support these tree species

- Manage for diversity of stand density, age, and structure utilizing strategies that promote natural regeneration where appropriate (Knutson et al. 1996)

- Reduction of undesirable plant species (river bulrush, cattail, perennial smartweed, etc.) in managed wetlands, manage for desirable seed producing annual plants

- Use disturbance (e.g., water level manipulation, prescribed fire, mechanical manipulation, herbicide) to control encroaching undesirable woody vegetation in open wetland types, and undesirable herbaceous plants where appropriate

- Increase historically abundant habitats, and duplicate historic habitat complexity and juxtaposition within wetlands (Stafford et al. 2010)

- Reduce sediment inputs into streams, rivers, and wetlands from row crop field through minimum tillage, vegetated waterways, buffers, and wetland restoration

- Maintain and increase water control in lakes and wetlands within river floodplains through managed or partial connections which will isolate habitats from growing-season floods yet allow movement of aquatic species when appropriate;

The proposed mitigation addresses numerous goals and objectives that were identified in the CTAP, specifically increasing hardmast producing wetland forests, restoration of forested riparian corridors, reduced forest fragmentation, increased buffers and the removal of silt and sedimentation from runoff.

C. Mitigation Site Evaluation

The proposed wetland mitigation bank consists of 158.5 acres that lies within Franklin and Perry Counties, Illinois, Reference Appendix 1. The site is situated adjacent to the Little Muddy River which is a tributary to the Big Muddy River.

Wetlands Forever, Inc. will have ownership of the property in Summer 2018. The farm has multiple types of habitat management within its boundaries. There are two major types of management that occur on the site, which include the following:

- Agricultural row cropping (~99.0 acres).
- Remnant oxbows and channels that are forested (59.5 acres)

This site is well suited to support forested wetland function types. This property supports major criteria for wetland functions, they are as follows:

- Property consists of hydric soils;
- Hydrology is present from Little Muddy River;
- Adjacent property (reference site) supports obligate and facultative wet vegetation.
- Along the forested tree lines natural regeneration can be seen associated with bottomland hardwoods.

These attributes meet the goals of multiple State of Illinois watershed documents and will improve overall forested wetland habitat, riparian corridor functions and water quality attributes within the region.

D. Mitigation Site Threats

The short and long term threats of the mitigation site are few due to the site location and planned construction techniques. The major short term threats (1 to 10 Years) to the property consist of invasive species and poor tree survivability due to potential climate change (specifically drought). The utilization of cover crops and annual maintenance, over the next 5-10 years, will effectively reduce the possibility of invasive vegetative species establishing on the site. The potential threat of climate change, reducing survivability of the forest establishment, is slight due to the quality of the trees being planted and the construction technique being utilized in those plantings.

The mitigation area has a natural drainage area from the Little Muddy River.

The tree planting may incorporate the construction of mounds that trees will be planted upon. Planting on mounds will increase survivability of container trees by promoting root development due to air space associated with the mounds. Secondly, it may reduce mechanical damage caused by major precipitation events and freezing in the Fall/Winter of the year. Using container trees (app. 4 feet in height) planted on mounds will reduce the frequency and duration of seedling being overtopping during the growing season.

Long term threats to the site would be altered forest management and acts of God relating to natural climatic occurances (flood, drought, fire, tornados). Through the use Heartland Conservancy as the Conservation Easement holder, altered forest management that is a detriment to the mitigation area will be identified within one calendar year. Thus, this management would be addressed immediately and should reduce any long term affects to the forested mitigation area. Through the use of high quality plant stock and construction techniques, the natural effects of flooding and drought are reduced. The natural effects of fire and tornados are more difficult to address, however, due to natural regeneration and the utilization of preservation at the site, a natural seed source will be present.

E. Cultural Resources Site Evaluation

The proposed wetland mitigation area consists of a 159 (+/-) acres within Franklin and Perry Counties, Illinois, Reference Appendix 1 Survey of Plat. The topography of the site is flat with less than 2 feet in elevational change across the mitigation area (< Elevation 395.). The soils across the mitigation site are 100 percent hydric and consist of Bonnie and Belknap frequently flooded soils classifications. The site has been in agricultural production for greater than 35 years. A visual survey of the site and previous work at an adjacent mitigation site (mitigation bank) was absent of any cultural or historical properties. The mitigation bank sponsors recommend no further survey of the mitigation site and that the scope of the current project has no potential to impact historic properties.

Service Area for the Mitigation Bank Site

SERVICE AREA DETERMINATION

The ecoregions hydrologic and biotic criteria of the mitigation bank site were determined by using the Illinois State Water Survey for Hydrologic Unit Boundaries (Map Series 2000-01, 4M¬5-00) and Soil Conservation Service Hydrologic Unit Map, Marion, Jefferson, Washington, Perry, Franklin, Jackson, Williamson, and Union counties within Illinois and the MBRT review process. The corresponding primary service area is Hydrologic River Basin Number "07140106". The bank is available to mitigation outside the primary service as deemed acceptable by the U.S. Army Corps of Engineers in consultation with the MBRT.

The mitigation bank site is situated in the Big Muddy Watershed, which includes the floodplain and terraces of the river. The soils on flood plains formed in alluvium, or water laid material that is Wisconsinan in age or younger. The alluvium ranges from silt loam to silty clay. Belknap and Bonnie soils formed in silty alluvium. In the southern part of Perry County, lacustrine sediments were deposited on terraces along the Little Muddy River during the latter part of the Wisconsinan Glaciation. The Big Muddy River was blocked and the resulting slack-water lake backed up water into parts of the floodplains along the Little Muddy River. The lacustrine sediments are generally clayey and are blanketed with as much as 2-feet of loess. Hurst and Colp soils formed in loess and the underlying lacustrine sediments. Illinois General Soil Map divided Illinois into soil associations' groups. They are Deep Loess, Loess over Illinoisan drift, Loess over Wisconsinan Drift, Wisconsinan Drift, Wisconsinan Outwash, Wisconsinan Lacustrine, Residuum, and Alluvium.

This Mitigation Bank will service impacts to wetlands and replace essential emergent and forested wetland functions and riparian habitat which are lost through authorized activities in the Big Muddy River watershed and creeks directly connected where the biota and soils are influenced by the Big Muddy River System.

Figure 2 – Watershed Map

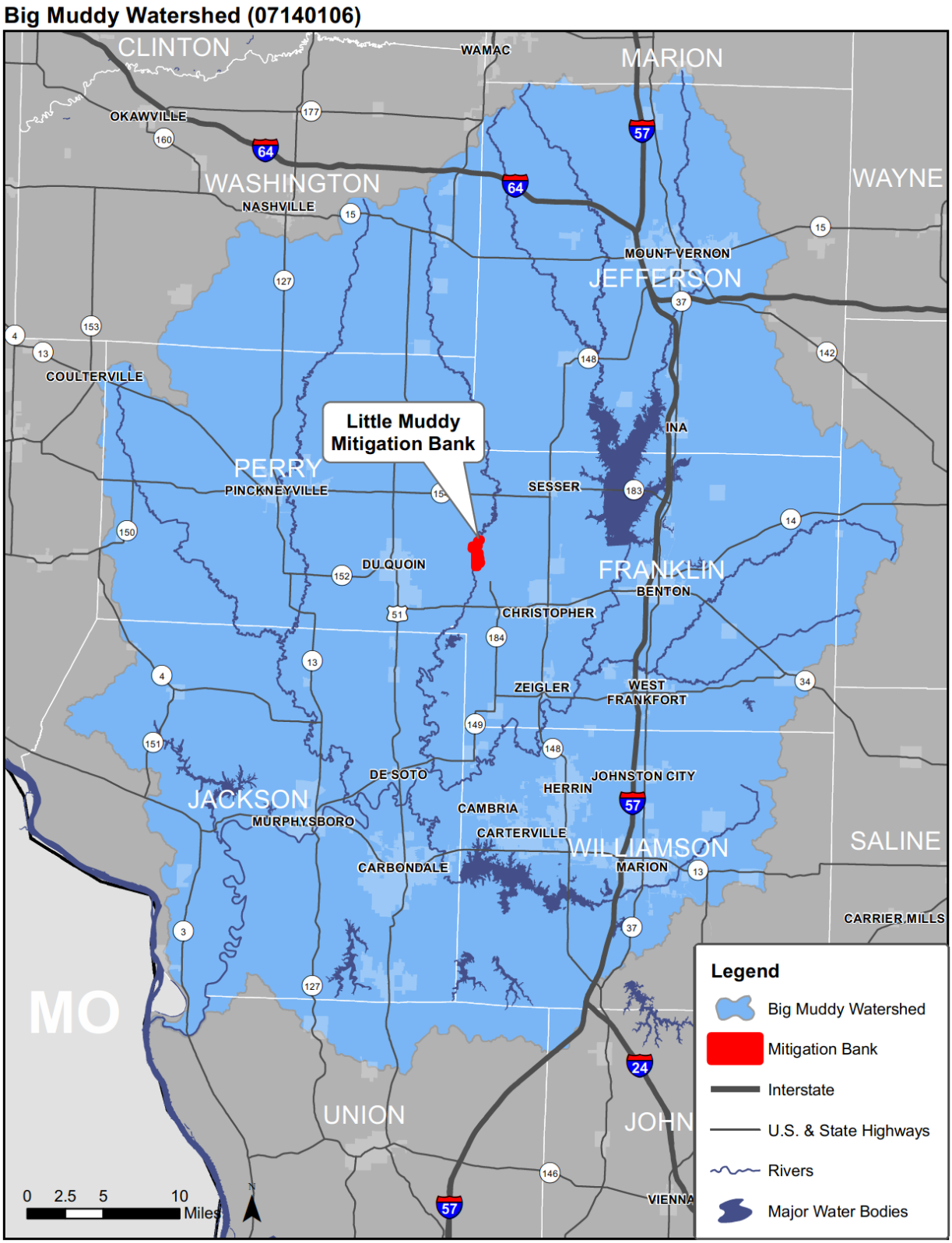
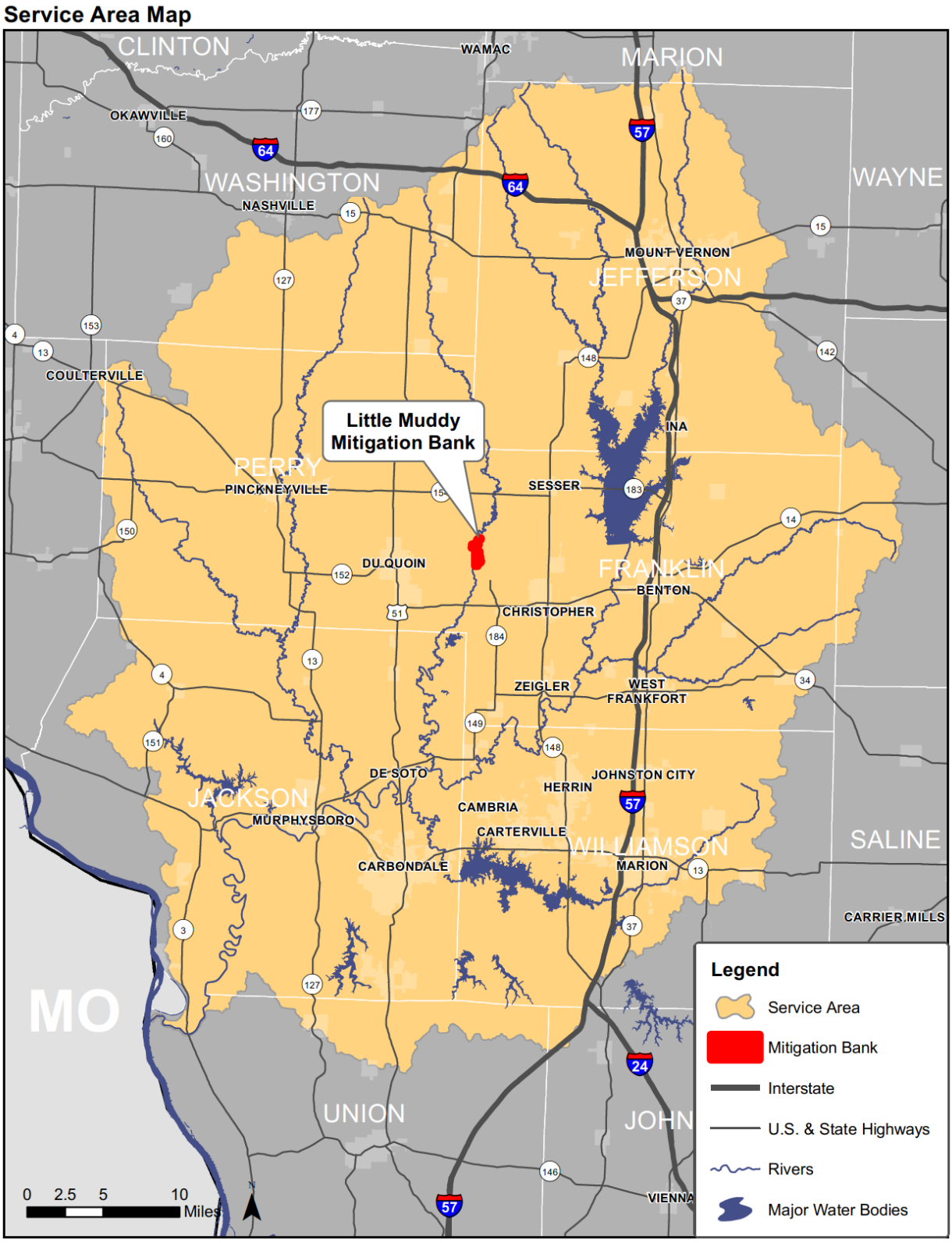


Figure 3 – Service Area



BIG MUDDY RIVER AND ASSOCIATED HYDROLOGIC UNIT MAPS FOR ILLINOIS

The Hydrologic River Basin Number “07140106”.

- Marion
- Jefferson
- Perry
- Washington
- Jackson
- Saline
- Williamson
- Franklin
- Union

Mitigation Plan Requirements for the Bank Site

SECTION A – Goals and Objectives

GOAL – Wetland Mitigation Bank

Restore and Enhance wetland habitat quality and quantity for wetland dependent wildlife and hydrophytic native plant species.

OBJECTIVE

- Increase food, shelter and breeding habitat for wildlife.
- Increase Bottomland Hardwood diversity, quality and hard mast tree dominance.
- Reduce forest fragmentation for "area sensitive" neo-tropical species.
- Maintain and enhance hydrologic functions and values.
- Recreate a natural levee that once existed between Little Muddy River and the floodplain, which sustained a hydrological regime and maintained a complex of habitat types.

GOAL – Wetland Mitigation Bank

Create areas of emergent and forested wetlands.

OBJECTIVE

- Nutrient removal/transformation.
- Reduce nutrient loading and increase nitrate fixation.
- Provide substrate for aquatic invertebrates and foraging habitat for birds and mammals.

GOAL – Wetland and Stream Mitigation Bank

Compensatory Mitigation Site for Wetland and Stream Areas in the Little Muddy River Watershed.

OBJECTIVE

- An appropriate form of compensation where no feasible on-site mitigation opportunity exists.
- Where it can be clearly demonstrated that off-site mitigation would be more environmentally beneficial.

- Projects with minor impacts, and linear projects, which when considered cumulatively, would result in more than minimal impact.

GOAL – Wetland and Stream Mitigation Bank

Develop a Wetland and Stream Mitigation Site to Create and Improve Habitat Conditions Favorable for Area Sensitive, Rare, Threatened and Endangered Species Endemic to the Service Area.

OBJECTIVE

- Restore, enhance and preserve a wooded riparian corridor on each side of the Little Muddy River and its tributaries that are connected to the flood pulse of the Big Muddy River System.
- Restore woody and herbaceous vegetation to create a continuum of plant species.

GOAL – Stream Mitigation Bank

Protection and restoration of streambank riparian corridor habitat and improved stream aquatics, which contributes to the enhancement and habitat diversity of the Big Muddy River watershed.

OBJECTIVE

- Enhanced opportunities for wildlife and human use by elimination of existing annual row-cropped farm field and restoration of a diverse wooded wetland.

- Restore and enhance the riparian stream corridor buffer.
- Reduces erosion and sedimentation, thereby improving water quality.

SECTION B - Site Selection

The Little Muddy River Wetland and Stream Mitigation Bank – Addendum 1 has been sited on a 158.5 acre parcel situated on the Little Muddy River in the Big Muddy River watershed, Franklin and Perry Counties, Illinois. The site lies east of Du Quoin, Illinois. Reference Figure 2.

The Bank is situated and developed to address the loss of forested, emergent and stream riparian wetland habitat. The site is compatible with adjacent land use, contributes to important local stream, terrestrial and wooded forest functions, will be ecologically self-sustaining, and protected in perpetuity by an approved U.S. Army Corps of Engineers Conservation Easement.

The entire property consists of hydric soils and lies within the floodplain of Little Muddy River. Historically, this property was and is hydrologically connected over a wide range of storm events to Little Muddy River within the Big Muddy River watershed. The site will be developed with multiple types of habitat features: hardwood bottomland forested wetlands, emergent wetlands, stream riparian corridor and aquatic improvements, and preservation acres. The vegetation types will follow very gentle grades that both exist and are to be created. The hardmast producing hardwood bottomland forest will focus on reducing fragmentation and linking multiple habitats together. The stream bank will restore wooded buffer and enhance river channel integrity. Emergent wetland will be created and will consist of a higher hydrologic regime over the year and may support migratory and endemic wetland species during the fall and spring migrations during timely hydrologic events in the Little Muddy River watershed.

The hydrology of the site is intended to mirror the existing hydraulic regime. The depth, duration, and extent of flooding in the restored wetland will primarily be driven by flood pulses from the Little Muddy River and additional streams entering the site (Sand Creek and Un-named tributary) from the confluence of the Little Muddy River. Flood entry followed by seasonal drying through the summer and fall will sustain productivity by recycling vegetation and nutrients. The current plan will result in the re-creation of a diverse forested, emergent wetland adjacent to a stream riparian corridor to enhance ecological functions and values for the Little Muddy River watershed.

The site will be developed to restore, enhance, and preserve habitat that will support sustainability within existing site and link adjacent habitat types for an increase in habitat function and connectivity.

Existing Conditions:

Description	Total Acres	Prior Converted	Forested	Stream	Hydric
Survey Mar 2018	158.5	99.5	48.0	11.00	158.5

Proposed Condition:

Description	Total Acres	South Phase	North Phase	Wetland Parcel
Emergent	2.0	8.0	2.0	10.0
Forested Wetland	55.5	35.5	20.0	55.5
Stream Riparian	73.0	51.0	22.0	73.0
Preservation	20.0	13.0	7.0	20.0
Total	158.5	107.5	51.0	158.5

The siting of this mitigation bank will support aquatic habitat diversity, habitat connectivity, the existence of threatened or endangered species related to prior habitat loss, and other landscape scale functions.

SITE SOIL TYPES

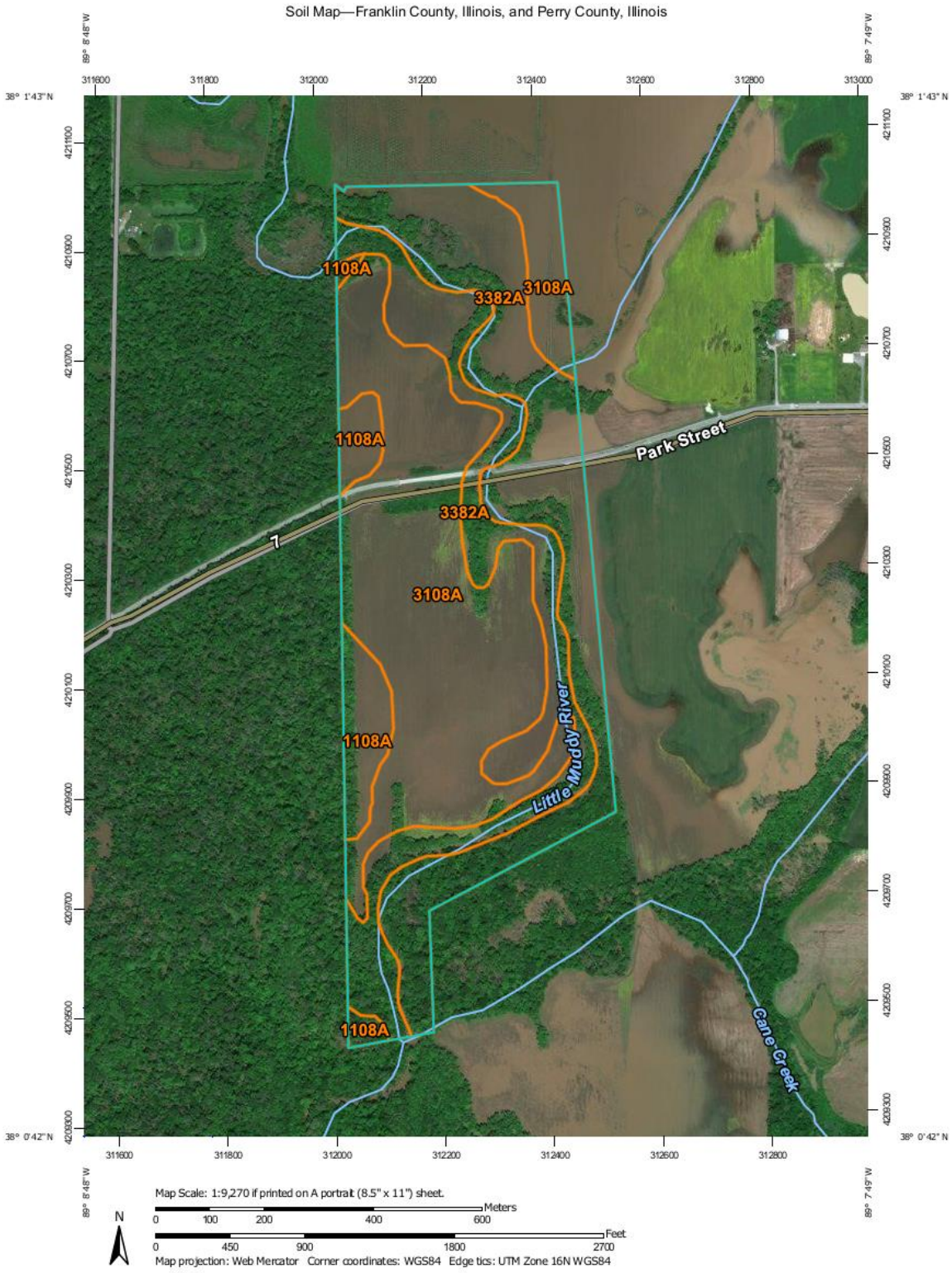
The property consists of mainly hydric soils within the floodplain of the Little Muddy River. The site is dominated by two major soils types- Bonnie silt loam (1108A/3108A) and Belknap silt loam (3382A). The Belknap silt loam soils are closer to the riparian areas while the Bonnie silt loam covers the area further from the Little Muddy River.

FRANKLIN AND PERRY COUNTIES, ILLINOIS SOIL SURVEY

- SOIL SURVEY FRANKLIN AND PERRY COUNTIES, ILLINOIS – MITIGATION AREA WEB SOIL SURVEY

- DETAILED SOIL MAP UNITS
    1. BONNIE SILT LOAM- 1108A/3108A
    2. BELKNAP SILT LOAM-3382A

Web Soil Survey – January 2018



Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
3108A	Bonnie silt loam, 0 to 2 percent slopes, frequently flooded	6.6	4.4%
3382A	Belknap silt loam, 0 to 2 percent slopes, frequently flooded	44.3	29.1%
Subtotals for Soil Survey Area		**51.0**	**33.4%**
Totals for Area of Interest		**152.4**	**100.0%**

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
1108A	Bonnie silt loam, undrained, 0 to 2 percent slopes, frequently flooded	10.2	6.7%
3108A	Bonnie silt loam, 0 to 2 percent slopes, frequently flooded	61.2	40.2%
3382A	Belknap silt loam, 0 to 2 percent slopes, frequently flooded	30.0	19.7%
Subtotals for Soil Survey Area		**101.5**	**66.6%**
Totals for Area of Interest		**152.4**	**100.0%**

Figure 4 – Mitigation Bank Soil Map

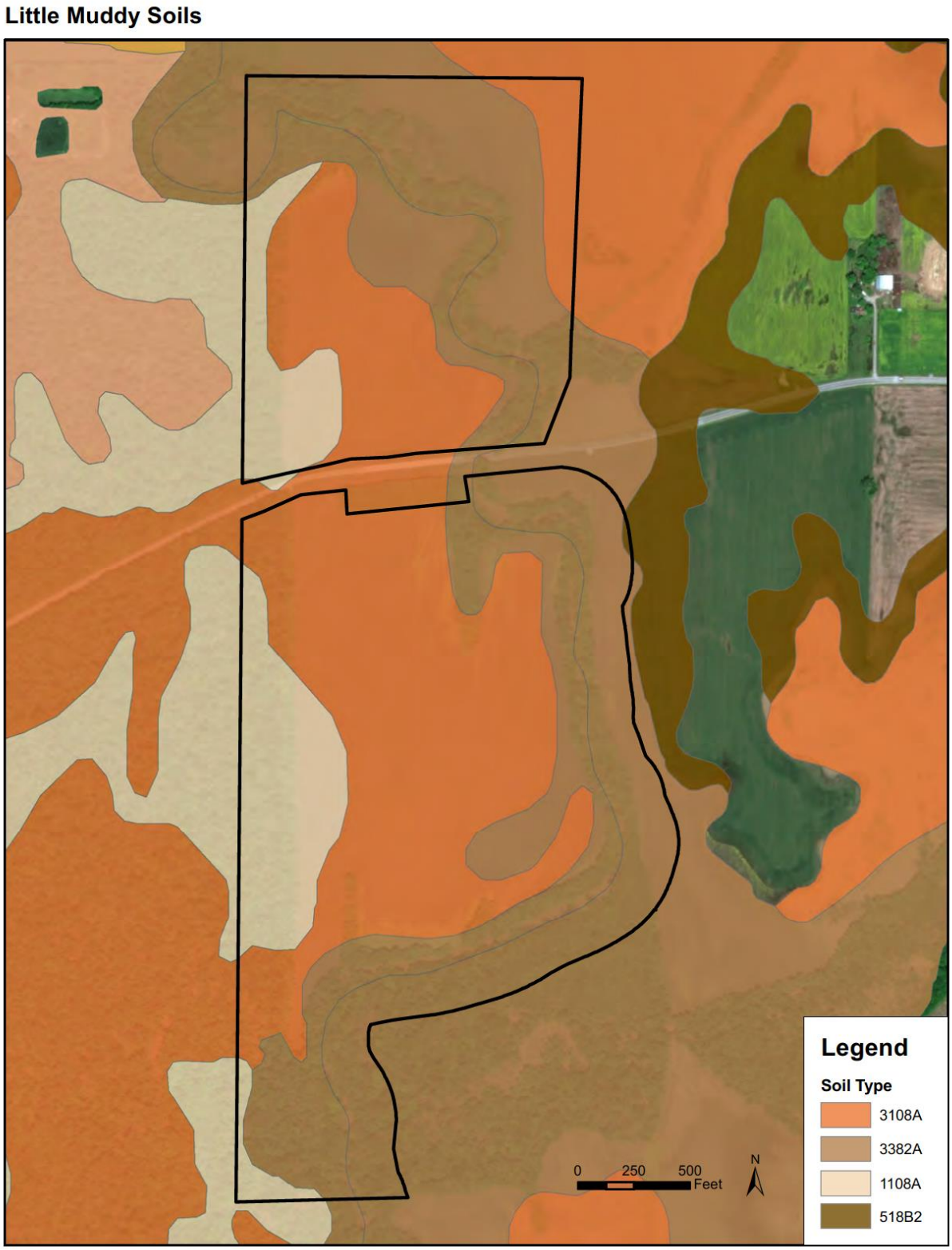
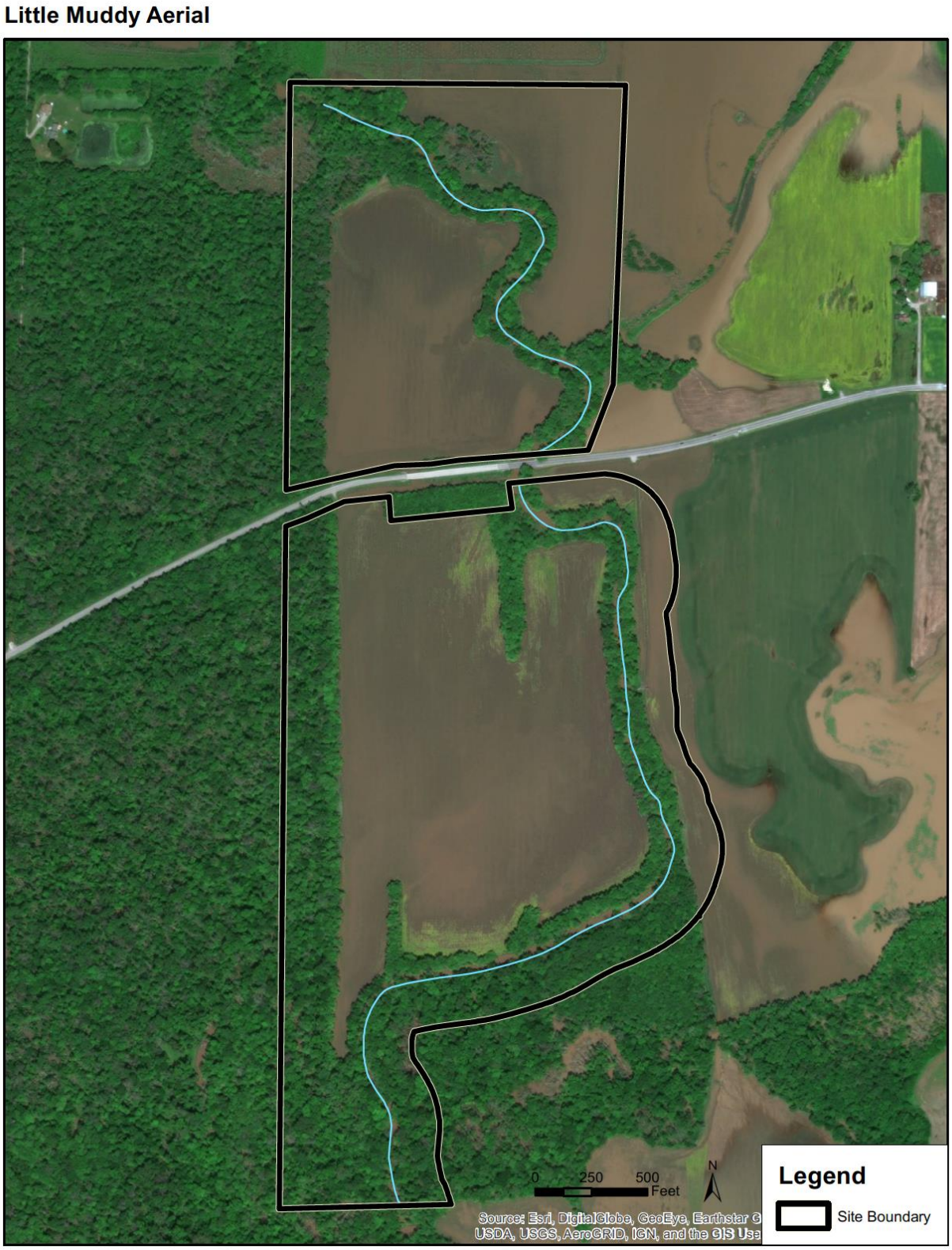


Figure 5 - Aerial



SECTION C - Site Protection Instrument

Whereas, Wetlands Forever, Inc. own 158.5 acres parcel of land which is situated in Franklin and Perry Counties, Illinois.

This tract of land is located in and being a part of fractional Section 7, Township 6 South, Range 1 West of the Third Principal Meridian, Franklin and Perry Counties, Illinois.

The bank site totals 158.50 acres, it is made up of Prior Converted Cropland and Degraded Wooded Wetland. The wetland and stream bank will have a cumulative acreage of 158.50 acres of restricted property in perpetuity.

Wetlands Forever, Inc. proposes to execute a conservation easement that has been modeled on the Corps of Engineers, Office of Counsel Approved Conservation Easement document (Appendix 3).

A signed and notarized copy of the conservation easement and associated exhibits will be sent to the St. Louis District, Corps of Engineers Regulatory Branch for review and recording prior to commencement of any permitted work or within 60 days of the issuance of this permit whichever occurs first. The recordation record will be sent to the Corps of Engineers, St. Louis District, Regulatory Branch and to the conservation easement grantee (Third Party) – HeartLands Conservancy, Mascoutah, Illinois, along with a copy of the executed easement mailed to the Corps' St. Louis District Regulatory Office.

Per the COE Approved Conservation Easement, Item 3 for Permitted Activities - Reference Long Term Management Plan for specific land use management activities that are permitted.

Signage will be posted around the perimeter of the Conservation Easement with adequate frequency, visibility, and proper height for viewing. Signage will be constructed of suitable materials to withstand climatic conditions. Signs will include the following language:

WETLAND MITIGATION AREA

DO NOT DISTURB

PERMIT NO. CEMVS-2018-xxxx

SECTION D - Baseline Information

OVERVIEW

The site will be classified into three main existing categories: agricultural row cropping; wooded wetlands consisting of remnant channels/oxbows, and stream confluences along the main stem of the Little Muddy River.

Project Description: The Wetland Mitigation Bank will lie within a 158.5 (+/-)-acre site, it is made up of Prior Converted Wetland and Degraded Wooded Wetland. The wetland mitigation site will have a cumulative acreage of 158.5-acres (+/-) of restricted property in perpetuity. The proposed mitigation bank will consist of 99.0 acres of prior converted acres; 59.50 acres of palustrine forested riparian corridor acres and forested wetlands, Reference Mitigation Bank Aerial, Figure 5.

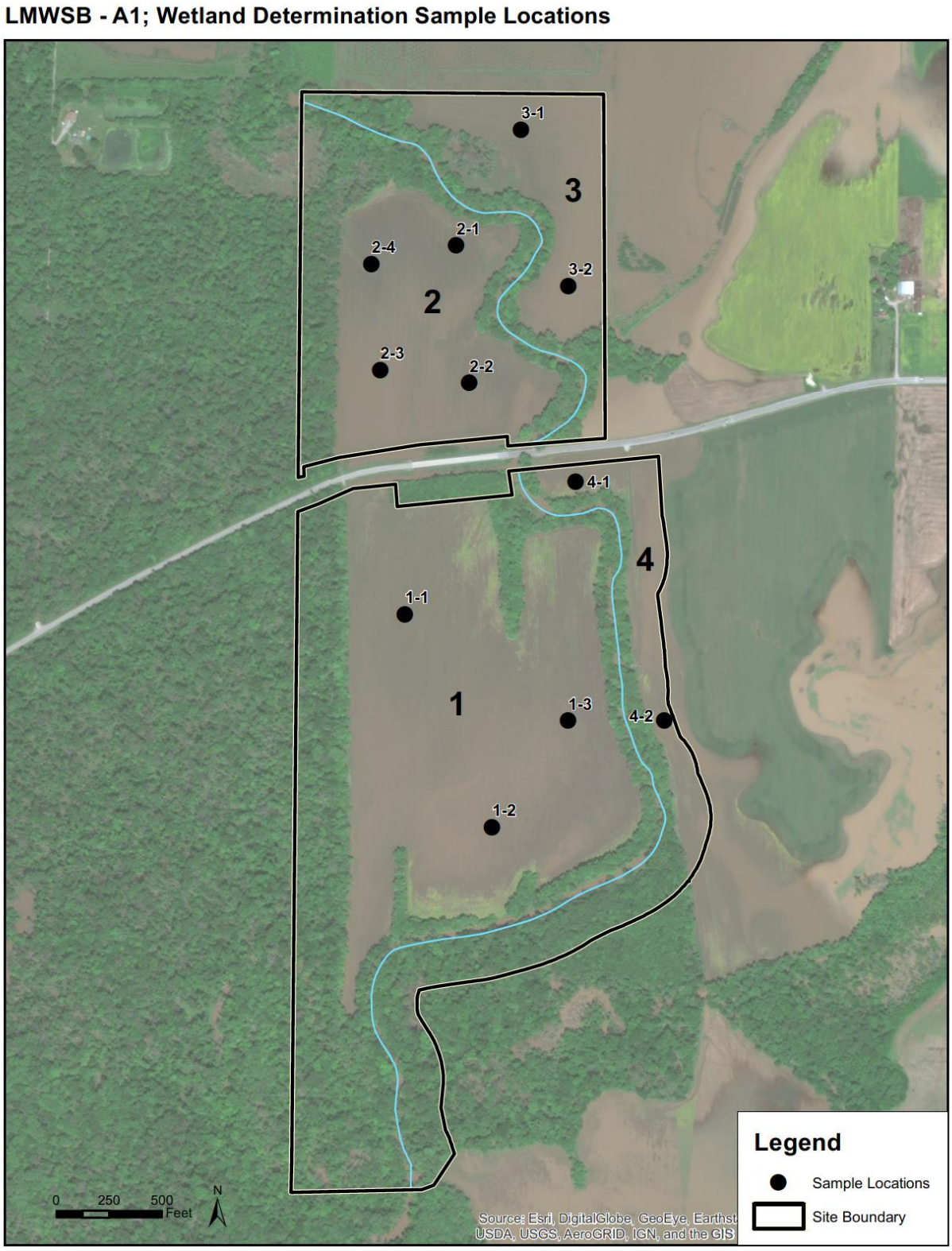
This prior converted site will be re-established to a Bottomland Hardwood Forest wetland habitat. Reference Appendix 9 for Wetlands Determination Forms for the 99.0 acres of Prior Converted farm land. The sponsor attempted to have the USDA-NRCS determinations completed, however, lead time for the project did not allow for the scheduled delay. The wetland determinations will identify four areas that will be mapped consisting of 4 fields (1-4) for the following tracts, Reference Map Figure 6 below:

- Tract # 1 – South of Park Street (Perry County);
- Tract # 2 – North of Park Street (Perry County);
- Tract #3 – North of Park Street (Franklin County);
- Tract # 4 – South of Park Street (Franklin County).

Agricultural row cropping is taking place on approximately 99.0 acres of farm ground on within the property, it encompasses five areas that lie in both Perry and Franklin counties of Illinois. The entire 99.0 acres of prior converted farm ground contains hydric soils.

The wooded wetlands consisting of remnant channels and oxbows consist of approximately 59.50 acres. These areas consist of three types of areas, the first is riparian boundary forest usually 10 to 20 feet wide adjacent to the Little Muddy River and consists of 26.0 acres. The second is the Little Muddy River which consists of 12.0 acres. Finally, there are forested wetland preservation acres along the western boundary of the mitigation site consisting of 20.0 acres. The site evaluation will be conducted with two evaluation techniques, a RIAM system used for large scale dynamics attributes and Floristic Quality Assessment method used by the Conservation Research Institute for local site characteristics and anticipated ecological lift.

Figure 6


LMWSB - A1; Wetland Determination Sample Locations
3-1
3
2-1
2-4
3-2
2
2-3
2-2
4-1
4
1-1
1
1-3
4-2
1-2
0
250
500
Feet
N
Source: Esri, DigitalGlobe, GeoEye, Earthst
USDA, USGS, AeroGRID, IGN, and the GIS
Legend
Sample Locations
Site Boundary

BASELINE CONDITIONS EVALUATION PROCEDURE

The **baseline conditions were evaluated using the Rapid Impact Assessment Method (RIAM) (Stein and** Ambrose 1998). This functional assessment technique was selected because impacts to aquatic resources are assessed in a manner that is scientifically defensible, yet easy to implement by regulators, planners, and resource managers.

The six important ecological characteristics evaluated were **endangered species habitat, structural diversity of habitat, spatial diversity of habitat, open space habitat, linear contiguity of habitat and adjacent habitats**. The underlying goal of this ecological functional assessment technique is to evaluate the capacity of a habitat to perform a particular ecological function, such as provision of foraging or breeding habitat for birds or retention of suspended particulate matter. The goal of the impact assessment is to evaluate how a given activity has altered an ecosystem's capability to perform those functions. Impact assessment is integral to the U.S. Army Corps of Engineers regulatory program under Section 404 of the Clean Water Act of the United States. If the Rock Island District COE used this Rapid Impact Assessment Method to assess the impacts of projects permitted under Section 404 it would be easy to determine if mitigation to the Little Muddy River Stream and Wetland Mitigation Bank was a desirable alternative for the permittee.

Six criterion were used in evaluating existing habitat of a wetland to perform major functions to a given activity at the project site (Stein and Ambrose 1998) and given a pre- and post-project rating of A, B, C., D, or E for each evaluation criterion, with A representing site conditions similar to a reference standard and E representing the most degraded condition. The reference standards were based on conditions typically found at local unimpacted sites. Pre-project ratings were based on aerial photographs, site visits, site descriptions and biological assessments. Post project rating was based on the assumption of the result obtained, when a given activity occurred, by best professional judgment of simple indices and current site conditions. For each criterion, the pre-project ratings were compared to the post-project rating to obtain an *impact score,* which reflected the impacts of the project on that criterion. This score was obtained by counting the change in the number of indicator levels after the project was completed. Impact scores could range from negative 4 for most severe degradation to positive 4 for the most extreme enhancement. Impact scores of zero reflected site conditions that were the same following implementation of the permitted activity as they were prior to the project being done. Although a rating of A represents a higher functional level than a rating of B, the significance of this difference may be difficult to establish. To address this question of resolution, the -3 and -4 columns were combined into a *Substantial Adverse Impact* column, the -2 and -1 columns into an *Adverse Impact* column and 0 into a *Minimal Impact* column. The +1 and +2 columns are grouped into *Enhancement* column, and +3 and +4 columns into *Substantial Enhancement* column.

This example is the impact evaluation, for a 404 permit of a project, for construction of a four-lane road across a creek and installation of two 3-m by 4.3-m concrete box culverts within the creek impacting 0.6 ha of waters of the United States. Prior to construction of the road crossing, the creek consisted of well-developed riparian habitat, surrounding freshwater marsh, supported by run off from an upland source. Once installed, the culverts provided only 0.3 to 0.6 vertical clearances between the streambed and the bottom of the bridge, eliminating most riparian vegetation from the site. The habitat that was eliminated was suitable for the federally endangered King Rail *(Rallus elegans)* and Decurrent False Aster *(Boltonia decurrens).*

EXAMPLE

Criterion	Pre Project Rank	Post Project Rank	Impact Score
Endangered species habitat	C	E	-2
Structural diversity of habitats	A	D	-3
Spatial diversity of habitats	A	E	-4
Open space habitat	A	E	-4
Adjacent habitats	B	B	0
Linear contiguity of Habitats	A	E	-4

LITTLE MUDDY RIVER WETLAND AND STREAM MITIGATION BANK (SRWSMB)

The following evaluation is the Little Muddy River Wetland and Stream Mitigation Bank Addendum 1(LMWSMB-A1) site using the Rapid Impact Assessment Method (RIAM). Current conditions (Pre Project Rank) were based on aerial photographs, site visits and biological assessment and the Post Project Rating was based on the assumption of the results obtained when a given activity occurred, by best professional judgment. The rating under the heading Bank is how the entire area would rate as an impacted site.

LITTLE MUDDY RIVER WETLAND AND STREAM MITIGATION

BANK EVALUATION – ADDENDUM 1

FORESTED AND EMERGENT WETLANDS

	Pre Project Rank	**Post Project Rank**	**Impact Score**	
Criterion				
Endangered species habitat	E	D	+1	ENHANCEMENT
Structural diversity of habitats	D	A	+3	SUBSTANTIAL ENHANCEMENT
Spatial diversity of habitats	D	A	+3	SUBSTANTIAL ENHANCEMENT
Open space habitat	D	A	+3	SUBSTANTIAL ENHANCEMENT
Adjacent habitats	D	B	+2	ENHANCEMENT
Linear contiguity of habitat	D	B	+2	ENHANCEMENT

LITTLE MUDDY RIVER WETLAND AND STREAM MITIGATION

BANK EVALUATION – ADDENDUM 1

STREAM MITIGATION

	Pre Project Rank	**Post Project Rank**	**Impact Score**	
Criterion				
Endangered species habitat	D	C	+1	ENHANCEMENT
Structural diversity of habitats	C	A	+2	ENHANCEMENT
Spatial diversity of habitats	C	A	+2	ENHANCEMENT
Open space habitat	D	A	+3	SUBSTANTIAL ENHANCEMENT
Adjacent habitats	D	B	+2	ENHANCEMENT
Linear contiguity of habitat	C	B	+1	ENHANCEMENT

LITTLE MUDDY RIVER WETLAND AND STREAM MITIGATION

BANK EVALUATION – ADDENDUM 1

ENHANCED/PRESERVATION FORESTED

	Pre Project Rank	**Post Project Rank**	**Impact Score**	
Criterion				
Endangered species habitat	D	D	+0	MINIMAL IMPACT
Structural diversity of habitats	B	A	+1	ENHANCEMENT
Spatial diversity of habitats	B	A	+1	ENHANCEMENT
Open space habitat	C	A	+2	ENHANCEMENT
Adjacent habitats	B	A	+1	ENHANCEMENT
Linear contiguity of habitat	D	A	+3	SUBSTANTIAL ENHANCEMENT

INDICATOR LEVELS FOR EACH EVALUATION CRITERION

Criterion: Endangered Species Habitat

A: At least one endangered species observed or known to use the area for breeding.

B: Multiple endangered species observed or known to use/forage in area.

C: Suitable habitat type for multiple endangered species OR one endangered species observed or known to use area.

D: Suitable habitat type for one endangered species, but no endangered species observed or currently known to use area.

E: No endangered species habitat.

Criterion: Structural Diversity of Habitats

A: Exemplary structural diversity in all vegetated areas. Riparian areas composed of three distinct strata: ground and shrub cover, understory, and canopy. Dense stands of mature willow, silver maple, green ash, oaks, and/or cottonwood, interspersed with understory and herbaceous shrubs. Little to no exotic plant species present.

B: Two distinct strata in all vegetated areas. Dominated by wetland-type understory interspersed with herbaceous shrubs. May include interspersed, isolated willows, cottonwoods, and etc. OR Grasses and shrubs with patches of structurally diverse riparian vegetation (i.e., three distinct strata). No more than 15% of the vegetated area dominated by exotic plant species.

C: Grasses and shrubs interspersed with isolated patches of wetland-type understory or interspersed with isolated willows and/or cottonwoods. OR Monoculture of willow and/or cottonwoods with no associated understory. No more that 35% of the vegetated areas dominated by exotic plant species.

D: Mainly one stratum of grasses and herbaceous shrubs interspersed with common

hydrophytic vegetation, such as cattails. Up to 60% coverage with exotic plant species.

E: No existing habitat value (e.g., concrete, developed, fully infested with exotic species or artificially landscaped).

Criterion: Spatial Diversity and Coverage of Habitats

A: Diverse riparian vegetation (e.g., at least 3 different genera of riparian vegetation present) covering between 75% and 100% of the site.

B: Diverse riparian vegetation covering between 30% and 75% of the site (e.g., strips or islands of riparian habitat interspersed in open space).

C: Diverse riparian vegetation covering up to 30% of the site AND/OR greater than 50% of the site covered with a monoculture of riparian vegetation.

D: Monoculture of riparian vegetation covering up to 50% of the site, interspersed among grasses, exotics, or bare ground.

E: No existing riparian vegetation (e.g., covered with upland grasses and scrub, bare ground, infested with exotics).

Criterion: Undeveloped Open Space Habitat

A: 80%-100% open space habitat of any quality

B: 60%-80% open space habitat of any quality

C: 40%-60% open space of any quality

D: 20%-40% open space of any quality

E: 0%-20% open space. Fully urbanized, concrete, developed residential or commercial cut.

Criterion: Adjacent Habitat (Floodplain Land-Use)

A: Completely surrounded by transitional upland habitat.

B: Adjacent to transitional upland habitat on one side and grassland, agriculture, or low

quality open space on other side.

C: Adjacent to transitional upland habitat on one side and urban setting on the other side.

D: Surrounded by degraded grassland, agriculture, or other low quality open space on at least one side.

E: Completely surrounded by urban setting.

Criterion: Linear Contiguity of Habitats

A: Completely contiguous with comparable habitat on both ends of the site.

B: Contiguous with comparable habitat on one end of the site and adjacent to a different type of open space habitat on the other end of the site.

C: Contiguous with comparable habitat on one end of the site, but adjacent to urban setting on the other end of the site.

D: Isolated within a different type of open space habitat.

E: Completely isolated within an urban setting or completely urbanized site.

PARAMETERS USED TO DEVELOP EVALUATION CRITERIA

Endangered Species Habitat. Species richness and abundance is a common measure of habitat health (Harris 1988). Fauna use of an area is often measured by surveying for presence or indications of presence (*e.g., tracks*, burrows). However, project files seldom contained comprehensive pre-project species surveys, and surveying for existing species richness was not practical due to time constraints and temporal variability in fauna site occupation. Review of Section 404 permits requires evaluation of the potential for a project to adversely affect a federally listed or proposed endangered or threatened species or their critical habitat. Therefore, information regarding the presence of endangered species or their habitat was readily available in project files. **Most federally listed species are endangered due to loss of specialized habitat that they require; therefore, assessing the presence of endangered species or their habitat can provided a useful indicator of the demise of regionally significant ecosystem (Eng. 1984). In addition, impacts to endangered species habitat may indicate that similar impacts are occurring to other habitat specialists that use comparable areas.**

Structural Diversity of Habitats. The stratification of vegetation into layers, including shrub cover, understory, and canopy, provides a variety of different habitats. This allows a diversity of organisms representing different trophic levels to coexist in a single site, thereby supporting a more complex and resilient food web (Warner and Hendrix, 1985). For example, diverse ground cover provides habitat for many insects that form the base of the food web, allowing higher trophic level organisms to use understory and canopy habitat that may be present (Erman 1984). Gosselink et al. (1990b) report that structural diversity within a site has been correlated with faunal diversity, especially for birds. Warner (1984) reports that the presence of a floristic structure consisting of three strata indicates that appropriate soil, moisture, and topographic conditions exist to support a "healthy" riparian system. Structural diversity of the vegetated portions of the project site was used as surrogate for general habitat suitability for an assortment of common species. Conversely, exotic species such as *Arundo donax* (Hickman) and *Tamarix* spp. have minimal habitat value and prohibit natural vegetation from establishing on a site (Meents et al. 1984). **Therefore, presence of exotics was assumed to provide limited habitat value for both the structural and spatial diversity criteria. Because riparian habitats are typically patchy (Faber and Holland 1988), the ratings for this criterion were based on only the vegetated portions of each site.**

Spatial Diversity and Coverage of Habitats. Riparian habitats are typically patchy, with an interspersion of different ecotones (Faber and Holland 1998). This interspersion allows the activities of animals in dry sites to be more closely coupled to those in wet sites. A mosaic of habitat types provides a richer, more continuous food source for mobile fauna than that of a homogeneous habitat. For example, Doyle (1990) found a strong correlation between the extent of herbaceous and deciduous shrub cover in riparian habitats and the abundance and diversity of small mammals. Habitat mosaics also allow animals to fulfill several life functions at a single site (*e.g.*, foraging, escape, reproduction) (Warner and Hendrix 1985, Gosselink et al. 1990b).

Alpha diversity (diversity within a site) has been correlated to the ability of a patch to support a complex food web and allow interior species, with specific habitat requirements, to thrive in the face of competition from generalist (Harris 1988, Klopatek 1988). **Assessment of changes to the spatial diversity of a project site provided information about impacts to a site's capability to support a variety of different faunal species.**

Undeveloped Open Space Habitat. The structure of a landscape mosaic influences the ability of organisms to move between discontinuous habitat patches (Wiens et al. 1993). Movement may be more difficult through certain types of landscape, thus limiting accessibility to neighboring patches. Urban land uses, such as roads, housing or commercial development, act as barriers to movement and decrease the overall regional availability of habitat (Klopatek 1988, Harris 1988). **Therefore, project sites that contain appreciable open space habitat can provide areas for performance of life functions may be present regardless of the site's spatial or structural diversity. In addition, the portion of a project site that remains open space habitat can provide a metric for the conversion of natural landscape to urban landscape.**

Adjacent Habitat (Floodplain Land-Use). The ecological value of riparian habitats depends on their integration as units within the surrounding landscape (Gosselink et al. 1990b). Many organisms have complex life histories in which different stages required distinct habitats within a regional landscape to meet their life requirements (Harris 1988). Therefore, continuity between riparian and upland habitat increases use by fauna and provides safe passage between riparian areas and adjacent upland (Gosselink et al. 1990c). Furthermore, the greater the edge area between riparian habitat and developed areas, the greater the potential negative impact from adjacent upland land-use (Warner and Hendrix 1985). Additionally, many riparian plants require adjacent uplands as a floodplain for establishment of their propagules during flooding events (Scott et al 1993). These floodplains also provide refuge for fauna during flooding (Gosselink et al 1990c). **Therefore, changes to adjacent land-use are an important consideration for impacts to the quality of riparian habitat.**

Linear Contiguity of Habitats. Fragmentation and habitat loss are dominant causes of the decrease in biotic diversity of wetland species (Harris 1988). Theories of island biogeography assert that disjunct patches connected by strips of protected habitat are preferable to isolated patches, and these corridors facilitate movement between patches (Diamond 1975, Noss 1987). This theory has been supported by the observation that many animals have a home range that exceeds the size of an individual habitat patch and require a means to move unmolested from one habitat patch to another. Without a system of travel corridors that allows these animals passage from one refuge to another, they will probably not occur in future landscapes (Harris 1984). Even if partially disturbed, riparian corridors are vital to the successful migration of neotropical birds and other organisms (Croonquist and Brooks 1991). In addition, habitat connectivity helps small populations (such as endangered species) maintain demographic and genetic integrity in the face of the isolation caused by habitat fragmentation (Frankel and Soule 1981). Changes to linear contiguity affect not only corridors but also contribute to overall habitat fragmentation and

decreases in patch size. This can be detrimental for resident as well as migrant species (Harris 1988). **Therefore, impacts to linear contiguity are key parameters when assessing the impacts of permitted projects.**

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FLORISTIC QUALITY ASSESSMENT

Floristic Quality Assessment (FQA), a vegetation-based ecological assessment protocol, was introduced by Gerould Wilhelm in 1977 and applied in a pilot study that assessed the natural areas of Kane County, Illinois, which is available on this page. It was applied for the 22-county Chicago region as a whole in 1979 by F. Swink and G. Wilhelm in their book, Plants of the Chicago Region, published by the Morton Arboretum, Lisle, Illinois. Wilhelm & Ladd expanded the explanation in 1988 in the Transactions of the 53rd North American Wildlife and Natural Resources Conference. Since then, it has been applied fully to numerous others states and regions, which include 33 states and 2 provinces.

During the growing season, conduct a Floristic Quality Assessment (FQA) as defined by Swink and Wilhelm and published in *Plants of the Chicago Region*, 1994. This will generate a list of observed plant species in the wetland areas. This FQA method assigns to plant species a rating that reflects the fundamental conservatism that the species exhibits for natural habitats. A native species that exhibits specific adaptations to a narrow spectrum of the environment is given a high rating. Conversely, an introduced, ubiquitous species that exhibits adaptation to a broad spectrum of environmental variables is given a low rating. Utilizing this method, a Floristic Quality Index (FQI) and Native Mean C are derived for a given area. The FQI is an indication of native vegetative quality for an area: generally 1-19 indicates low vegetative quality; 20-35 indicates high vegetative quality and above 35 indicates "Natural Area" quality. Wetlands with a FQI of 20 or greater are considered high quality aquatic resources. The Native Mean C is also an indication of native vegetative quality. Wetlands with Native Mean C values over 3.5 are considered high quality aquatic resources. To ensure accuracy using this method, it is important that this list of plant species be generated within the growing season.

WFI Wetland Specialist performed site investigation for specific species identified at various locations throughout the mitigation bank site. These will be reflected in baseline applications of the FQA and then the planting schedule recommended in the Mitigation Plan Section will be added to the FQA to determine ecological lift from a FQA/FQI perspective.

OVERVIEW OF FLORISTIC QUALITY ASSESSMENT (FQA)

Reference Appendix 7 for FQA data tables.

The project area broken down by current condition land use categories of agricultural, Wooded Wetland scheduled for Enhancement/Preservation provides a different increase in Floristic Quality Index (FQI) evaluations. Reference Table 1 – Floristic Quality Assessmenet – Adjusted FQI below. This table will identify current FQI and Adjusted FQI.

First, the agricultural fields have an extremely low vegetative quality, an FQI of ten (10.0) due to the row cropping activities. The resulting adjusted FQI when planting the Mitigation Bank planting scheduled will be a 62, resulting in the conversion of habitat to “Native Area” quality state with a Floristic Quality Index (FQI) above 35. This shows considerable ecological lift for the project wetland areas.

The second area is the existing Wooded Wetland scheduled for Stream/Riparian Restoration and Preservation. The total acreage of these areas is 60.0 acres. The Adjusted FQI baseline for the areas range from 33.0-45.0. The resulting adjusted FQI when planting the Mitigation Bank planting scheduled will be a 33 to 62, resulting in the conversion of habitat to “Native Area” quality state with a Floristic Quality Index (FQI) above 35. This shows considerable ecological lift for the project wetland areas adjacent to existing forested areas.

References:

FQA DB Description:

Taft, J. B., Wilhelm, G. S., Ladd, D. M., & Masters, L. A. 1997. Floristic quality

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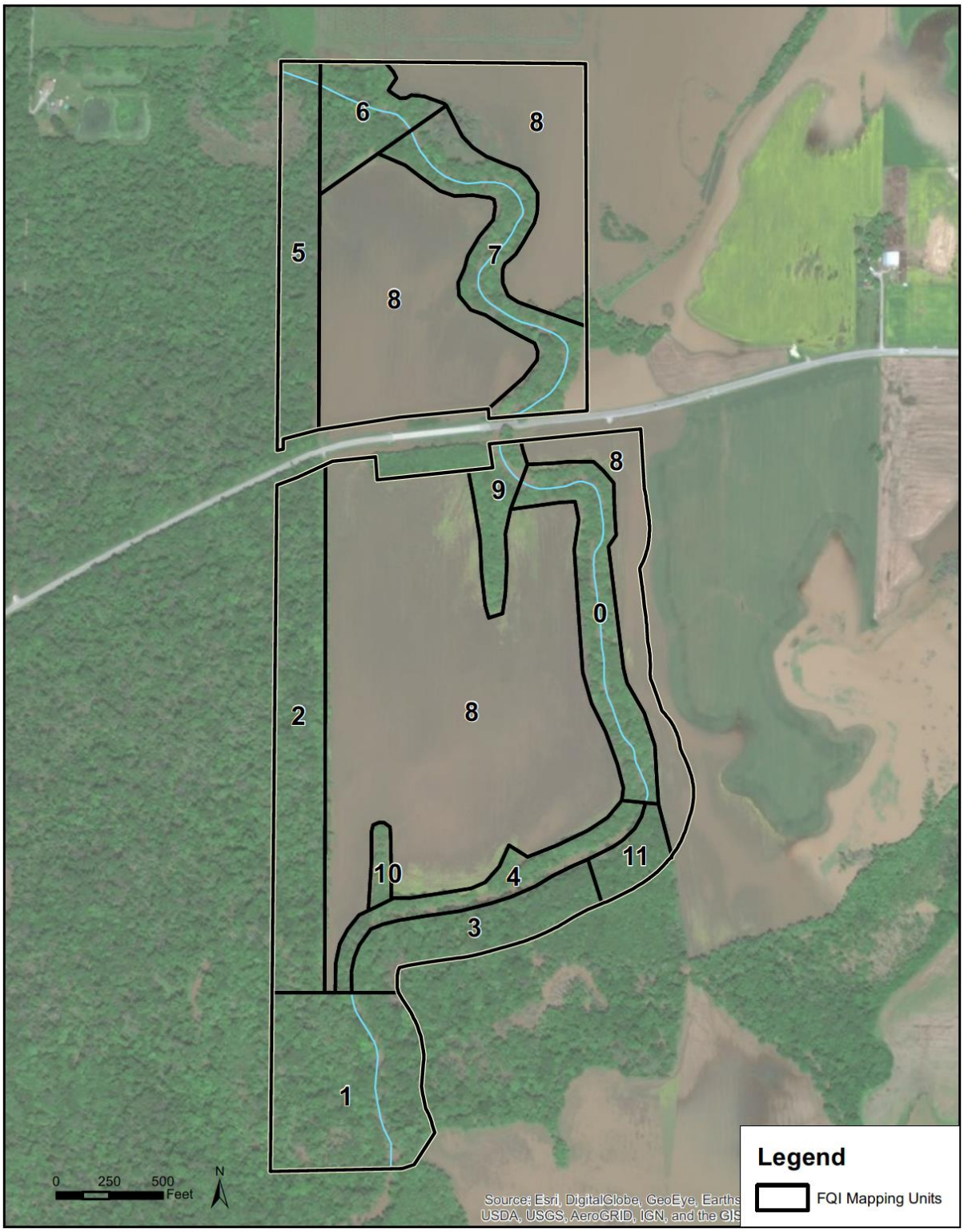
Table 1 Floristic Quality Assessment – Adjust FQI

Floristic Quality Assessment						
Little Muddy Wetland and Stream Mitigation Bank - Addendum 1						
Assessment Name	Site	ractition	FQA Database	Adjusted FQI	Enhanced FQI	FQI Lift
Area 1 - Stream Preservation	Little Muddy	KD	Illinois, 1997	39	39	0
Area 2 - Preservation	Little Muddy	KD	Illinois, 1997	31	36	5
Area 3 - Stream Preservation	Little Muddy	KD	Illinois, 1997	39	39	0
Area 4 - Riparian Corridor	Little Muddy	KD	Illinois, 1997	33	62	29
Area 5 - Preservation	Little Muddy	KD	Illinois, 1997	45	45	0
Area 6 - Stream Preservation	Little Muddy	KD	Illinois, 1997	36	36	0
Area 7 - Riparian Corridor	Little Muddy	KD	Illinois, 1997	31	62	31
Area 8 - Baseline Tillable Field	Little Muddy	KD	Illinois, 1997	10	62	52
Area 9 - Forested Finger	Little Muddy	KD	Illinois, 1997	32	62	30
Area 10 - Forested Finger	Little Muddy	KD	Illinois, 1997	22	62	40
Area 11 - Presevation Leveed	Little Muddy	KD	Illinois, 1997	33	33	0
Restored Forest	Little Muddy	KD	Illinois, 1997	62		
WFI Planting List						

LMWSB - A1; FQI Mapping Units



SITE HYDROLOGY

The entire site is connected to all hydrologic events associated with the Little Muddy River within Franklin and Perry Counties, Illinois. Hydrologic events on Little Muddy River regularly flood this area. Soil properties, observations of flooding, drainage patterns, soil saturation and plant species all indicate that the area has the hydrology to support a wetland community. A hydraulic analysis shows a channel capacity of 900 to 950 cfs or about 22% of the 2-year predicted flow of 4230 cfs.

SECTION E - Determination of Credits

The same methodology will be used to assess both credits and debits. We determined that an appropriate functional assessment methodology is impractical to employ, thus acreage will be used as a surrogate for measuring function for the emergent and forested wetland habitats. The stream riparian corridor will employ an assessment methodology utilized within the region.

The number of credits (acres/credits) reflect the difference between site conditions under the with and without-bank scenarios.

Little Muddy River Wetland and Stream Mitigation Bank – Addendum 1 (LMWSMB-A1) will have 141 total acres that equate to 68 credits available of forested, emergent and preservation habitats and 73 acres of riparian and aquatic habitat when the bank development has been completed, reference Figure 8 and Table 2.

The aquatic resources restored will receive the following credits:

Forested Wetland – 55.50 credits

Emergent Wetland – 10.0 credits

Stream and Riparian Corridor – 73 acres or 64,989 credits via Illinois Stream Method Calculations

Preservation – 2.0 credits

BREAKDOWN OF CREDIT RATIO

FORESTED

1:1 acres to credit = 55.50 acres or 55.50 credits

Total 55.50 Credits

Justification: The credit justification is based on the agricultural acreage being removed from row cropping and planted at a greater than 51% of the area with bottomland hardwoods. This planting increases the FQI of the acres and reduces forest fragmentation along the Little Muddy River.

EMERGENT

1:1 acres to credit = 10.0 acres or 10.0 credits

Total 10.0 Credits

Justification: The credit justification is based on the agricultural acreage being removed from row cropping and planted at a greater than 51% of the area with Emergent wetland planting regime. This planting increases the FQI of the acres and provides a diverse wetland habitat regime on the site as it interacts with the Little Muddy River.

RIPARIAN CORRIDOR – Reference Illinois Stream Mitigation Method Worksheet, Appendix 8.0

1:1 acres to credit = 73.0 acres or 64,989 credits

Total 64,989 Credits

Justification: The credit justification is based on the agricultural acreage being removed from row cropping and planted at a greater than 51% of the area with bottomland hardwoods. This planting increases the FQI of the acres and reduces forest fragmentation along the Little Muddy River. Secondly, aquatic improvements are being implemented to increase depth, roughness and dissolved oxygen for the entire reach of the mitigation bank stream restoration (

PRESERVATION

1:0.10 acres to credit = 20.0 acres or 2.0 credits

Total 2.0 Credits

Justification: The credit justification is based on the preservation of the existing acrea. This area has a FQI score of 39 or greater that guidance allows for preservation credits. This area will support other restoration action to support reduced forest fragmentation along the Little Muddy River.

Justification: The credit justification is based on the agricultural acreage being removed from row cropping and planted at a greater than 51% of the area with bottomland hardwoods. This planting increases the FQI of the acres and reduces forest fragmentation along the Little Muddy River. This buffer planting supports the functions and services of the adjacent wetland, reduces

edge effects if not planted, supports neotropical species for nesting, will provide a wetland seed source in adjacent upland areas and overall supports a natural wetland complex for the project.

TOTAL CREDITS GENERATED FOR LITTLE MUDDY WETLAND AND STREAM MITIGATION BANK – ADDENDUM 1:

Forested Wetlands: 55.50 credits

Emergent Wetlands : 10.0 credits

Steam and Riparian Corridor: 64,989 credits

Preservation Forested Wetlands: 2.0 credits

TABLE 2 - CREDIT JUSTIFICATION TABLE

Credit Justifications	Phase 1 South 108	South Credits	Phase 2 North 51	North Credits	Totals 158.5		
Forested	35.5	35.5	20	20	55.5		
Emergent	8	8	2	2	10		
Stream and Riparian Corridor	51	51	22	22	73		
Preservation	13	1.3	7	0.7	20		
	107.5	95.8	51	44.7	158.5	140.5	Total Credit Acres

F. Mitigation Work Plan

Project Description: The bank will lie within on 158.5 acre site, it is made up of prior converted cropland, river channel, and degraded wooded wetlands. The wetland and stream bank will have a cumulative acreage of 158.5 - acres of restricted property in perpetuity.

Whereas, under this Banking Instrument, the Sponsor will establish and/or maintain 158.5 - acres of wetland and stream corridor habitat in accordance with the provisions of this Banking Instrument and the Bank Development Plan and shall then maintain the Bank in such condition for 10 years in accordance with the Bank Closure Procedures. The Bank area shall consist of a total of 158.5 - acres. This prior converted site will be re-established to Bottomland Hardwoods Forest (55.50 acres), Streambank Riparian Corridor (73.0 acres), Emergent Wetland (10.0 acres) Preservation (20.0 acres). The stream bank component will employ in stream aquatic measures to increase depth, roughness and dissolved oxygen. The use of Rock Riffle Grade Control Structures will meet these measures for the Little Muddy River reach. A number of grade control structures will improve habitat over the entire length of Little Muddy River in the project area.

To prepare for unpredictable flooding the plan calls for a mix of vegetation that can tolerate a wide range of water levels. The proposed hydrology for the farmed area is to keep the soils near the surface saturated, but not necessary inundated for most of the growing season where wooded wetlands occur. This modification for hydrology will consist of removing agricultural drainage ditches and the construction of mounds/berms for tree plantings and small berms for emergent areas based on extended durations for hydrology. Spring and fall rainfall plus annual flooding from of Little Muddy River will provide soil saturations to support hydrophytic vegetation without mechanical means or intervention by the Sponsor.

The Mitigation Bank will be established in two phases. Phase construction will allow for lower risk of planting hazards such as flooding, drought and unknown mechanical habitat damage. This will allow the Mitigation Team an opportunity to Adaptively Manage the site over a two or three year cycle.

South Phase (1)

This phase will consist of approximately 107.50 acres and will encompass 4,638 linear feet of the Little Muddy River and all fields south of Park Street. The major habitat types related to the South Phase (1) will include Forested Wetlands, Stream Riparian Corridor and channel modifications for the entire project, Emergent Wetland and Wooded Wetland Enhancement/Preservation. The Root Production Method produced trees will be planted on unconnected berms and in-situ with an identified cover crop supporting the planting. Hydrology will be modified to extend duration on the site. This will be accomplished through closing agricultural drainage ditches with rock weirs and stoplog structures.

North Phase (2)

This phase will consist of approximately 51.0 acres and will encompass 2,860 linear feet of the Little Muddy River and all fields north of Park Street. The major habitat types related to North Phase (2) will include Forested Wetlands, Stream Riparian Corridor and channel modification, and Forest Enhancement/Preservation. The Root Production Method produced trees will be planted on elevated mounds and in-situ soil areas with an identified cover crop supporting the planting. Hydrology will be modified via mounds and unconnected berm construction. This will augment hydrology for both longer duration on lower elevation and less hydrology on berm and mound plantings.

MITIGATION PLAN

PROPERTY SIZE: 158.5 -acres

WETLAND MITIGATION BANK (Forested, Emergent, Wooded Wetland Enhancement/ Preservation): 85.50 - acres

STREAM MITIGATION BANK: 73.0 - acres

TOTAL WETLAND AND STREAM MITIGATION BANK: 158.5 - acres

CROPLAND:

Bottomland Hardwood Forest – 55.50 - acres

> Carya illinoinensis, Carya laciniosa, Quercus bicolor, Quercus palustris, Quercus nuttallii, Quercus lyrata, Quercus macrocarpa, Quercus x schuettei “Kimberly”, Crataegus viridis, Platanus occidentalis, betula nigra, Celtis laevigata, Cephalanthus occidentalis, Forestoiera acuminata, etc.

Emergent Wetland – 10.0 - acres

> Amorpha fruticose, Cephalanthus occidentalis, Forestiera acuminata, Hibiscus laevis, Quercus lyrata, Spartina pectinata, Taxodium distichum, Ilex decidua, Lindera benzoin, Sambucus canadensis (sp), Cornus amomum, Cornus sericea, etc.

FOREST:

Bottomland Hardwood Forest Enhancement/Preservation – 20.0 - acres

Carya illinoensis, Quercus bicolor, Quercus macrocarpa, Quercus palustris, Crataegus viridis., Cornus spp., Gymnocladus dioicus, Platanus occidentalis, Diospyros virginiana, etc.

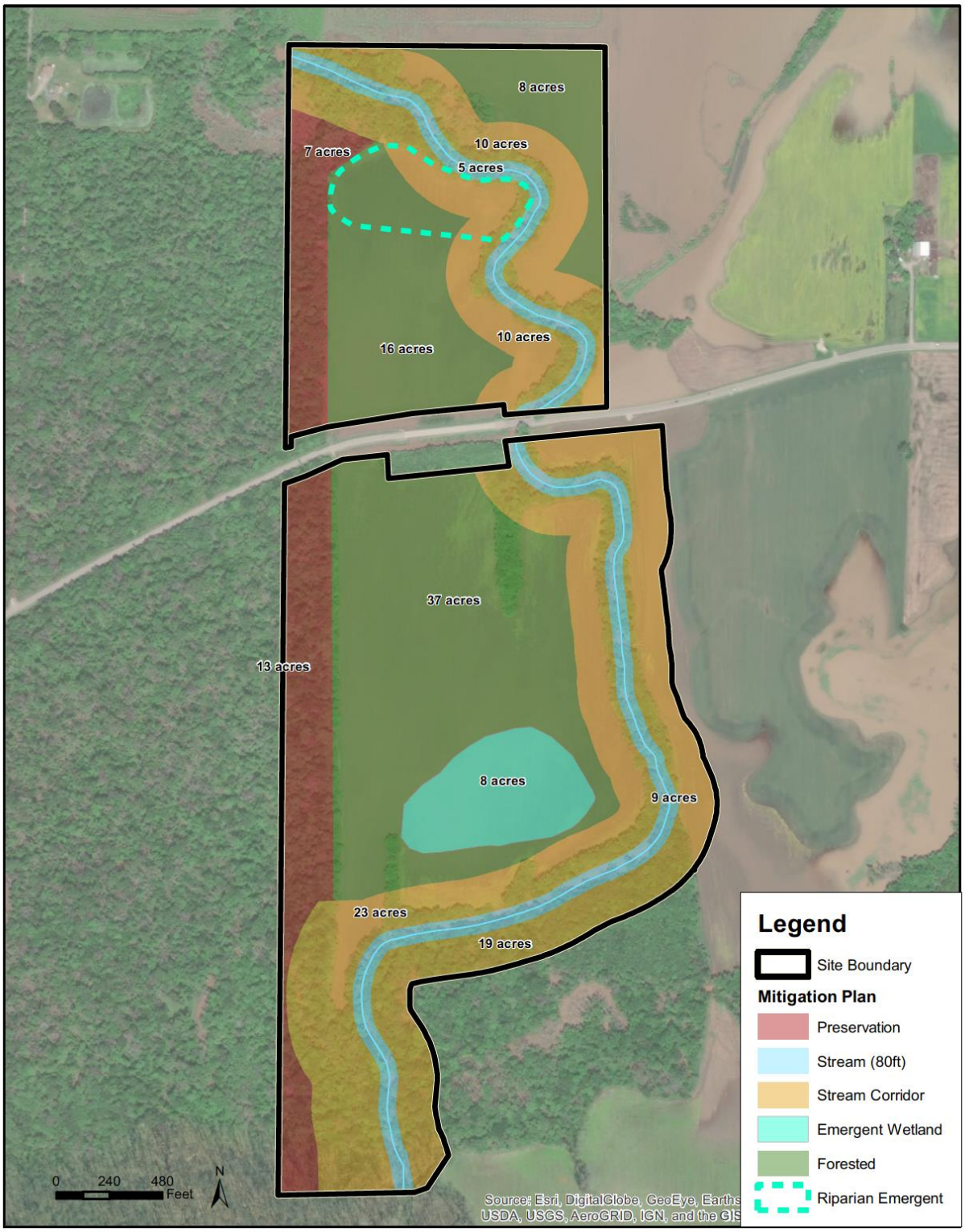
STREAM BANK RIPARIAN CORRIDOR:

Bottomland Hardwood Forest – 73.0 - acres

Carya illinoinensis, Carya laciniosa, Quercus bicolor, Quercus palustris, Quercus nuttallii, Quercus lyrata, Quercus macrocarpa, Quercus x schuettei “Kimberly”, Crataegus viridis, Platanus occidentalis, betula nigra, Celtis laevigata, Cephalanthus occidentalis, Forestoiera acuminata, etc.

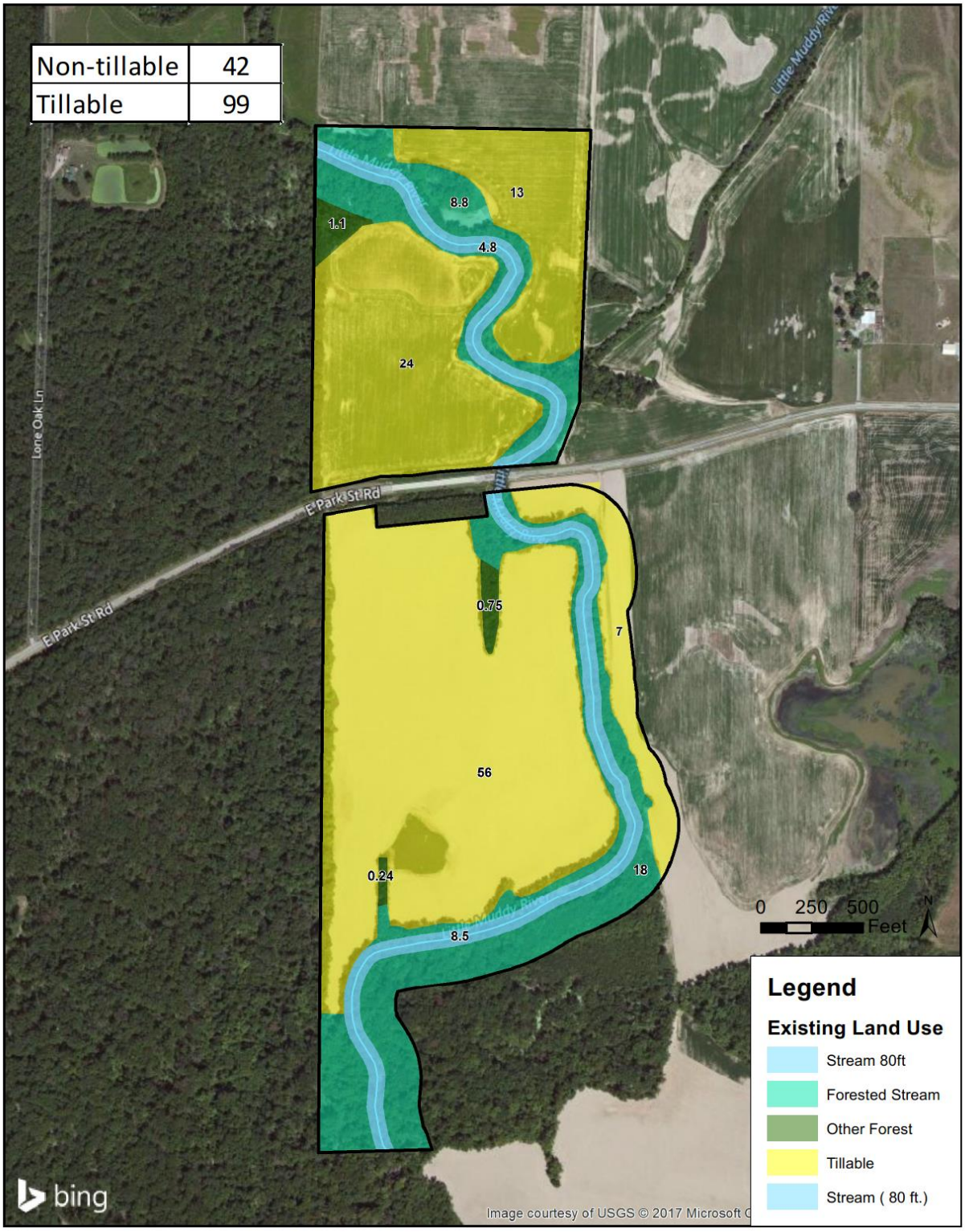
Figure 8:

Mitigation Plan Map

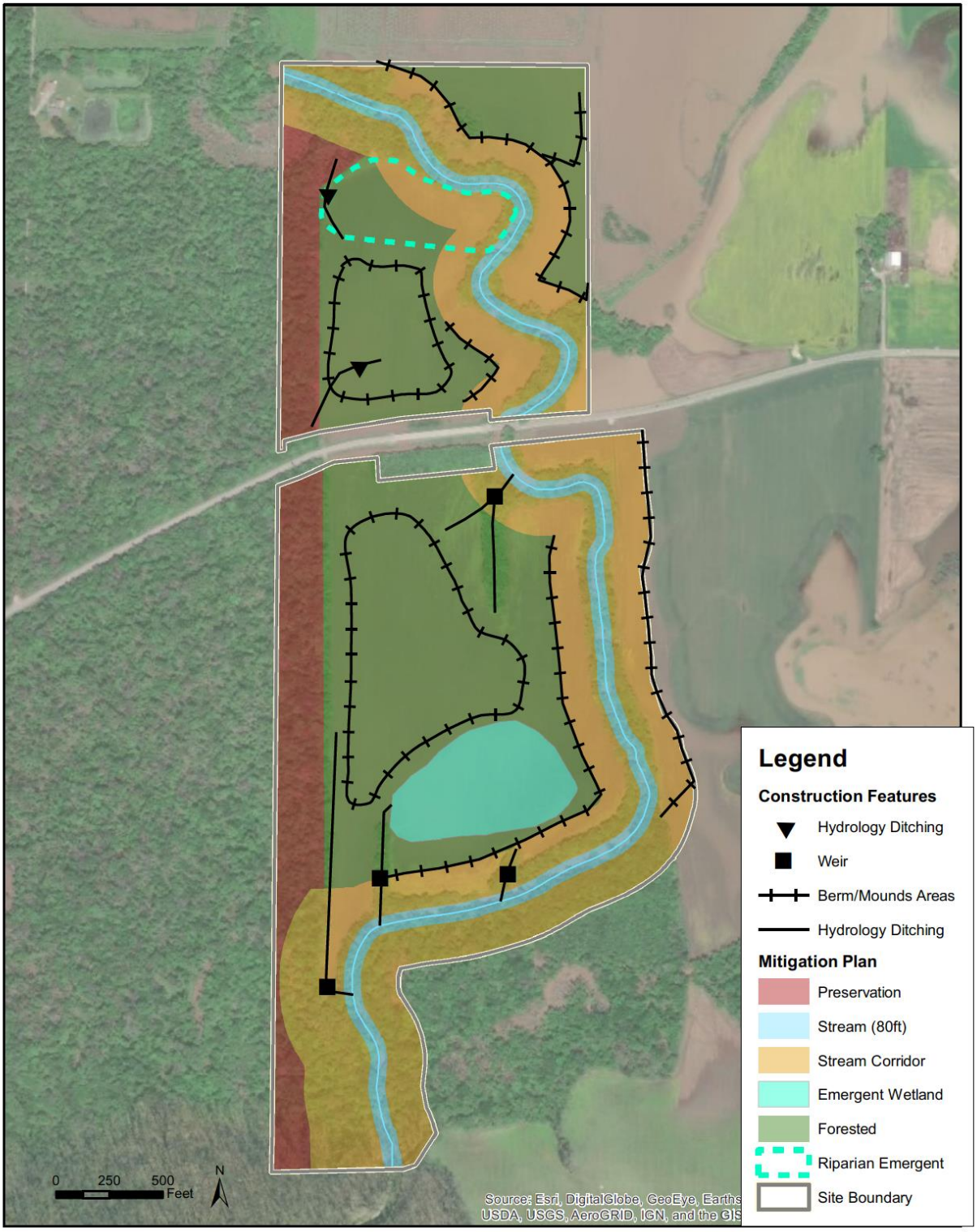


This map shows the tillable acres for the project, however, non tillable acres have increased due to the western edge of the property expanding due to final survey. Figure 9:

Little Muddy Kuhns Property - South



Construction Features



LITERATURE USED FOR WETLAND REFORESTATION SPECIFICATIONS

The planting of woody species will follow the specifications set forth in the following wetland reforestation document.

Wetland Reforestation

Ken Dalrymple

Wildlife Management Biologist

There are five essential elements for plant growth and survival.

1. Light (photosynthesis)
2. Air **(oxygen within the soil is the most essential element needed in wetland plantings)**
3. Water
4. Temperature
5. Nutrients

All of the above basic elements must be in abundance to have accelerated plant growth and flowering and fruiting at an early age.

A prescription for a Wetland Mast Tree Planting System.

1. Planting Site - The following are considerations in selection, planting method and tree species (elevation, soil type, flood frequency, flood duration, past use, management objective, etc.).

2. Tree Species - Select several **hard mast tree species** that grow in wooded wetlands **near the planting site**. Swamp White Oak, Pin Oak, Pecan, Burr Oak, Overcup Oak, or even fruit trees such as Persimmon, and Green Hawthorn are a few of the species that could be considered depending on the latitude of the planting site (Cypress is hardy throughout Illinois also). Trees with winged fruit (Ash, Maple, Box Elder, Cottonwood, Sycamore) will invade some of the area thus creating very good woody plant diversity. This invasion is desirable in most locations if numbers are low on a per acre basis.

3. Seed Source - One hundred (100) mile radius of planting sites, adapted to local weather conditions and flooding frequency, collected in the floodplain of the present planting site **(Do not use a seed source from an upland collection site)**.

4. Root Zone Management:

The driving force that creates the natural movement of water from soil to plant and atmosphere is based on the free energy gradient of the water. Most plants actually have little ability to cope with atmospheric conditions and dependent upon the moisture supply of the soil. Saturated flow, which equals piston flow, pushes the air from the root zone for a period of a few hours t a few days depending upon the soil type. Aeration difficulty is typical in medium to heavy clay soils where saturation may last several days. However the plant root must respire for the uptake of minerals to metabolize organic compounds.

Ridge and swale topography, which was present in floodplains before being modified or eliminated by farming and drainage practices, provided the micro-conditions in the root zone that hard mast producing bottomland hardwoods needed for growth and reproduction. The location that these tree species colonized were the elevated areas usually situated adjacent to old channel scars.

In hydric soils with a clay content of 60% or more as well as areas with altered hydrology (an increase in hydrologic events), elevated planting areas (berms) provide a greater probability for plant roots to be located in a zone that can supply the correct air to moisture ratio that is essential for maximized growth, fruit/seed production and survival. An increase of the water usage following establishment may change the hydrologic gradient thus promote regeneration of less flood tolerant species and maintenance of small-scale topographic heterogeneity in the bottomland hardwood forest landscape becomes less valuable.

A grass or grass like companion (cover crop) crop, in the tree plantation, will reduce competition from woody and herbaceous vegetation for sunlight, moisture and nutrients. The cover crop must be established before the tree planting ins implemented and the grass like species, that will withstand inundation for four to six weeks with a maturity height of less than 3 feet, is essential. These elevated areas (berms) should be placed no closer than 40 feet of each other and determined by an environmental wetland scientist, if needed, by evaluating soil texture, existing micro-topography, hydrology, tree species habitat requirement and tree growing method of woody species to be restored ton the site.

5. Woody Plant Selection - Select a mast species that has been air root pruned to produce a superior root system. Recommend the **Root Production Method (RPM) process developed at Forrest Keeling Nursery in Elsberry, Missouri. The tree should have a caliper of 5/8 inch at 6 inches above the root collar and a minimum height of 5 feet**. These specifications' increases tree survival from deer depredation and severe flooding events.

6. Ground Cover Mat/Mulch - Place a 1-3 year biodegradable ground cover (approximately 9-10 square feet) around each planted container tree to reduce container media evaporation and competition from fast growing herbaceous species.

7. Fertilization - A supplemental feeding program with **slow release** fertilizer for 3 years after establishment will increase survival and enhance growth **(for accelerated growth to occur a high level of available nitrogen must be present)**.

8. Tree Spacing – Spacing between trees will be approximately 20x20 feet apart, on center with staggered rows. The hard mast producing species will be planted on berms (if determined the environmental scientist as needed) and other bottomland hardwood species planted between the berms. This design will be similar to the ridge and swale topography that historically existed, before the implementation of cropping practices occurred.

This program enhances the biological atmosphere of the soil plus encourages growth of mycorrhizal fungi.

Advantages

Ridges/berm/mounds - (7-10 inch raised beds) Increase soil air, water availability, soil temperature in spring, and nutrients by concentrating organic matter.

Ground Cover - Increases light (reduces nearby competition), moisture, soil temperature in early spring, and maintains nutrient available for tree growth (reduces competition).

Companion Grass - Provides air for roots, organic matter, mulch to keep soil cool and moist in summer, increases available light by reducing large herbaceous or woody vegetation.

Fertilizer - Nutrients for accelerated growth and fruit production.

ROOT PRODUCTION METHOD (RPM) SYSTEM DESCRIPTION

Wayne Lovelace

Forrest Keeling Nursery

P.O. Box 135

Elsberry, MO 63343

RPM SYSTEM

The RPM system (Root Production Method) is a multi step production system of container tree production that places primary emphasis on the root system, which ultimately determines the trees survival and performance in its out planted environment. This particular container production system has been developed to facilitate volume production, of a high quality tree with good height-caliper balance. Approximately 80% of our production consists of native trees, many of which present transplanting difficulties using conventional nursery growing systems. We specialize in Oak production, currently growing twenty-six varieties.

SEED SELECTION, COLLECTING, PROCESSING AND GRADING

QUALITY SEED

This is accomplished by selecting superior trees growing on specific sites for seed collection. Experience has taught us that most species have ecotypes that are site specific. We look towards the wetlands or floodplains as a prime seed source for native species that are found growing on both wetlands and upland sites. Since wetland species have evolved under stress we find they will consistently out perform their upland counterparts on virtually any site, particularly on highly stressed sites.

PROCESSING

After basic cleaning and drying procedures are completed all seed is graded and sized using aspirators or gravity tables. We find the weight of individual seed to be more important than size, thus air separations that use specific gravity give the best result. This step is the first "grading" but of great importance in our goal to produce uniformity.

SUMMARY

The RPM System is a multi-step tree growing program using seed selection and handling, an air root pruning process, careful production planning which will produce container grown tree liners that are uniform in grade and quality. Seedlings propagated from seed provide a broad genetic

base, which will insure longevity and protection against diseases plus conditions that might endanger certain asexually produced and over used varieties.

RPM® Trees

- Provides superior plant survivability and growth rate
- Increases operating efficiency and profitability
- Makes Fall planting a viable alternative

Root Production Method Produces

- Vastly improved root system through a multi-step program of air-root pruning
- More dense fibrous root system that absorbs and utilizes more oxygen, water and nutrients

The Result Is

- Improved transplantability
- Accelerated growth pattern and survivability
- Reduced loss, faster turnover time
- Substantial labor savings

RPM®® trees' secret to success is a unique, multi-step system of air-root pruning that enables us to produce trees with a denser, more fibrous root mass that absorbs and utilizes more oxygen, water and nutrients than conventionally grown trees.

Forrest Keeling has worked closely with conservation and private organizations to develop ways to utilize RPM® technology in Wetland Restoration, Wildlife Habitat Development, Buffer Development, Retention Pond Planting and Soil Stabilization to solve a seemingly insurmountable challenge: the survivability and regeneration of native hardwood trees in hostile, competitive growing environments where maintenance presented a severe problem.

The Four Step Sequence in the Walk-A-Way-Planting System

- Ground preparation, plowing, discing and creation of berms (June to July)
- Cover crop establishment (August to September)
- Tree installation (October to December)

Mat placement (weed barrier and moisture retainer) and fertilization (April to May)

SCOPE OF WORK FOR ESTABLISHMENT OF WOODY SPECIES

MATERIALS

Seed

Seed Mixture

Seed mixtures shall be proportioned by weight as follows:

Seed	Pounds Per Acre (Minimum)
Red Top (Agrostis alba)	6
Virginia Wild Rye (Elymus virginicus)	6
Alsike Clover (Trifolium hybridum)	2

The seed quantities indicated per acre for seed shall be the minimum amounts of pure, live seed per acre for each species listed.

SEEDING TIMES AND CONDITIONS

Seeding Time

Seed shall be sown from August 10 to September 20.

Seed Bed Preparation

Immediately prior to seeding, the areas to be seeded shall be prepared by thoroughly working the soil to a depth of not less than 3 inches, with no clumps or clods. Surfaces shall be smooth graded and uniform, with no abrupt humps or depressions. Surfaces shall be free from clumps, clods, rivulets, gullies, crusting and caking.

APPLYING SEED

A two gang rolling seeder with 1/2 inch flutes on each roller gang and a seed box positioned in such a manner to drop seed material between the gangs shall be used to plant the seed. Seed shall be uniformly placed to a depth of 1/4 inch or as recommended by the seed supplier. The total weight of the two gang rolling seeder shall not be less than 200 pounds per foot of the seeders working width.

TREES

DELIVERY, INSPECTION, STORAGE AND HANDLING

Identification: Plants shall be identified with durable waterproof labels and weather-resistant ink. Plants shall have attached labels stating the correct plant name.

Protection During Delivery: Plants shall be protected during delivery to prevent desiccation of the plant or damage to the roots. Branches of plants shall be protected by covering all exposed branches.

Tree Plantings:

MAST BOTTOMLAND HARDWOOD PLANTINGS - This area will follow all recommendation outlined in this section for tree planting requirements. This area consists of approximately 55.5 - acres of forested wetlands and 73.0 - acres of stream riparian corridor plantings and 20.0 – acres of forested preservation buffer . The forested and riparian planting equates to twenty foot by twenty foot (20 ft x 20 ft) spacing.

South Phase (1) Planting Acres:

Forested Wetland = 35.50 acres x 109 trees/acre = 3,870

Riparian Corridor = 19.0 acres x 109 trees/acre = 2,071

Total Trees Planted = 5,941 each

Phase 2 Planting Acres:

Forested Wetland = 20.0 acres x 109 trees/acre = 2,180

Riparian Corridor = 15.0 acres x 109 trees/acre = 1,635

Total Trees Planted = 3,815 each

SOUTH PHASE (1) – Restored Wetland Forest Trees

Tree Varieties	Trees per Acre	Acres Planted	Total Number of Trees for Site
Pin Oak (Quercus palustris)	10	54.50	545
Sycamore (Platanus occidentalis)	10	54.50	545
Willow Oak (Quercus phellos)	10	54.50	545
Northern Pecan (Carya Illinoensis)	10	54.50	545
Swamp White Oak (Quercus bicolor)	10	54.50	545
Green Hawthorne (Crataegus viridis.)	5	54.50	273
Button Bush (Cephalanthus occidentalis)	5	54.50	273
River birch (Betula nigra)	5	54.50	272
Overcup Oak (Quercus lyrata)	10	54.50	545
Water hickory (Carya aquatic	10	54.50	545
Sugarberry (Celtis laevigata)	9	54.50	491
Nuttall Oak (Quercus nuttallii)	10	54.50	545
Swamp Privit (Forestiera acuminate)	5	54.50	272
Totals	109	54.50	5,941

NORTH PHASE (2) - Restored Wetland Forest Trees

Tree Varieties	Trees per Acre	Acres Planted	Total Number of Trees for Site
Pin Oak (Quercus palustris)	10	35	350
Sycamore (Platanus occidentalis)	10	35	350
Willow Oak (Quercus phellos)	10	35	350
Northern Pecan (Carya Illinoensis)	10	35	350
Swamp White Oak (Quercus bicolor)	10	35	350
Green Hawthorne (Crataegus viridis.)	5	35	175
Button Bush (Cephalanthus occidentalis)	5	35	175
River birch (Betula nigra)	5	35	350
Overcup Oak (Quercus lyrata)	10	35	350
Water hickory (Carya aquatic	10	35	350
Sugarberry (Celtis laevigata)	9	35	315
Nuttall Oak (Quercus nuttallii)	10	35	350
Swamp Privit (Forestiera acuminate)	5	35	175
Totals	109	35	3,815

GROWING METHOD CONDITIONS

Minimum acceptable requirements for the tree stock shall be as follows: Container grown trees shall be at least 5/8 inch and 3-5 feet in height. Container grown trees shall be produced by a root-pruned method to develop a dense, fibrous, non-curling root system.

The required root-pruned growth method shall include: Plants shall be grown under climatic conditions similar to those in the locality of the project.

Seed Source: From a wetland site within 200 miles of the project site. Seed Germination Plus a Two Step Air Root Pruning Process

Fertilizer

Controlled release of 30-3-6 analysis fertilizer

LAYOUT

PLANTING TREES WITHIN AGRICULTURAL FIELDS

The Environmental Wetland Scientist will determine if the hard-mast producing bottomland hardwood trees within agriculture fields and forest management areas need to be planted on berms. Should they require beds (berms), the trees shall be planted in raised planting beds (berms), constructed of existing soil materials, 8 to 10 inches in height after being compacted with a roller or a two gang roller of which has a minimum combined weight of 200 pounds per foot of ground contact length (e.g., 8 foot of working width double gang rolling seeder must weigh a minimum of 1600 lbs.). The base of the raised bed (berm) shall have an approximate minimum width of 7 feet with a flat crown being approximately 3 feet in width. The berms shall be constructed in such a manner that restriction of the natural drainage of the site or impound water during high rainfall periods of flooding does not occur.

PLANT PITS

The size of tree pits shall be approximately the same size as the container or slightly larger.

PLANTING TIMES AND CONDITIONS

Trees shall be planted during specified periods. Acceptable planting periods are between October 10 and December 10, and between March 1 and April 30. Plants shall be set plum (within 10 degrees of vertical) and held in position until sufficient soil has been placed around the roots.

CONTROLLED-RELEASED FERTILIZER

Fertilizer shall be placed on top of the soil surface at the time of planting or within 7 days after planting. Thirty grams of 33-3-6 analysis slow release fertilizer shall be placed on the soil surface at the time of planting and 50 grams placed on top of the weed barrier mat/mulch 210 to 240 days after the trees have been planted.

CONTAINER GROWN TREES

Non-biodegradable containers shall be removed without damage to the plant or root system. Biodegradable containers shall be split.

WEED BARRIER MATS/MULCH

Weed barrier mats may be placed in accordance with the manufacturer's recommendations and/or as indicated. The weed barrier mats will be utilized pending the Wetland Scientist decision as it relates to the specific site conditions. Weed barriers will be placed between the dates of March 15 and May 30 on either fall or spring planted trees. The 4-foot by 4-foot mat will be held down by placing 9 flat-topped staples of 11 gauge, 6 inch by 1 inch by 6 inch in size, inserted through the mat and into the soil. The staples will be placed with 1 staple in each of the four corners of the mat, 1 in the edge, 1/2 the distance between corners, and 1 where the mat is split next to the tree stem for a total of 9 staples. These staples shall be pushed into the soil until tight against the weed barrier mat securing it firmly against the soil. Should mulch be utilized, mulch shall be placed around each tree and cover an area of approximately 9 square feet and two inches deep.

TREE PROTECTION

The installation of bamboo stakes will be utilized to support the beneficial characteristics of the RPM plantings. Two bamboo stakes (0.25-0.75 inches) will be placed adjacent to planted trees to reduce wildlife mechanical damage that exists in nature. The use of stakes circumvents the mechanical damage of deer rubs in open management regimes. The stakes will utilize a rubber band to affix/secure the planted tree to the bamboo stakes. After 3-5 years the bio-degradable rubber band will cease to provide function (break) and the bamboo stakes will rot and fall away from the planted RPM tree.

EXCAVATION DEVELOPMENT PLAN

Bottomland Hardwood Planting:

Mounds or Unconnected berms are scheduled for this work. The construction method will employ a rice levee plow to mound/berm with in-situ material into unconnected mounds/berms in tree planting areas.

Stream Riparian Corridor:

73 (+) - acres of bottomland hardwood RPM tree plantings and natural successional species will be established along stream bank corridors within the bank mitigation site. A berm/mound will be constructed along the edge of the riparian zone during, other mound/berms may be constructed interior of the perimeter mound/berm.

SECTION G. Operation and Maintenance Plan

The wetland restoration/mitigation area is designed to be self-sustaining once the mitigation work plan is complete. Maintenance will be determined based on observations performed during post-construction monitoring and may include but not be limited to the following:

- Evaluating the site for animal damage and addressing if the damage is causing or may lead to poor site performance as measured by the ecological performance standards, ensuring stability and designed conditions of the berms/weirs/overflow structures.
- Supplemental tree plantings.
- Investigating for invasive species (i.e. noxious weeds, as defined by the State of Illinios) including undesirable plant species as listed in this document;
- Any invasive, undesirable or noxious species will be addressed through an herbicide or insecticide application program. The timing, application method, type and frequency of the application will be approved prior to commencing with the activity.
- Mowing may be implemented to reduce competition and evaluated periodically after that. Any necessary mowing would occur in the summer and be mowed to a height of approximately 6-inches and used as a tool to stimulate or retard specific species that the site manager has identified as being problematic or beneficial to the habitat being restored.
- Boundary signs marking the perimeter of the mitigation area will be addressed during this initial maintenance period.
- During the monitoring period, slight adjustments may be made to the berms/wiers to prolong ponding or lower water levels to ensure optimum hydrologic conditions to promote the planned wetland communities with native plant species diversity to achieve the ecological performance standards.

Wetlands Forever, Inc. will be responsible for maintenance activities until wetland performance standards are determined to be met.

FIVE-YEAR MANAGEMENT PLAN

PHASE ONE AND TWO (BASED ON PLANTING DATE)

POST CONSTRUCTION AND YEAR ONE

1. Conduct a baseline ecological functional assessment using the Rapid Impact Assessment Method **RIAM** (Stein and Ambrose 1998) to compare the site prior to project implementation to conditions present after implementation of the project (assumption used is by best professional judgment) using the following six evaluation criteria: endangered species habitat, structural diversity of habitat, spatial diversity of habitat, open space habitat, linear contiguity of habitat and adjacent habitats.

1. Transect meander search in accordance with Section I
2. Restore and plant 55.50 acres of the PC land to hard mast producing bottomland hardwoods.
3. Monitor tree planting and maintain.
4. Restore 10.0 acres to emergent wetlands.
5. Restore 73.0 – acres to wooded riparian corridor.

YEAR TWO

1. Monitor tree plantings and maintain.
2. Transect time meander search in accordance with Section I

YEAR THREE

1. Monitor and replace where needed forested plantings.
2. Monitor all herbaceous and hydrophytic vegetation.
3. Transect time meander search in accordance with Section I.
4. Mow as needed for bottomland hardwood forest wetland.

YEAR FOUR

1. Monitor and replace where needed forested plantings.
2. Monitor all herbaceous and hydrophytic vegetation.
3. Transect time meander search in accordance with Section I.
4. Mow as needed for bottomland hardwood forest wetland.

YEAR FIVE

1. Monitor and replace where needed forested plantings.
2. Monitor all herbaceous and hydrophytic vegetation.
3. Transect time meander search in accordance with Section I.
4. Mow as needed for bottomland hardwood forest wetland.

H. Ecological Performance Standards

The performance standards listed below will be used to measure or assess whether the mitigation project is developing into the desired resource type, and providing the expected functions. These performance standards will be applied to determine the success of this compensatory mitigation activity.

1) The wetland will meet jurisdictional wetland criteria as outlined in the Midwest Regional Supplement to the 1987 U.S. Army Corps of Engineers Wetland Delineation Manual (U.S. Army Corps of Engineers 2008, Environmental Laboratory 1987).

a) Predominance of hydrophytic vegetation. More than 50% of the dominant plant species must be hydrophytic at each sampling location.

b) Presence of hydric soils. Hydric soil characteristics should be present, or conditions favorable for hydric soil formation should persist. Favorable conditions include inundation or saturation to within 12 inches of the surface.

c) Presence of wetland hydrology. The planned wetlands must be inundated at average depths less than 6.6 feet or have soils that are saturated to the surface for at least 14 consecutive days of the growing season in at least 5 of 10 years on average.

2) The mitigation area should meet the standards for vegetative cover and floristic composition, and hydrology outlined in Table 3 below.

Table 3. Performance Standards for Forested Wetlands

Target	**1-3-year performance standards**	**3-5 (further)** **-year performance standards**
Vegetative Success for Wetland Mitigation Area	At least 75% of the vegetative cover consists of desirable plant species suitable for the proposed areas water regime and site potential. No single occurrence of undesirable species shall exceed 0.25 contiguous acre in area even if the overall abundance of undesirable species is less than 25%. Undesirable species shall be defined as those plants on the Iowa noxious weeds list, as well as other exotic or invasive species, all listed in Appendix 3.	At least 90% of the vegetative cover consists of desirable plant species suitable for the proposed areas water regime and site potential. Minimum of 10 hydrophytic plant species per acre. In addition, no single occurrence of undesirable species shall exceed 0.10 contiguous acre in area even if the overall abundance of undesirable species is less than 10%. Undesirable species shall be defined as those plants on the Iowa noxious weeds list, as well as other exotic or invasive species, all listed in Appendix 3.
Wetland Hydrology	No more than 5% of the wetland shall consist of a contiguous "unvegetated open water" area measured no later than September 15th of each monitoring year.	
Woody Plantings	70% Survivability of the planted species for each year after initial planting. Minimum of 109 woody stems/acre consisting of 5 or more woody species per acre (natural recruitment is acceptable to meet the stems per acre metric).	
RIAM	After fifth year verify if pre-project assessment in Section D meets post project ranking as determined by best professional judgment.	

PLANTING PERFORMANCE STANDARDS

The following performance assumes near normal behavior of those conditions generally affecting plant establishment and growth. For example, below normal precipitation may delay performance by vegetation.

A. YEAR 1 (determine around November)

35% cover wetland forbs/emergent and aquatic plants

5% cover of woody species

20% of planted forb and species should be found

80% of RPM woody species planted are alive

B: YEAR 2 (determined around November)

50% cover wetland forbs/emergent and/or hydrophytic plants

5% cover of woody species

20% of planted forb and species should be found

70% of RPM woody species planted are alive

C: YEAR 3-4 (determine around November)

50% cover of wetland forbs/emergent and/or hydrophytic plants

10% cover of woody native species

50% of species of planted forbs should be found

70% survival of RPM woody species planted

D: Year 5 (determine around November) - 75% of the total plant cover within wetlands for which bank credit is sought shall be dominated by species designated obligate wetland or facultative wetland in order to assure the dominant presence are truly wetland species.

E: Planting Performance Year 5

70% survival of RPM woody species planted

80% of relative cover is composed of hydrophytic species

A minimum of 80% hydrophytic species

Minimum of 10 hydrophytic plant species per acre

A minimum of 110 woody stems/acre consisting of 5 or more woody plant species.

F: The use of hydric soils and their associated seed banks will be expected to produce a variety of volunteer native species, both obligate and facultative, which may or may not have been planted but which will be considered as acceptable cover and species in determining compliance with all of the aforesaid performance criterion.

G: On site RIAM will be conducted to determine if as assessed at pre project by best professional judgment.

Where inspected landscape work does not comply with the requirements, replace rejected work and continue specified maintenance until re-inspected by the Wetlands Forever, Inc. Environmental Scientist and found to be acceptable.

Wildlife monitoring - Observations during spring, summer and fall to determine wildlife migration and breeding seasons, nesting, brood-rearing and migratory and/or resident wildlife recruitment over winter.

SECTION I. Monitoring Requirements

A five (5) year monitoring program will be initiated after installation of the planting material for each phase. The Wetlands Forever, Inc., Environmental Scientist shall conduct all monitoring.

Monitoring and data collection will be conducted annually during the first year. The monitoring will be repeated annually through year 5. Monitoring Reports will be written by the Wetlands Forever, Inc. Representative, Environmental Scientist and provided to Corps of Engineers to document all monitoring events in accordance with Regulatory Guidance Letter 06-3. The reports shall provide a description of site assessment, results, and recommendations. Monitoring Report summaries will be prepared and submitted to the Corps of Engineers by December 31 of each scheduled year following the issuance of the mitigation banking instrument. The monitoring will continue for a minimum of five (5) calendar years after planting is completed. At present, we expect the annual reports will be submitted to the Corps of Engineers starting December 31, 2018, and continuing through December 31, 2025.

The following information shall be collected during each monitoring event:

- General ecological condition of the wetland.
- Percent of surviving planted RPM woody species.
- Height and diameter at breast height (dbh) of the trees [ten (10) percent of the total planted.]
- Estimated percent cover of emergent and woody species.
- Hydrologic indicators – depth of inundation, primary and secondary indicators.
- Photographs at four (4) pre-determined locations (locations and view direction are to be marked in the field for consistency at repeat visits, Reference Figure 10.2).
- Wildlife observed.
- Monitoring Data Form (vegetation, hydrology, soils, and comments).

The goals of the monitoring plan are to identify and document wetland functions at the site, specifically the vegetation, hydrology and soil characteristics. A Wetlands Forever, Inc. Representative, Environmental Scientist shall monitor the site for the entire eight -year monitoring plan per phase. The Wetlands Forever, Inc. Representative, Environmental Scientist shall conduct both a random and transect based meander search for each class at every site. The transect meander search will follow defined transects that intersect specific wetland classes on the site. The random meander search will seek to quantify wetland classes on the site. The transect meander will be performed as a baseline, verification of hydrology and final meander search. The random meander search will be performed during regular monitoring events as identified in this Section I. The random search shall be conducted in October - November of each year. The samples will be randomly taken at approximately 200 feet intervals for classes that were seeded and/or planted. The Corps of Engineers Wetland Delineation Manual of 1987 will be used as the standard for this transect sampling.

Hydrology monitoring will utilize a “Water Level Monitoring” device identified as a Telog WLS-31 for a period of 2-3 years until hydrology confirmation is approved. There will be two devices utilized, one in an unchanged area of the mitigation site and another within the modified hydrology zone to document duration and depth modifications. The devices will be installed in the Phase 1 (South) mitigation bank area. Reference Appendix 10.

Compliance inspection by the MBRT may be conducted every year upon their request.

Inspections shall be conducted to assess compliance with long-term performance standards as outlined in the Section H, above.

SECTION J. Long-term Management Plan

The mitigation site will have a long-term management plan that focuses on the survival and success of the forested wetlands being restored. Long term management will be implemented after the performance standards are met.

Heartland Conservancy has been identified as the long-term manager/steward.

STRUCTURE OF LONG-TERM FINANCING

Long-term financing for HeartLands Conservancy's services are outlined above and referenced in Appendix 6. An endowment in the amount of Twenty-Five Thousand dollars ($25,000) will be put into an interest accruing account prior to implementation of mitigation project construction and used for any maintenance requirements once the performance standards have been met for a period of 20 years after submittal of the closeout report. Based upon financing and anticipated forested management action, the non-diminishing endowment will have financial stability in perpetuity.

PROVISIONS FOR LONG-TERM MANAGEMENT AND MAINTENANCE

LONG-TERM CARE

Though Long-term care is not deemed necessary once the project has met the specified performance standards, a management and maintenance plan is located in Appendix 5.

SECTION K. Adaptive Management Plan

During the mitigation bank progress to completion there may be a time when the bank cannot be constructed in accordance with mitigation plan. When this is discovered the Sponsor will notify the Corps immediately and provide an alternative to the activity for approval. Remedial measures will be based on information contained in the monitoring reports (i.e. the attainment of prescribed Performance Standards) and site inspection by the COE and/or MBRT.

Performance standards are established to show that he compensatory mitigation bank is providing ecological benefits as it was planned and intended. However, due to unforeseen circumstances either caused by construction or environmental factors these performance standards may not be met. The sponsor will act immediately once this deficiency is identified and notify the Corps. The sponsor will work with the Corps to rectify the deficiency and determine if the ecological benefits will still be met.

Some of the measures that will be considered to rectify the deficiencies may include site modifications, design changes, altering construction techniques and revising maintenance requirements. These changes will be reviewed by the Corps to ensure they meet the original goals for aquatic resource functions as outlined in the mitigation plan.

Where measures have been taken to overcome deficiencies and management strategies have changed it may be necessary to revise the performance standards. Only will the performance standards be revised if it is agreed that the changes are comparable or exceed the original goals for the aquatic resource functions as outlined in the mitigation plan.

SECTION L. Financial Assurances

STRUCTURE OF ASSURANCE

WFI agrees to provide the following financial assurances for the work and performance described in this Mitigation Plan. WFI shall procure a financial assurance in the form of a Irrevocable Standby Letter of Credit (LC) issued by Germantown Bank for Seventy-Five Thousand Dollars ($75,000). This LC will be established in the event that the Wetlands Forever, Inc. becomes unable or unwilling to comply with the terms of the Mitigation Plan. If the Corps should determine that WFI has failed to perform their compensatory mitigation obligations discussed in this mitigation plan then the financial institution, Germantown Bank will be contacted by the beneficiary who has been instructed by the Corps in writing to draw upon the LC for assurance payouts from Germantown Bank, Germantown, Illinois (Reference Appendix 6). HeartLands Conservancy has been identified by WFI as the beneficiary who agrees to receive and use the funds for the purposes of fulfilling the requirements of this mitigation plan.

The Line of Credit shall be in force for a minimum of five (5) years. The Letter of Credit can be reduced after 2 year performances standards are met in coordination with USACE. The financial assurances may be phased-out or reduced, once it has been demonstrated that the mitigation site is functionally mature and/or self-sustaining (in accordance with performance standards, Section 9.

SECTION M. Credit Release Schedule for the Mitigation Bank Site

SOUTH PHASE (ONE)

The following is a breakdown of credits releases:

- Fifteen (15) percent of the Bank credit will become available for sale upon Charter approval (Approved signatures, Deed Restrictions and Financial Assurances).
- Twenty-five (25) percent will be released based on construction and planting activities have been completed and survival of represent individuals of all emergent and woody species. Construction release to be based on the following schedule:

Construction		25%
	Dirt Work	5%
	Seeding	5%
	Tree Planting	10%
	Stream Work	5%

- Twenty (20) percent shall be released for sale when wetland hydrology has been achieved through out the site as determined by transect monitoring (Reference Section I).
- Ten (10) percent will be released when the 2-year performance standards are met.
- Ten (10) percent will be released when the 5-year performance standards are met.
- Twenty (20) percent of bank credits shall become available for sale when performance standards are met, as referenced in Section I.

NORTH PHASE (TWO)

The following is a breakdown of credits releases:

- Upon submittal of the Phase Two construction start date by the bank sponsor and approval by the Corps, forty (40) percent will be released when construction and planting activities have been completed and survival of represent individuals of all emergent and woody species have been determined by using a time meander search that will randomly sample each class that was seeded or planted.
- Twenty (20) percent shall be released for sale when wetland hydrology has been achieved through out the site as determined by transect monitoring (Reference Section I).
- Ten (10) percent will be released when the 2-year performance standards are met.
- Ten (10) percent will be released when the 5-year performance standards are met.

- Twenty (20) percent of bank credits shall become available for sale when performance standards are met, as referenced in Section I.

Table 4:

Phase1 Total Credits Equals 95.8
Phase 2 Total Credits Equals 44.7

Credit Release		South Phase 1	North Phase 2
Charter Approval/CE/Financial Assurances	15%	14.37	6.71
Construction	25%		
Dirt Work	5%	4.49	2.24
Seeding	5%	4.79	2.24
Tree Planting	10%	9.58	4.47
Stream Work	5%	4.79	2.24
Wetland Hydrology	20%	19.16	8.94
2 Year Performance Standards	10%	9.58	4.47
5 Year Performance Standard	10%	9.58	4.47
Performance Standards Met	20%	19.16	8.94
Total	100%	95.80	44.70

SECTION N Default and Closure Provisions

A. Default Provisions

1. If the Corps determines that the mitigation bank is not meeting performance standards or complying with the terms of the instrument, appropriate action will be taken. Such actions may include, but are not limited to, suspending credit sales, adaptive management, decreasing available credits, utilizing financial assurances, and/or terminating the instrument.

B. Bank Closure Plans

1. A Bank Closure Report (Close-out Report) will be provided upon completion or termination of operation of the Bank. The report will include aquatic resource delineation and Cowardin Classification of each identified resource, pre-construction and current aerial photography, expected land use and management of the site, a finalized ledger, long-term management steward identification and ownership records. It is anticipated that the bank will be a self-sustaining system with no operation or maintenance required.

SECTION O - FORCE MAJEURE

In the event of a complete or partial mitigation area failure attributed to natural catastrophes, such as flood, fire, wind, drought, disease, regional pest infestation, etc., the permittee, Wetlands Forever Inc. or an approved third party, will contact the Corps to evaluate the physical and functional changes to the mitigation site. If such events occur before performance standards are met, Wetlands Forever Inc. or the permittee, with consultation from the USACE and the IRT, will determine the extent of site changes and follow the adaptive management plan outlined to either take corrective action or modify performance standards. The permittee, Wetlands Forever Inc. or an approved third party, will not be held responsible for natural catastrophes that may occur after the mitigation site has successfully met performance standards.

Appendix 1

Survey - Plat

PLAT OF SURVEY

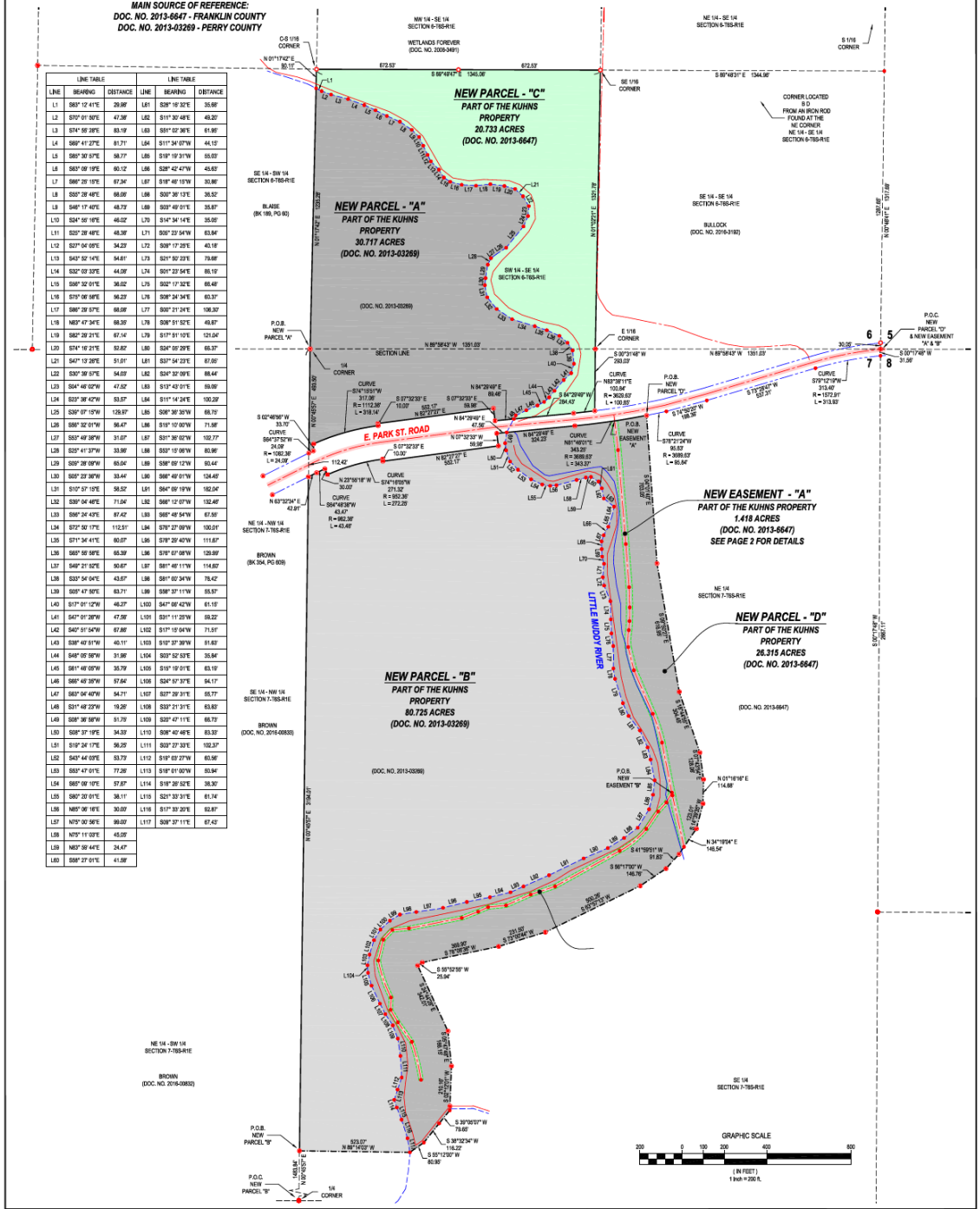
PART OF THE KUHNS PROPERTY

THE SW ¼ - SE ¼ OF SECTION 6, PART OF THE NE ¼ & PART OF THE SE ¼ OF SECTION 7; ALL IN T 6 S, R 1 E OF THE 3RD P.M., FRANKLIN & PERRY COUNTIES, ILLINOIS.

*** * LEGEND * ***

- IRON ROD SET PER S.P.S.
- SURVEY POINT NO MONUMENTATION
- CONCRETE MONUMENT FOUND
- IRON ROD FOUND
- CONCRETE RIGHT-OF-WAY MONUMENT FOUND POST
- IRON ROD SET PER PRIOR S.P.S. SURVEY
- FLOW LINE OF RIVER/CREEK
- CENTERLINE OF ROAD/LANE
- RIGHT-OF-WAY LINE
- EASEMENT LINE
- PROPERTY LINE
- NEW LINE
- P.O.C. POINT OF COMMENCEMENT
- P.O.B. POINT OF BEGINNING

MAIN SOURCE OF REFERENCE:
DOC. NO. 2013-6647 - FRANKLIN COUNTY
DOC. NO. 2013-03269 - PERRY COUNTY



LINE TABLE			LINE TABLE		
LINE	BEARING	DISTANCE	LINE	BEARING	DISTANCE
L1	S83° 12' 41"E	29.98'	L61	S28° 16' 32"E	35.68'
L2	S70° 01' 50"E	47.38'	L62	S11° 30' 48"E	49.20'
L3	S74° 55' 28"E	83.19'	L63	S51° 03' 36"E	61.98'
L4	S69° 41' 27"E	81.71'	L64	S11° 34' 07"W	44.13'
L5	S85° 30' 57"E	58.77'	L65	S18° 15' 31"W	55.03'
L6	S83° 09' 19"E	60.12'	L66	S28° 42' 47"W	43.63'
L7	S66° 25' 15"E	67.34'	L67	S18° 46' 18"W	30.86'
L8	S55° 28' 48"E	68.09'	L68	S00° 36' 13"E	36.52'
L9	S46° 17' 40"E	48.73'	L69	S03° 49' 01"E	35.87'
L10	S34° 55' 16"E	46.02'	L70	S14° 34' 14"E	35.05'
L11	S25° 28' 48"E	48.38'	L71	S05° 23' 54"W	63.84'
L12	S27° 04' 05"E	34.23'	L72	S09° 17' 25"E	40.18'
L13	S43° 52' 14"E	54.81'	L73	S21° 50' 23"E	79.68'
L14	S32° 03' 33"E	44.09'	L74	S01° 23' 54"E	85.15'
L15	S56° 32' 01"E	36.02'	L75	S02° 17' 32"E	68.48'
L16	S75° 06' 58"E	56.23'	L76	S06° 24' 34"E	60.37'
L17	S86° 29' 57"E	68.08'	L77	S00° 21' 24"E	106.30'
L18	N83° 47' 34"E	68.39'	L78	S06° 51' 52"E	49.87'
L19	S82° 29' 21"E	67.14'	L79	S17° 51' 10"E	121.04'
L20	S74° 16' 21"E	52.82'	L80	S24° 00' 29"E	66.37'
L21	S47° 13' 28"E	51.01'	L81	S37° 54' 23"E	87.05'
L22	S30° 39' 57"E	54.03'	L82	S24° 32' 09"E	88.44'
L23	S04° 46' 02"W	47.52'	L83	S13° 43' 01"E	59.09'
L24	S33° 38' 42"W	53.57'	L84	S11° 14' 24"E	100.23'
L25	S30° 07' 15"W	129.97'	L85	S06° 36' 36"W	68.75'
L26	S66° 32' 01"W	56.47'	L86	S15° 10' 00"W	71.58'
L27	S83° 49' 38"W	31.07'	L87	S31° 36' 02"W	102.77'
L28	S25° 41' 37"W	33.99'	L88	S03° 15' 06"W	80.96'
L29	S05° 28' 09"W	65.04'	L89	S56° 05' 12"W	93.44'
L30	S05° 23' 39"W	33.44'	L90	S66° 48' 01"W	124.45'
L31	S10° 57' 15"E	58.52'	L91	S64° 09' 19"W	182.04'
L32	S39° 04' 46"E	71.04'	L92	S66° 12' 07"W	132.48'
L33	S56° 24' 43"E	87.42'	L93	S65° 48' 54"W	67.56'
L34	S72° 50' 17"E	112.51'	L94	S76° 27' 09"W	100.01'
L35	S71° 34' 41"E	80.07'	L95	S76° 29' 40"W	111.67'
L36	S65° 55' 58"E	65.39'	L96	S76° 01' 08"W	129.99'
L37	S49° 21' 52"E	50.67'	L97	S81° 46' 11"W	114.62'
L38	S33° 54' 04"E	43.67'	L98	S81° 07' 34"W	78.42'
L39	S05° 47' 50"E	63.71'	L99	S86° 37' 11"W	55.57'
L40	S17° 01' 12"W	46.27'	L100	S47° 05' 42"W	61.15'
L41	S47° 01' 28"W	47.58'	L101	S31° 11' 25"W	69.22'
L42	S40° 51' 54"W	57.88'	L102	S17° 15' 04"W	71.51'
L43	S38° 40' 51"W	45.11'	L103	S10° 37' 39"W	51.63'
L44	S48° 05' 58"W	31.98'	L104	S03° 52' 53"E	35.84'
L45	S61° 48' 05"W	35.79'	L105	S19° 19' 01"E	63.19'
L46	S66° 45' 35"W	57.64'	L106	S24° 57' 37"E	94.17'
L47	S65° 04' 40"W	54.71'	L107	S27° 29' 31"E	65.77'
L48	S31° 48' 23"W	19.26'	L108	S33° 21' 31"E	63.83'
L49	S08° 36' 58"W	51.79'	L109	S20° 47' 11"E	66.73'
L50	S08° 37' 19"E	34.33'	L110	S06° 40' 46"E	63.32'
L51	S19° 24' 17"E	56.25'	L111	S03° 27' 33"E	102.37'
L52	S43° 44' 03"E	53.73'	L112	S19° 03' 27"W	63.56'
L53	S53° 47' 01"E	77.26'	L113	S18° 01' 00"W	53.94'
L54	S65° 09' 10"E	57.87'	L114	S18° 26' 52"E	38.30'
L55	S80° 20' 01"E	38.11'	L115	S21° 33' 31"E	61.74'
L56	N85° 06' 16"E	30.03'	L116	S17° 33' 20"E	62.87'
L57	N75° 00' 56"E	99.03'	L117	S28° 37' 11"E	67.43'
L58	N75° 11' 03"E	45.05'			
L59	N83° 59' 44"E	24.47'			
L60	S68° 27' 01"E	41.59'			

Requested By:	Drafted by:	LEE OVERTON	Revisions		
	Project Manager:	AARON DILBY			
	Date:	3/15/2018	#	Date	Note
	Reviewed by:	AWD			
ELDON KUHNS	Scale:	1"=200'			
	Job Number:	2017-607			
	Sheet:	1 OF 2			
	Drawing Status				
	☒ Preliminary Drawing				
	☐ Final Drawing				

This Professional Service Conforms To The Current Illinois Minimum Standards of Practice Applicable To Boundary Surveys.

PLAT OF SURVEY

PART OF THE KUHNS PROPERTY

THE SW ¼ - SE ¼ OF SECTION 6, PART OF THE NE ¼ & PART OF THE SE ¼ OF SECTION 7; ALL IN T 6 S, R 1 E OF THE 3RD P.M., FRANKLIN & PERRY COUNTIES, ILLINOIS.

Path: S:\2017\PERRY\2017-607 ELDON KUHNS\DBL\ERABLES\DWG\2017-607.DWG

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(618) 658-6065

901 NORTH DuQUOIN STREET
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(618) 439-9447

BEARINGS ARE REFERENCED TO ILLINOIS STATE PLANE COORDINATES - EAST ZONE NAD 83

Appendix 2

Title Report for Property

"Forthcoming – Site is scheduled for purchase in the next 30 days and Title Report will be included. No anticipated problems are expected, no permanent easements or leases that will conflict with Conservation Easement requirements. "

Appendix 3

Conservation Easement

CONSERVATION EASEMENT

THIS DEED OF CONSERVATION EASEMENT is given this 5th day of June, 2018, by **Wetlands Forever, Incorporated**, having an address of 112 N. Sunset Drive, Bartelso, Illinois 62218 ("Grantor") to **HeartLands Conservancy**, an Illinois not-for-profit, having an address of 406 East Main Street, Mascoutah, Illinois ("Grantee"). As used herein, the term "Grantor" shall include any and all heirs, successors, or assigns of the Grantor, and all subsequent owners of the Property (as hereinafter defined), and the term "Grantee" shall include any successor or assignee of Grantee.

WITNESSETH:

WHEREAS, Grantor is the sole owner in fee simple title of certain lands situated in Perry and Franklin Counties, ILLINOIS, more particularly described in Exhibit(s),

LEGAL DESCRIPTION OF PROPERTY AND EXHIBIT identified as NEW PARCEL "A through D"

attached hereto and incorporated herein ("Property"), and

WHEREAS, Department of the Army Permit No. 2018-xxx of the U.S. Army Corps of Engineers ("Corps") (hereinafter referred to as the "Permit") authorizes certain activities which affect waters of the United States; and

WHEREAS, the permit requires that Grantor preserve, enhance, restore, or mitigate wetlands or uplands located on the Property and under the jurisdiction of the Corps; and

WHEREAS, Grantor, in consideration of the issuance of the permit to construct and operate the permitted activity, and as an inducement to Grantee and the Corps to issue the Permits, is willing to grant a perpetual Conservation Easement over the Property; and

WHEREAS, Grantee represents that it is a publicly supported, tax-exempt, not-for-profit corporation and a qualified organization under sections 501(c)(3) and 170(h), respectively, of the IRC (26 U.S.C. 501(c)(3), 170(h)) and the regulations promulgated thereunder, and is a qualified conservation organization, as defined by the IRC, whose primary purpose is preservation, protection, or enhancement of land in its natural agricultural, forested, and/or open space condition, and, as certified by resolution of its board of directors, accepts the responsibility of enforcing the terms of this deed and upholding its conservation purposes forever.

NOW THEREFORE, in consideration of the above and mutual covenants, terms conditions, and restrictions contained herein, together with other good and valuable consideration, the adequacy and receipt of which is hereby acknowledged, Grantor hereby voluntarily grants and conveys a perpetual Conservation Easement for and in favor of Grantee upon the property, which shall run with the land and be binding upon the Grantor, and shall remain in full force and effect forever.

The scope, nature, and character of this Conservation Easement shall be as follows:

1. **Purpose:** The purpose of this Conservation Easement is to retain and maintain land or water areas on the Property in their natural, vegetative, hydrologic, scenic, open, agricultural, or wooded condition and to retain such areas as suitable habitat for fish, plants, or wildlife. Those wetland or upland areas that are to be restored, enhanced, or created pursuant to the Permit shall be retained and maintained in the restored, enhanced, or created condition required by the Permit.

2. **Rights of Grantee:** The following rights are conveyed to Grantee and the Corps by this easement:

a. The right to take action to preserve and protect the environmental value of the Property; and

b. The right to prevent any activity on or use of the Property that is inconsistent with the purpose of this Conservation Easement, and to require the restoration of areas or features of the Property that may be damaged by any inconsistent activity or use;

c. The right to enter upon and inspect the Property in a reasonable manner and at reasonable times to determine if Grantor is complying with the covenants and prohibitions contained in this Conservation Easement; and

d. The right to proceed at law or in equity to enforce the provisions of this Conservation Easement, and to prevent the occurrence of any of the prohibited activities hereinafter set forth.

3. **Prohibited Uses:** Except for restoration, creation, enhancement, maintenance, and monitoring activities, or surface water management improvements, which are permitted or required by the Permit, the following activities are prohibited on the Property:

a. Construction or placing of buildings, roads, signs, billboards or other advertising, utilities, or other structures on or above the ground, or the construction or placing of structures below the ground that may impact the surface of the Property;

b. Dumping or placing of soil or other substance or material as landfill, or dumping or placing of trash, waste, or unsightly or offensive materials;

c. Removal or destruction of trees, shrubs, or other vegetation, except as may be permitted by the Permit, and except for the removal of nuisance, exotic, or non-native vegetation in accordance with a maintenance plan approved by Grantee;

d. Planting of undesirable plant species identified on the attached list;

e. Exploration for, or extraction of, oil or gas in such a manner as to affect the surface, or excavation, dredging, or removal of coal, loam, peat, gravel, soil, rock, or other material substance, except as may be permitted or required by the Permit;

f. Use of motorized and non-motorized vehicles, the keeping or riding of horses, grazing, livestock confinement, or other surface use that may affect the natural condition of the Property, except for vehicle use for purposes of maintenance and upkeep, or as otherwise may be permitted or required by the Permit;

g. Tilling, plowing, planting of crops, digging, mining, or other activities that are or may be detrimental to drainage, flood control, water conservation, water quality, erosion control, soil conservation, or fish and wildlife habitat preservation, including but not limited to ditching, diking, and fencing, except as permitted or required by the Permit;

h. The extraction of water from the Property or adjacent properties owned by Grantor, or the impoundment of water on the Property or on adjacent properties owned by Grantor, so as to affect the hydrology of the Property;

i. Acts or uses detrimental to the aforementioned retention and maintenance of land or water areas;

j. Acts or uses detrimental to the preservation of the structural integrity or physical appearance of sites or properties of historical, architectural, archaeological, or cultural significance.

k. The subdivision of the Property.

4. **Reserved Rights:** Grantor reserves all rights as owner of the Property, including the right to engage in uses of the Property that are not prohibited herein and that are not inconsistent with any Corps rule, criteria, permit, or the intent and purposes of this Conservation Easement.

5. **Taxes:** Grantor shall pay any and all applicable real property taxes and assessments levied by competent taxing authority on the Property.

6. **Maintenance:** Grantor shall, at Grantor's sole expense, operate, maintain and keep up the Property consistent with the purpose of this Conservation Easement. The Grantor shall maintain the hydrology of the Property as required by the Permit. Grantee shall remove from the Property any undesirable plant species identified on the attached list.

7. **Hazardous Waste:** Grantor covenants that if any hazardous substances or toxic waste exist or has been generated, treated, stored, used, disposed of, or deposited in or on the Property, or there are or have been any underground storage tanks on the Property, Grantor shall be responsible for any and all necessary costs of remediation.

8. **Public Access:** No right of access by the general public to any portion of the Property is conveyed by this Conservation Easement. Grantor further covenants not to hold any portion of the Property open to general use by the public except with the written permission of the Corps and Grantee.

9. **Liability:** Grantor shall continue to retain all liability for any injury or damage to the person or property of third parties that may occur on the Property arising from ownership of the Property. Neither Grantor, nor any person claiming by or through Grantor, shall hold Grantee or the Corps liable for any damage or injury that may occur on the Property.

10. **Recording Requirements:** Grantor shall record this Conservation Easement in the official records of Fayette County, ILLINOIS, and shall re-record it at any time Grantee or the Corps may require to preserve their rights. Grantor shall pay all recording costs, fees and taxes necessary at any time to record this Conservation Easement in the public records. Grantor shall thereafter insert the terms and restrictions of this Conservation Easement in any subsequent deed or other legal instrument by which Grantor divests himself/herself/itself of any interest in the Property, and shall provide a photocopy of the recorded Conservation Easement to the new owner(s).

11. **Enforcement:** The terms and conditions of this Conservation Easement may be enforced in an action at law or equity by the Grantee or the Corps against the Grantor or any other party violating or attempting to violate these Restrictions as follows:

a. Enforcement of this Conservation Easement shall be at the reasonable discretion of the Grantee unless the Grantee decides not to enforce a violation of this Easement or prevent a threat to the Easement, then the Corps reserves the right to enforce or prevent a threat to the Easement;

b. If Grantee determines that a violation of the terms of this Easement has occurred or is threatened, Grantee shall give written notice to the Grantor of such violation and demand corrective action sufficient to cure the violation and where the violation involves injury to the Property resulting from any use or activity inconsistent with the purpose of this Easement, to restore the portion of the Property so injured to its condition prior to the violation complained of in accordance with a plan approved by Grantee;

c. If Grantor fails to cure the violation within thirty (30) days after receipt of notice thereof from Grantee or, under circumstances where the violation cannot reasonably be cured within a thirty (30) day period, fails to begin curing such violation within the thirty (30) day period, or fails to continue diligently to cure such violation until finally cured, Grantee may bring an action in law or in equity in a court of competent jurisdiction to enforce the terms of this Easement, to enjoin the violation, ex parte as necessary, by temporary or permanent injunction, and to require the restoration of the Property to the condition that existed prior to any such injury;

d. Any forbearance on behalf of Grantee to exercise its rights under this Easement in the event of any breach of any term of this Easement by Grantor shall not be deemed or construed to be a waiver of rights by Grantee.

e. Any costs incurred in enforcing, judicially or otherwise, the terms, provisions, and restrictions of this Conservation Easement, including without limitation, the costs of suit, and attorney's fees, shall be borne by and recoverable against the non-prevailing party in such proceedings, except that such costs shall not be recoverable against the Corps. In addition, if the Grantee or the Corps shall prevail in an enforcement action, such party shall also be entitled to recover that party's cost of restoring the land to the natural vegetative and hydrologic condition existing at the time of execution of these Restrictions or to the vegetative and hydrologic condition required by the Permits.

12. **Assignment of Rights:** Grantee shall hold this Conservation Easement exclusively for conservation purposes. Grantee will not assign its rights and obligations under this Conservation Easement, except to another legal entity qualified to hold such interests under applicable state and federal laws and committed to holding this Conservation Easement exclusively for the purposes stated herein. Grantee shall notify the Corps (at the address specified in Section 14 below) in writing of any intention to reassign this Conservation Easement to a new grantee at least sixty (60) days in advance thereof, and the Corps must acknowledge the assignment in writing. The new grantee shall then deliver a written acceptance to the Corps office specified in Section 14. The assignment instrument must then be recorded and indexed in the same manner as any other

instrument affecting title to real property and a copy of the assignment instrument shall be furnished to the Corps office specified in Section 14. Failure to comply with the assignment procedure herein stated shall result in invalidity of the assignment. In the event of dissolution of the Grantee or any successor, or failure for sixty (60) days or more to perform the obligations of this Conservation Easement, the Grantee shall transfer this Conservation Easement to a qualified and willing grantee. Upon failure of the Grantee or any successor to so transfer the Conservation Easement, the Corps shall have the right to sue to force such an assignment to a grantee to be identified by the Court.

13. **Successors:** The covenants, terms, conditions, and restrictions of this Conservation Easement shall be binding upon, and inure to the benefit of the parties hereto and their respective personal representatives, heirs, successors, and assigns, and shall continue as a servitude running in perpetuity with the Property.

14. **Notices:** All notices, consents, approvals, or other communications hereunder shall be in writing and shall be deemed properly given if sent by United States certified mail, return receipt requested, addressed to the appropriate party or successor-in-interest.

HeartLands Conservancy

406 East Main Street

Mascoutah, Illinois 62258

U.S. Army Corps of Engineers, Regulatory Branch

1222 Spruce Street

St. Louis, Missouri 63103

15. **Severability:** If any provision of this Conservation Easement or the application thereof to any person or circumstances is found to be invalid, the remainder of the provisions of this Conservation Easement shall not be affected thereby, as long as the purpose of the Conservation Easement is preserved.

16. **Alteration or Revocation:** This Conservation Easement may be amended, altered, released, canceled, or revoked only by written agreement between the parties hereto or their heirs, assigns, or successors in interest, which shall be filed in the public records of Fayette County, ILLINOIS. No action shall be taken, however, without advance written approval thereof by the Corps office specified in Section 14 above. Corps approval shall be by letter attached as an exhibit to the document amending, altering, canceling, or revoking the Conservation Easement, and said letter shall be informal and shall not require notarization. It is understood and agreed that Corps approval requires a minimum of sixty (60) days written notice, and that the Corps may require substitute or additional mitigation, a separate conservation easement or alternate deed restrictions, or other requirements as a condition of approval. Any amendment, alteration, release, cancellation, or revocation together with written Corps approval thereof shall then be filed in the public records of Fayette County, ILLINOIS, within 30 days thereafter.

17. **Controlling Law:** The interpretation and performance of this Conservation Easement shall be governed by the laws of the State of ILLINOIS.

TO HAVE AND TO HOLD unto Grantee forever. The covenants, terms, conditions, restrictions, and purpose imposed with this Conservation Easement shall be binding upon Grantor, and shall continue as a servitude running in perpetuity with the property.

GRANTOR FURTHER COVENANTS that Grantor is lawfully seised of said Property in fee simple; that the Property is free and clear of all encumbrances that are inconsistent with the terms of this Conservation Easement and that no mortgages or other liens exist; that Grantor has good, right and lawful authority to convey this Conservation Easement, and that it hereby fully warrants and defends the title to the Conservation Easement hereby conveyed against the lawful claims of all persons whomsoever.

TO HAVE AND TO HOLD unto Grantee, its successors, and assigns forever.

GRANTOR: **Wetlands Forever, Incorporated**

_____
Michael Thompson

Subscribed and sworn to before me this _____day of _____2018.

_____
Notary Public

GRANTEE: **HeartLands Conservancy**, an Illinois not-for-profit Corporation,

By _____
Robert J. Hilgenbrink, Chair

Subscribed and sworn to before me this _____day of _____2018.

_____
Notary Public

CONSERVATION EASEMENT APPENDIX FOR PARCEL

Re: This tract of land is located in and being a part of fractional Section 7, Township 6 South, Range 1 West of the Third Principal Meridian, Franklin and Perry Counties, Illinois.

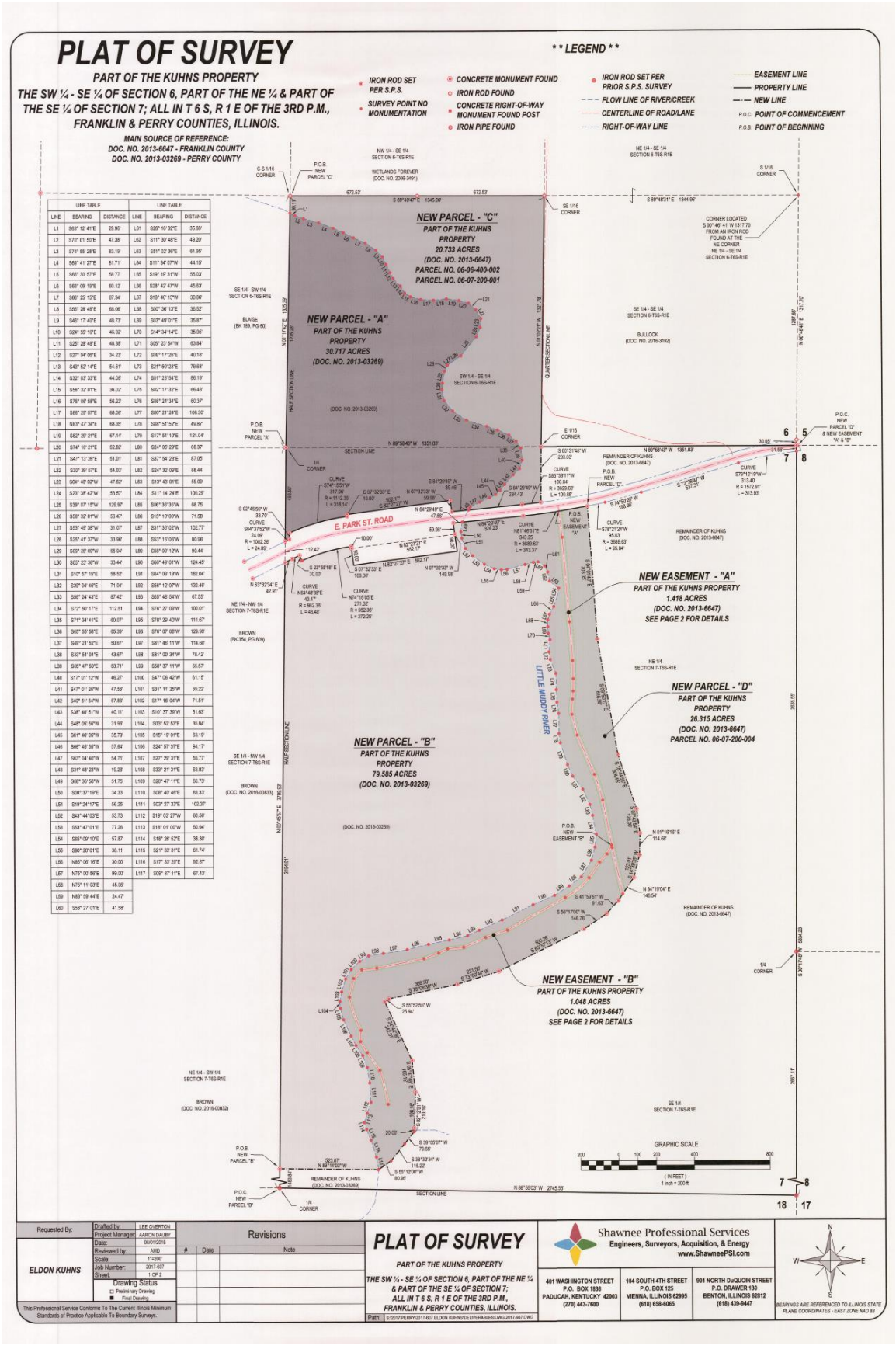
Background:

The Wetland Mitigation Plan for the sites identifies two (2) phases of construction. These phases are identified as the South Phase (1) and the North Phase (2). Due to scheduling, potential risk and credit requirements, the site will be constructed in two phases to address these issues. The Bank Sponsor would like to record one conservation easement for the project. However, the North Phase (2) will be under the total project conservation easement and "Prohibited Uses" will be applicable.

The Bank Sponsor recommends that a Letter of Construction for the North Phase (2) be allowed to activate the formal binding "Prohibited Uses, Item g" for "Tilling, plowing, planting of crops" only related to the conservation easement for this North Phase(2). The result will be that the North Phase "Prohibited Uses, Item g" will not be actived until this Letter of Construction is submitted to the St. Louis District Corps of Engineers. Thus, the acreage in question can on be used for "Tilling, plowing, planting of crops" until such time as the North Phase (2) is activated.

Exceptions:

Section 7, Township 6 South, Range 1 West of the Third Principal Meridian, Franklin and Perry Counties, Illinois relating to the North Phase (2) will waive "Prohibited Uses, Item g" for "Tilling, plowing, planting of crops" until a Letter of Construction is submitted to the St. Louis District Corps of Engineers for the North Phase (2) construction start date.



LINE TABLE			LINE TABLE		
LINE	BEARING	DISTANCE	LINE	BEARING	DISTANCE
L1	S63° 12' 41"E	29.96'	L61	S26° 16' 32"E	35.66'
L2	S70° 01' 50"E	47.38'	L62	S11° 30' 48"E	49.20'
L3	S74° 59' 28"E	83.19'	L63	S51° 02' 36"E	61.95'
L4	S68° 41' 27"E	81.71'	L64	S11° 34' 07"W	44.15'
L5	S66° 30' 57"E	58.77'	L65	S19° 16' 31"W	55.03'
L6	S63° 09' 19"E	60.12'	L66	S28° 42' 47"W	45.63'
L7	S66° 25' 15"E	67.34'	L67	S18° 46' 15"W	30.86'
L8	S55° 28' 48"E	68.06'	L68	S00° 36' 13"E	36.52'
L9	S46° 17' 40"E	48.73'	L69	S03° 49' 01"E	35.87'
L10	S24° 55' 16"E	46.02'	L70	S14° 34' 14"E	35.95'
L11	S25° 28' 48"E	48.38'	L71	S05° 23' 54"W	63.84'
L12	S27° 04' 06"E	34.23'	L72	S09° 17' 25"E	40.18'
L13	S43° 52' 14"E	54.61'	L73	S21° 50' 23"E	78.68'
L14	S32° 03' 33"E	44.08'	L74	S01° 23' 54"E	66.19'
L15	S56° 32' 01"E	36.02'	L75	S02° 17' 32"E	66.48'
L16	S75° 09' 58"E	56.23'	L76	S08° 24' 34"E	60.37'
L17	S86° 29' 57"E	68.08'	L77	S00° 21' 24"E	106.30'
L18	N83° 47' 34"E	68.39'	L78	S05° 51' 52"E	49.87'
L19	S62° 29' 21"E	67.14'	L79	S17° 51' 10"E	121.04'
L20	S74° 16' 21"E	52.82'	L80	S24° 05' 29"E	66.37'
L21	S47° 13' 26"E	51.01'	L81	S37° 54' 23"E	87.05'
L22	S33° 39' 57"E	54.03'	L82	S24° 32' 09"E	88.44'
L23	S04° 48' 02"W	47.52'	L83	S13° 43' 01"E	59.09'
L24	S23° 38' 42"W	53.57'	L84	S11° 14' 24"E	100.29'
L25	S38° 07' 15"W	129.97'	L85	S06° 36' 35"W	68.75'
L26	S56° 32' 01"W	56.47'	L86	S15° 10' 00"W	71.58'
L27	S53° 49' 35"W	31.07'	L87	S31° 36' 02"W	102.77'
L28	S25° 41' 37"W	33.96'	L88	S53° 15' 06"W	80.96'
L29	S05° 28' 09"W	55.04'	L89	S58° 09' 12"W	90.44'
L30	S05° 23' 36"W	33.44'	L90	S66° 49' 01"W	124.45'
L31	S10° 57' 15"E	58.52'	L91	S64° 09' 18"W	182.04'
L32	S39° 04' 48"E	71.04'	L92	S65° 12' 07"W	132.46'
L33	S56° 34' 43"E	87.42'	L93	S65° 48' 54"W	67.55'
L34	S72° 50' 17"E	112.51'	L94	S76° 27' 09"W	100.01'
L35	S71° 34' 41"E	60.07'	L95	S76° 29' 40"W	111.67'
L36	S65° 55' 58"E	65.39'	L96	S76° 07' 08"W	129.98'
L37	S49° 21' 52"E	50.67'	L97	S81° 46' 11"W	114.60'
L38	S33° 54' 04"E	43.67'	L98	S81° 00' 34"W	78.42'
L39	S05° 47' 50"E	53.71'	L99	S58° 37' 11"W	55.57'
L40	S17° 01' 12"W	46.27'	L100	S47° 06' 42"W	61.15'
L41	S47° 01' 26"W	47.58'	L101	S31° 11' 25"W	59.22'
L42	S40° 51' 54"W	57.89'	L102	S17° 15' 04"W	71.51'
L43	S38° 40' 51"W	40.11'	L103	S10° 37' 39"W	51.63'
L44	S48° 05' 59"W	31.96'	L104	S03° 52' 53"E	35.84'
L45	S61° 48' 05"W	35.79'	L105	S15° 19' 01"E	63.19'
L46	S66° 45' 35"W	57.64'	L106	S24° 57' 37"E	94.17'
L47	S63° 04' 40"W	54.71'	L107	S27° 29' 31"E	55.77'
L48	S31° 48' 23"W	19.28'	L108	S33° 21' 31"E	63.83'
L49	S08° 36' 58"W	51.75'	L109	S20° 47' 11"E	66.73'
L50	S09° 37' 15"E	34.33'	L110	S06° 40' 48"E	83.33'
L51	S19° 34' 17"E	56.25'	L111	S03° 27' 33"E	102.37'
L52	S43° 44' 53"E	53.73'	L112	S15° 02' 27"W	60.56'
L53	S53° 47' 01"E	77.28'	L113	S18° 01' 00"W	50.94'
L54	S85° 09' 10"E	57.87'	L114	S18° 26' 52"E	38.30'
L55	S80° 20' 01"E	38.11'	L115	S21° 33' 31"E	61.74'
L56	N85° 06' 16"E	30.00'	L116	S17° 33' 20"E	92.67'
L57	N75° 00' 58"E	99.00'	L117	S09° 37' 11"E	67.43'
L58	N75° 11' 03"E	45.05'			
L59	N83° 59' 44"E	24.47'			
L60	S58° 27' 01"E	41.58'			

PLAT OF SURVEY

PART OF THE KUHNS PROPERTY

THE SW ¼ - SE ¼ OF SECTION 6, PART OF THE NE ¼ & PART OF THE SE ¼ OF SECTION 7; ALL IN T 6 S, R 1 E OF THE 3RD P.M., FRANKLIN & PERRY COUNTIES, ILLINOIS.

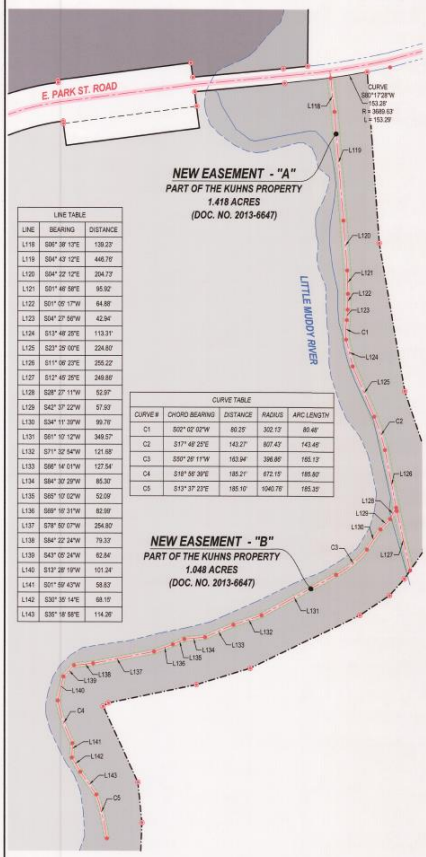
MAIN SOURCE OF REFERENCE:
DOC. NO. 2013-6647 - FRANKLIN COUNTY
DOC. NO. 2013-03269 - PERRY COUNTY

SURVEYOR'S NOTES & REFERENCES

1) PURPOSE OF SURVEY - TO CREATE NEW PARCELS "A", "B", "C" & "D" AND NEW EASEMENTS "A" & "B" AS SHOWN HEREIN.
2) THIS SURVEYOR WAS NOT PROVIDED WITH A TITLE COMMITMENT AT THE TIME OF SURVEY.
3) REFERENCE IS MADE TO A SURVEY BY BRIGHT, IPLS 1912, DATED 8/24/2004, RECORDED IN BOOK 162, PAGE 7).
4) REFERENCE IS MADE TO A SURVEY BY ABERNATHY, IPLS 3536, FOR MILLER, DATED 6/24/2004, SHAWNEE PROFESSIONAL SERVICES (JOB # 2004-159).
5) REFERENCE IS MADE TO A SURVEY BY ABERNATHY, IPLS 3536, FOR LINDSEY, DATED 6/29/2004, SHAWNEE PROFESSIONAL SERVICES (JOB # 2004-158).
6) REFERENCE IS MADE TO A SURVEY BY SHAFER, IPLS 2754, FOR BULLOCK, DATED 5/18/2005, LAWRENCE LIPE & ASSOCIATES (JOB # 004.199).
7) REFERENCE IS MADE TO A MONUMENT RECORD BY ABERNATHY, IPLS 3536, DATED 3/9/2006, RECORDED IN DOCUMENT NUMBER 2006-1477.
8) REFERENCE IS MADE TO A MONUMENT RECORD BY ABERNATHY, IPLS 3536, DATED 3/9/2006, RECORDED IN DOCUMENT NUMBER 2006-1478.
9) REFERENCE IS MADE TO A SURVEY BY SHOCKLEY, IPLS 3621, FOR THOMPSON, DATED 3/26/2007, LAWRENCE LIPE & ASSOCIATES (JOB # 007.16).
10) REFERENCE IS MADE TO A SURVEY BY DAUBY, IPLS 3878, FOR HALL, DATED 9/23/2016, SHAWNEE PROFESSIONAL SERVICES (JOB # 2016-081).
11) REFERENCE IS MADE TO A SURVEY BY DAUBY, IPLS 3878, FOR AMEC, DATED 11/22/2016, SHAWNEE PROFESSIONAL SERVICES (JOB # 2016-423).
12) REFERENCE IS MADE TO A SURVEY BY DAUBY, IPLS 3878, FOR WALKER, DATED 6/16/2017, SHAWNEE PROFESSIONAL SERVICES (JOB # 2017-226).
13) REFERENCE IS MADE TO RIGHT-OF-WAY PLANS OF PARK STREET, PER THE PERRY COUNTY ENGINEER.
14) IRON RODS SET PER S.P.S. AND IRON RODS SET PER PRIOR S.P.S. SURVEY ARE 24" LONG, 1/2" DIAMETER REBAR WITH A SURVEY KAP UNLESS OTHERWISE NOTED.

** LEGEND **

- IRON ROD SET PER S.P.S.
- SURVEY POINT NO MONUMENTATION
- CONCRETE MONUMENT FOUND
- IRON ROD FOUND
- CONCRETE RIGHT-OF-WAY MONUMENT FOUND POST
- IRON ROD SET PER PRIOR S.P.S. SURVEY
- FLOW LINE OF RIVER/CREEK
- CENTERLINE OF ROAD/LANE
- RIGHT-OF-WAY LINE
- EASEMENT LINE
- PROPERTY LINE
- NEW LINE
- P.O.C. POINT OF COMMENCEMENT
- P.O.B. POINT OF BEGINNING



NEW EASEMENT - "A"
PART OF THE KUHNS PROPERTY
1.418 ACRES
(DOC. NO. 2013-6647)

LINE TABLE		
LINE	BEARING	DISTANCE
L118	S86° 39' 13"E	139.23'
L119	S04° 43' 12"E	446.76'
L120	S04° 22' 12"E	204.73'
L121	S01° 48' 58"E	95.92'
L122	S01° 05' 17"W	64.88'
L123	S04° 27' 58"W	42.94'
L124	S13° 48' 28"E	113.31'
L125	S23° 25' 00"E	224.80'
L126	S11° 06' 23"E	255.22'
L127	S12° 45' 25"E	249.66'
L128	S28° 27' 11"W	52.97'
L129	S42° 37' 22"W	57.53'
L130	S34° 11' 39"W	99.78'
L131	S61° 15' 12"W	349.57'
L132	S71° 32' 54"W	121.68'
L133	S66° 14' 01"W	127.54'
L134	S84° 30' 29"W	85.30'
L135	S65° 15' 02"W	52.09'
L136	S69° 16' 31"W	82.39'
L137	S78° 50' 57"W	254.90'
L138	S84° 22' 24"W	79.33'
L139	S43° 05' 24"W	82.84'
L140	S12° 28' 19"W	101.24'
L141	S01° 59' 43"W	59.83'
L142	S30° 35' 14"E	68.15'
L143	S35° 18' 58"E	114.26'

CURVE TABLE				
CURVE #	CHORD BEARING	DISTANCE	RADIUS	ARC LENGTH
C1	S02° 02' 02"W	89.25'	302.13'	89.48'
C2	S17° 48' 23"E	143.27'	907.43'	143.44'
C3	S50° 26' 11"W	163.94'	396.80'	165.13'
C4	S18° 58' 39"E	185.21'	672.15'	185.80'
C5	S13° 37' 23"E	185.10'	1040.78'	185.35'

NEW EASEMENT - "B"
PART OF THE KUHNS PROPERTY
1.048 ACRES
(DOC. NO. 2013-6647)

GRAPHIC SCALE
200 0 100 200 400 800
(IN FEET)
1 inch = 200 ft.

SURVEYORS CERTIFICATION

STATE OF ILLINOIS
COUNTY OF FRANKLIN

THIS IS TO STATE, AT THE REQUEST OF ELDON KUHNS, I, AARON M. DAUBY, AN ILLINOIS PROFESSIONAL LAND SURVEYOR, MADE A SURVEY AS SHOWN HEREIN, AND THAT SAID SURVEY WAS PERFORMED TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF.

DATED THIS 1ST DAY OF JUNE, 2018 AT BENTON, ILLINOIS

AARON M. DAUBY - IL. PROFESSIONAL LAND SURVEYOR NO. 3878
LICENSE EXPIRES: 11/30/2019
FIELDWORK COMPLETED: 6/01/2018
FIRM LICENSE #: 184-002344

AARON M. DAUBY 035003878 PROFESSIONAL LAND SURVEYOR STATE OF ILLINOIS

DESCRIPTION OF SURVEY- NEW PARCEL "A"

30.717 ACRES - PART OF THE KUHNS PROPERTY

A PARCEL OF LAND BEING PART OF THE SOUTHWEST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 6 AND PART OF THE NORTHEAST QUARTER OF SECTION 7, TOWNSHIP 6 SOUTH, RANGE 1 EAST OF THE THIRD PRINCIPAL MERIDIAN. SAID PARCEL IS PART OF THE PROPERTY DESCRIBED AND RECORDED IN DOCUMENT NUMBER 2013-03269, IN THE PERRY COUNTY COURTHOUSE IN THE NAME OF ELDON A. AND RUTH KUHNS, DATED 12/12/2013. SAID PARCEL BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT A CONCRETE MONUMENT FOUND AT THE SOUTHWEST CORNER OF SAID QUARTER-QUARTER SECTION; THENCE N 01° 17' 42" E 1235.28 FEET ALONG THE WEST LINE OF SAID QUARTER-QUARTER SECTION TO A POINT IN THE CENTERLINE OF THE LITTLE MUDDY RIVER; THENCE ALONG SAID CENTERLINE THE FOLLOWING FORTY-EIGHT (48) CALLS: THENCE S 63° 12' 41" E 29.56 FEET TO A POINT; THENCE S 70° 01' 50" E 47.38 FEET TO A POINT; THENCE S 74° 55' 28" E 83.19 FEET TO A POINT; THENCE S 85° 43' 27" E 91.71 FEET TO A POINT; THENCE S 85° 30' 57" E 58.77 FEET TO A POINT; THENCE S 63° 09' 19" E 61.12 FEET TO A POINT; THENCE S 66° 25' 15" E 67.34 FEET TO A POINT; THENCE S 55° 28' 49" E 69.06 FEET TO A POINT; THENCE S 46° 17' 40" E 48.73 FEET TO A POINT; THENCE S 24° 55' 19" E 40.22 FEET TO A POINT; THENCE S 22° 28' 48" E 48.36 FEET TO A POINT; THENCE S 27° 04' 03" E 34.23 FEET TO A POINT; THENCE S 43° 32' 14" E 54.61 FEET TO A POINT; THENCE S 50° 03' 32" E 44.08 FEET TO A POINT; THENCE S 56° 32' 01" E 39.02 FEET TO A POINT; THENCE S 79° 06' 58" E 56.23 FEET TO A POINT; THENCE S 85° 29' 57" E 68.08 FEET TO A POINT; THENCE N 83° 47' 34" E 68.39 FEET TO A POINT; THENCE S 82° 28' 19" E 67.14 FEET TO A POINT; THENCE S 74° 16' 27" E 52.67 FEET TO A POINT; THENCE S 47° 13' 20" E 51.01 FEET TO A POINT; THENCE S 00° 02' W 47.52 FEET TO A POINT; THENCE S 22° 38' 42" W 53.57 FEET TO A POINT; THENCE S 39° 07' 15" W 129.97 FEET TO A POINT; THENCE S 59° 32' 01" W 56.47 FEET TO A POINT; THENCE S 59° 49' 39" W 31.07 FEET TO A POINT; THENCE S 25° 41' 37" W 33.96 FEET TO A POINT; THENCE S 08° 28' 59" W 69.04 FEET TO A POINT; THENCE S 06° 23' 36" W 33.44 FEET TO A POINT; THENCE S 10° 07' 15" E 58.52 FEET TO A POINT; THENCE S 39° 04' 49" E 31.04 FEET TO A POINT; THENCE S 56° 24' 43" E 71.54 FEET TO A POINT; THENCE S 72° 50' 17" E 112.61 FEET TO A POINT; THENCE S 71° 34' 41" E 60.07 FEET TO A POINT; THENCE S 60° 58' 58" E 65.39 FEET TO A POINT; THENCE S 49° 21' 52" E 50.67 FEET TO A POINT; THENCE S 33° 54' 04" E 43.67 FEET TO A POINT; THENCE S 08° 47' 52" E 63.71 FEET TO A POINT; THENCE S 17° 31' 12" W 46.27 FEET TO A POINT; THENCE S 47° 01' 26" W 47.59 FEET TO A POINT; THENCE S 40° 5' 54" W 67.86 FEET TO A POINT; THENCE S 38° 40' 51" W 40.11 FEET TO A POINT; THENCE S 48° 06' W 31.56 FEET TO A POINT; THENCE S 61° 46' 00" W 35.79 FEET TO A POINT; THENCE S 69° 46' 30" W 57.94 FEET TO A POINT; THENCE S 63° 54' 40" W 84.71 FEET TO A POINT; THENCE S 51° 48' 23" W 19.26 FEET TO A POINT IN THE NORTH RIGHT-OF-WAY LINE OF EAST PARK STREET ROAD; THENCE ALONG SAID NORTH RIGHT-OF-WAY LINE THE FOLLOWING SEVEN (7) CALLS: THENCE S 84° 39' 49" W 69.46 FEET TO A POINT; THENCE S 85° 28' 49" W 69.06 FEET TO A POINT; THENCE N 01° 32' 39" W 89.98 FEET TO AN IRON ROD SET; THENCE S 82° 27' 29" W 552.17 FEET TO AN IRON ROD SET; THENCE S 07° 32' 33" E 10.00 FEET TO AN IRON ROD SET; THENCE ALONG A CURVE TO THE LEFT WITH CHORD BEARING S 74° 15' 51" W 317.06 FEET, A RADIUS OF 1112.36 FEET, AND AN ARC LENGTH OF 318.14 FEET TO AN IRON ROD SET; THENCE S 02° 46' 56" W 33.70 FEET TO AN IRON ROD SET; THENCE ALONG A CURVE TO THE LEFT WITH CHORD BEARING S 84° 37' 52" W 24.09 FEET, A RADIUS OF 1062.36 FEET, AND AN ARC LENGTH OF 24.09 FEET TO AN IRON ROD SET IN THE WEST LINE OF SAID QUARTER SECTION; THENCE N 00° 45' 57" E 493.90 FEET ALONG THE WEST LINE OF SAID QUARTER SECTION TO THE POINT OF BEGINNING.

SAID PARCEL TO CONTAIN 30.717 ACRES, MORE OR LESS, PER SURVEY BY AARON M. DAUBY, IL PROFESSIONAL LAND SURVEYOR NO. 3878, DATED 05/3/2018.
SAID PARCEL BEING SUBJECT TO ALL RIGHTS-OF-WAY AND EASEMENTS, ALL RIGHTS-OF-WAY AND EASEMENTS, RECORDED OR OTHERWISE. ALL SITUATED IN THE COUNTY OF PERRY, STATE OF ILLINOIS.

DESCRIPTION OF SURVEY- NEW PARCEL "B"

79.585 ACRES - PART OF THE KUHNS PROPERTY

A PARCEL OF LAND BEING PART OF THE EAST HALF OF SECTION 7, TOWNSHIP 6 SOUTH, RANGE 1 EAST OF THE THIRD PRINCIPAL MERIDIAN. SAID PARCEL IS PART OF THE PROPERTY DESCRIBED AND RECORDED IN DOCUMENT NUMBER 2013-03269, IN THE PERRY COUNTY COURTHOUSE IN THE NAME OF ELDON A. AND RUTH KUHNS, DATED 12/12/2013. SAID PARCEL BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT AN IRON ROD SET AT THE SOUTHWEST CORNER OF THE EAST HALF OF SAID SECTION; THENCE N 00° 45' 57" E 1483.84 FEET ALONG THE WEST LINE OF THE EAST HALF OF SAID SECTION TO AN IRON ROD SET, THIS BEING THE POINT OF BEGINNING; THENCE N 00° 45' 57" E 3194.01 FEET CONTINUING ALONG THE WEST LINE OF THE EAST HALF OF SAID SECTION TO AN IRON ROD SET IN THE SOUTH RIGHT-OF-WAY LINE OF EAST PARK STREET ROAD; THENCE ALONG SAID SOUTH RIGHT-OF-WAY LINE THE FOLLOWING EIGHT (8) CALLS: THENCE N 83° 32' 34" E 42.91 FEET TO AN IRON ROD SET; THENCE ALONG A CURVE TO THE RIGHT WITH CHORD BEARING N 84° 39' 49" E 43.47 FEET, A RADIUS OF 983.39 FEET, AND AN ARC LENGTH OF 43.48 FEET TO AN IRON ROD SET; THENCE S 22° 58' 18" E 30.00 FEET TO A CONCRETE MONUMENT FOUND; THENCE ALONG A CURVE TO THE RIGHT WITH CHORD BEARING N 74° 16' 05" E 271.32 FEET, A RADIUS OF 952.36 FEET, AND AN ARC LENGTH OF 272.25 FEET TO AN IRON ROD SET; THENCE S 07° 32' 33" E 100.00 FEET, PASSING AN IRON ROD SET AT 10.00 FEET, TO AN IRON ROD SET; THENCE N 82° 27' 27" E 552.17 FEET TO AN IRON ROD SET; THENCE N 07° 32' 33" W 149.98 FEET, PASSING AN IRON ROD SET AT 90.00 FEET, TO AN IRON ROD SET; THENCE N 84° 39' 49" E 47.56 FEET TO POINT IN THE CENTERLINE OF THE LITTLE MUDDY RIVER; THENCE ALONG SAID CENTERLINE THE FOLLOWING SIXTY-NINE (69) CALLS: THENCE S 08° 36' 59" W 81.75 FEET TO A POINT; THENCE S 06° 37' 19" E 34.33 FEET TO A POINT; THENCE S 19° 24' 17" E 56.25 FEET TO A POINT; THENCE S 44° 03' E 53.73 FEET TO A POINT; THENCE S 53° 47' 01" E 77.26 FEET TO A POINT; THENCE S 65° 06' 19" E 57.87 FEET TO A POINT; THENCE S 80° 26' 01" E 39.11 FEET TO A POINT; THENCE S 86° 39' 13" E 30.00 FEET TO A POINT; THENCE S 79° 06' 58" E 56.23 FEET TO A POINT; THENCE S 71° 11' 03" E 45.05 FEET TO A POINT; THENCE S 83° 59' 44" E 24.47 FEET TO A POINT; THENCE S 58° 27' 01" E 41.59 FEET TO A POINT; THENCE S 26° 18' 32" E 35.88 FEET TO A POINT; THENCE S 11° 30' 48" E 48.20 FEET TO A POINT; THENCE S 01° 48' 58" E 95.92 FEET TO A POINT; THENCE S 11° 34' 04" E 100.29 FEET TO A POINT; THENCE S 05° 36' 56.75 FEET TO A POINT; THENCE S 15° 10' 00" W 71.58 FEET TO A POINT; THENCE S 31° 36' 00" W 102.77 FEET TO A POINT; THENCE S 59° 10' 00" W 90.98 FEET TO A POINT; THENCE S 58° 05' 12" W 90.44 FEET TO A POINT; THENCE S 69° 49' 01" W 124.45 FEET TO A POINT; THENCE S 84° 39' 19" W 19.04 FEET TO A POINT; THENCE S 85° 48' 04" W 67.55 FEET TO A POINT; THENCE S 76° 27' 00" W 100.01 FEET TO A POINT; THENCE S 67° 06' 19" W 116.60 FEET TO A POINT; THENCE S 61° 08' 34" W 78.42 FEET TO A POINT; THENCE S 58° 37' 11" W 65.57 FEET TO A POINT; THENCE S 47° 42' W 91.15 FEET TO A POINT; THENCE S 31° 11' 29" W 89.22 FEET TO A POINT; THENCE S 13° 19' 34" W 71.51 FEET TO A POINT; THENCE S 10° 37' 39" W 51.83 FEET TO A POINT; THENCE S 03° 52' 55" E 35.84 FEET TO A POINT; THENCE S 15° 19' 01" E 63.19 FEET TO A POINT; THENCE S 24° 57' 37" E 64.17 FEET TO A POINT; THENCE S 27° 39' 31" E 65.77 FEET TO A POINT; THENCE S 32° 31' E 63.83 FEET TO A POINT; THENCE S 37° 47' 11" E 66.73 FEET TO A POINT; THENCE S 08° 40' 48" E 63.39 FEET TO A POINT; THENCE S 12° 55' 17" W 102.37 FEET TO A POINT; THENCE S 19° 03' 27" W 80.56 FEET TO A POINT; THENCE S 21° 33' 11" E 61.74 FEET TO A POINT; THENCE S 08° 28' 59" W 69.04 FEET TO A POINT; THENCE S 18° 01' 00" W 59.64 FEET TO A POINT; THENCE S 18° 26' 52" E 38.30 FEET TO A POINT; THENCE S 21° 33' 11" E 61.74 FEET TO A POINT; THENCE S 27° 33' 25" E 60.67 FEET TO A POINT; THENCE S 09° 37' 11" E 67.43 FEET TO A POINT; THENCE N 85° 14' 09" W 523.07 FEET ALONG A NEW LINE TO THE POINT OF BEGINNING.

SAID PARCEL TO CONTAIN 79.585 ACRES, MORE OR LESS, PER SURVEY BY AARON M. DAUBY, IL PROFESSIONAL LAND SURVEYOR NO. 3878, DATED 05/3/2018.
SAID PARCEL BEING SUBJECT TO ALL RIGHTS-OF-WAY AND EASEMENTS, ALL RIGHTS-OF-WAY AND EASEMENTS, RECORDED OR OTHERWISE. ALL SITUATED IN THE COUNTY OF PERRY, STATE OF ILLINOIS.

DESCRIPTION OF SURVEY- NEW PARCEL "C"

20.733 ACRES - PART OF THE KUHNS PROPERTY

A PARCEL OF LAND BEING PART OF THE SOUTHWEST QUARTER OF THE SOUTHEAST QUARTER OF SECTION 6 AND PART OF THE NORTHEAST QUARTER OF SECTION 7, TOWNSHIP 6 SOUTH, RANGE 1 EAST OF THE THIRD PRINCIPAL MERIDIAN. SAID PARCEL IS PART OF THE PROPERTY DESCRIBED AND RECORDED IN DOCUMENT NUMBER 2013-6647, IN THE FRANKLIN COUNTY COURTHOUSE IN THE NAME OF ELDON A. AND RUTH KUHNS, DATED 12/17/2013. SAID PARCEL BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT AN IRON ROD FOUND AT THE NORTHWEST CORNER OF SAID QUARTER-QUARTER SECTION; THENCE S 89° 49' 47" E 1345.06 FEET, PASSING AN IRON ROD FOUND OUT 672.53 FEET, TO AN IRON ROD FOUND AT THE NORTHEAST CORNER OF SAID QUARTER-QUARTER SECTION; THENCE S 01° 02' 21" W 1321.76 FEET TO AN IRON ROD SET AT THE SOUTHEAST CORNER OF SAID QUARTER-QUARTER SECTION; THENCE S 00° 31' 40" W 293.03 FEET ALONG A NEW LINE TO AN IRON ROD SET IN THE NORTH RIGHT-OF-WAY LINE OF EAST PARK STREET ROAD; THENCE ALONG SAID NORTH RIGHT-OF-WAY LINE THE FOLLOWING TWO (2) CALLS: THENCE ALONG A CURVE TO THE RIGHT WITH CHORD BEARING S 83° 38' 11" W 100.84 FEET, A RADIUS OF 3629.63 FEET, AND AN ARC LENGTH OF 100.85 FEET TO AN IRON ROD SET; THENCE S 84° 29' 49" W 284.43 FEET TO A POINT IN THE CENTERLINE OF THE LITTLE MUDDY RIVER; THENCE ALONG SAID CENTERLINE THE FOLLOWING FORTY-EIGHT (48) CALLS: THENCE N 31° 48' 23" E 19.26 FEET TO A POINT; THENCE N 62° 04' 40" E 54.71 FEET TO A POINT; THENCE N 84° 49' 39" E 67.84 FEET TO A POINT; THENCE N 61° 58' 01" E 61.46 FEET TO A POINT; THENCE N 41° 08' 05" E 35.79 FEET TO A POINT; THENCE N 68° 58' 56" E 51.66 FEET TO A POINT; THENCE N 38° 40' 51" E 40.11 FEET TO A POINT; THENCE N 40° 51' 56" E 67.86 FEET TO A POINT; THENCE N 47° 01' 26" E 47.59 FEET TO A POINT; THENCE N 17° 31' 12" E 46.27 FEET TO A POINT; THENCE N 05° 47' 50" W 63.71 FEET TO A POINT; THENCE N 37° 54' 04" W 43.67 FEET TO A POINT; THENCE N 49° 21' 52" W 50.67 FEET TO A POINT; THENCE N 60° 58' 58" W 65.39 FEET TO A POINT; THENCE N 71° 34' 41" W 60.07 FEET TO A POINT; THENCE N 72° 50' 17" W 112.61 FEET TO A POINT; THENCE N 56° 24' 43" W 71.54 FEET TO A POINT; THENCE N 39° 04' 49" W 31.04 FEET TO A POINT; THENCE N 10° 07' 15" W 58.52 FEET TO A POINT; THENCE N 06° 23' 36" W 33.44 FEET TO A POINT; THENCE N 08° 28' 59" W 69.04 FEET TO A POINT; THENCE N 25° 41' 37" W 33.96 FEET TO A POINT; THENCE N 59° 49' 39" W 31.07 FEET TO A POINT; THENCE N 59° 32' 01" W 56.47 FEET TO A POINT; THENCE N 39° 07' 15" W 129.97 FEET TO A POINT; THENCE N 22° 38' 42" E 53.57 FEET TO A POINT; THENCE N 04° 48' 02" E 47.52 FEET TO A POINT; THENCE N 30° 39' 57" W 54.03 FEET TO A POINT; THENCE N 47° 13' 28" W 51.01 FEET TO A POINT; THENCE N 74° 16' 27" W 52.67 FEET TO A POINT; THENCE S 85° 43' 34" W 67.14 FEET TO A POINT; THENCE N 85° 29' 57" W 68.08 FEET TO A POINT; THENCE N 79° 06' 58" W 56.23 FEET TO A POINT; THENCE N 56° 32' 01" W 39.02 FEET TO A POINT; THENCE N 50° 03' 32" W 44.08 FEET TO A POINT; THENCE N 43° 32' 14" W 54.61 FEET TO A POINT; THENCE N 27° 04' 03" W 34.23 FEET TO A POINT; THENCE N 22° 28' 48" W 48.36 FEET TO A POINT; THENCE N 24° 55' 19" W 40.22 FEET TO A POINT; THENCE N 46° 17' 40" W 48.73 FEET TO A POINT; THENCE N 55° 28' 49" W 69.06 FEET TO A POINT; THENCE N 66° 25' 15" W 67.34 FEET TO A POINT; THENCE N 63° 09' 19" W 61.12 FEET TO A POINT; THENCE N 85° 30' 57" W 58.77 FEET TO A POINT; THENCE N 85° 43' 27" W 91.71 FEET TO A POINT; THENCE N 74° 55' 28" W 83.19 FEET TO A POINT; THENCE N 70° 01' 50" W 47.38 FEET TO A POINT; THENCE N 63° 12' 41" W 29.56 FEET TO A POINT IN THE WEST LINE OF SAID QUARTER-QUARTER SECTION; THENCE N 01° 17' 42" E 90.11 FEET ALONG THE WEST LINE OF SAID QUARTER-QUARTER SECTION TO THE POINT OF BEGINNING.

SAID PARCEL TO CONTAIN 20.733 ACRES, MORE OR LESS, PER SURVEY BY AARON M. DAUBY, IL PROFESSIONAL LAND SURVEYOR NO. 3878, DATED 05/3/2018.
SAID PARCEL BEING SUBJECT TO ALL RIGHTS-OF-WAY AND EASEMENTS, ALL RIGHTS-OF-WAY AND EASEMENTS, RECORDED OR OTHERWISE. ALL SITUATED IN THE COUNTY OF FRANKLIN, STATE OF ILLINOIS.

DESCRIPTION OF SURVEY- NEW PARCEL "D"

26.315 ACRES - PART OF THE KUHNS PROPERTY

A PARCEL OF LAND BEING PART OF THE EAST HALF OF SECTION 7, TOWNSHIP 6 SOUTH, RANGE 1 EAST OF THE THIRD PRINCIPAL MERIDIAN. SAID PARCEL IS PART OF THE PROPERTY DESCRIBED AND RECORDED IN DOCUMENT NUMBER 2013-6647, IN THE FRANKLIN COUNTY COURTHOUSE IN THE NAME OF ELDON A. AND RUTH KUHNS, DATED 12/17/2013. SAID PARCEL BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT AN IRON ROD SET AT THE NORTHEAST CORNER OF SAID SECTION; THENCE S 00° 17' 48" W 31.56 FEET ALONG THE EAST LINE OF SAID SECTION TO A POINT IN THE SOUTH RIGHT-OF-WAY LINE OF EAST PARK STREET ROAD; THENCE ALONG SAID SOUTH RIGHT-OF-WAY LINE THE FOLLOWING FOUR (4) CALLS: THENCE ALONG A CURVE TO THE LEFT WITH CHORD BEARING S 79° 12' 19" W 313.40 FEET, A RADIUS OF 1573.91 FEET, AND AN ARC LENGTH OF 313.93 FEET TO A POINT; THENCE S 73° 28' 47" W 537.31 FEET TO A POINT; THENCE ALONG A CURVE TO THE RIGHT WITH CHORD BEARING S 78° 21' 24" W 95.83 FEET, A RADIUS OF 3689.63 FEET, AND AN ARC LENGTH OF 95.84 FEET TO AN IRON ROD SET; THIS BEING THE POINT OF BEGINNING; THENCE ALONG NEW LINES THE FOLLOWING NINETEEN (19) CALLS: THENCE S 04° 01' 49" E 703.05 FEET TO AN IRON ROD SET; THENCE S 08° 50' 27" E 616.66 FEET TO AN IRON ROD SET; THENCE S 18° 44' 59" E 334.45 FEET TO AN IRON ROD SET; THENCE S 54° 01' 49" E 128.09 FEET TO AN IRON ROD SET; THENCE S 01° 16' 19" W 114.68 FEET TO AN IRON ROD SET; THENCE S 14° 39' 35" W 123.01 FEET TO AN IRON ROD SET; THENCE S 34° 19' 04" W 149.54 FEET TO AN IRON ROD SET; THENCE S 41° 59' 51" W 91.63 FEET TO AN IRON ROD SET; THENCE S 90° 17' 00" W 146.76 FEET TO AN IRON ROD SET; THENCE S 63° 57' 13" W 500.26 FEET TO AN IRON ROD SET; THENCE S 73° 00' 44" W 231.50 FEET TO AN IRON ROD SET; THENCE S 78° 08' 28" W 289.66 FEET TO AN IRON ROD SET; THENCE S 82° 56' 47" W 242.01 FEET TO AN IRON ROD SET; THENCE S 34° 47' 40" E 342.01 FEET TO AN IRON ROD SET; THENCE S 05° 47' 40" E 165.15 FEET TO AN IRON ROD SET; THENCE S 02° 12' 01" W 210.15 FEET, PASSING AN IRON ROD SET AT 190.16 FEET, TO A POINT IN THE CENTERLINE OF A CREEK; THENCE ALONG THE CENTERLINE OF SAID CREEK THE FOLLOWING THREE (3) CALLS: THENCE S 39° 00' 07" W 78.66 FEET TO A POINT; THENCE S 38° 32' W 116.22 FEET TO A POINT; THENCE S 55° 12' 00" W 66.53 FEET TO POINT IN THE CENTERLINE OF THE LITTLE MUDDY RIVER; THENCE ALONG SAID CENTERLINE THE FOLLOWING SIXTY-NINE (69) CALLS: THENCE N 09° 37' 11" W 67.43 FEET TO A POINT; THENCE N 17° 33' 20" W 82.87 FEET TO A POINT; THENCE N 21° 33' 11" W 61.74 FEET TO A POINT; THENCE N 18° 26' 52" W 38.30 FEET TO A POINT; THENCE N 18° 01' 00" E 59.64 FEET TO A POINT; THENCE N 08° 28' 59" E 69.04 FEET TO A POINT; THENCE N 19° 03' 27" E 66.56 FEET TO A POINT; THENCE N 03° 27' 33" W 102.37 FEET TO A POINT; THENCE N 08° 40' 48" W 63.39 FEET TO A POINT; THENCE N 37° 47' 11" W 66.73 FEET TO A POINT; THENCE N 27° 39' 31" W 65.77 FEET TO A POINT; THENCE N 24° 57' 37" W 64.17 FEET TO A POINT; THENCE N 15° 19' 01" W 63.19 FEET TO A POINT; THENCE N 03° 52' 55" W 35.84 FEET TO A POINT; THENCE N 15° 37' 39" E 51.83 FEET TO A POINT; THENCE N 13° 19' 34" E 71.51 FEET TO A POINT; THENCE N 31° 11' 29" E 89.22 FEET TO A POINT; THENCE N 47° 42' E 91.15 FEET TO A POINT; THENCE N 58° 37' 11" E 65.57 FEET TO A POINT; THENCE N 61° 08' 34" E 114.60 FEET TO A POINT; THENCE N 76° 27' 00" E 126.99 FEET TO A POINT; THENCE N 78° 29' 40" E 111.67 FEET TO A POINT; THENCE N 76° 27' 00" E 100.01 FEET TO A POINT; THENCE N 65° 48' 54" E 67.55 FEET TO A POINT; THENCE N 66° 12' 07" E 132.46 FEET TO A POINT; THENCE N 64° 39' 19" E 182.04 FEET TO A POINT; THENCE N 66° 49' 01" E 124.45 FEET TO A POINT; THENCE N 58° 09' 12" E 90.44 FEET TO A POINT; THENCE N 53° 31' 06" E 85.66 FEET TO A POINT; THENCE N 31° 36' 00" E 102.77 FEET TO A POINT; THENCE N 15° 10' 00" E 71.58 FEET TO A POINT; THENCE N 05° 36' 56" E 78.42 FEET TO A POINT; THENCE N 11° 14' 24" W 100.29 FEET TO A POINT; THENCE N 13° 43' 01" W 59.09 FEET TO A POINT; THENCE N 24° 32' 05" W 88.44 FEET TO A POINT; THENCE N 37° 54' 23" W 87.05 FEET TO A POINT; THENCE N 39° 04' 49" W 60.37 FEET TO A POINT; THENCE N 17° 51' 10" W 121.04 FEET TO A POINT; THENCE N 08° 51' 52" W 49.87 FEET TO A POINT; THENCE N 05° 21' 34" W 106.30 FEET TO A POINT; THENCE N 09° 24' 34" W 60.37 FEET TO A POINT; THENCE N 01° 23' 56" W 86.19 FEET TO A POINT; THENCE N 21° 50' 23" W 79.68 FEET TO A POINT; THENCE N 09° 17' 25" W 40.18 FEET TO A POINT; THENCE N 05° 23' 54" E 83.84 FEET TO A POINT; THENCE N 14° 34' 14" W 35.68 FEET TO A POINT; THENCE N 02° 49' 01" W 35.87 FEET TO A POINT; THENCE N 08° 13' 16" W 36.52 FEET TO A POINT; THENCE N 08° 42' 47" E 40.63 FEET TO A POINT; THENCE N 19° 18' 31" E 55.03 FEET TO A POINT; THENCE N 11° 34' 07" E 44.15 FEET TO A POINT; THENCE N 51° 36' W 61.85 FEET TO A POINT; THENCE N 11° 26' 48" W 40.20 FEET TO A POINT; THENCE N 26° 16' 32" W 35.88 FEET TO A POINT; THENCE N 58° 27' 01" W 41.59 FEET TO A POINT; THENCE S 83° 59' 44" W 24.47 FEET TO A POINT; THENCE S 75° 11' 03" W 45.05 FEET TO A POINT; THENCE S 75° 05' 56" W 99.00 FEET TO A POINT; THENCE S 86° 39' 19" W 30.00 FEET TO A POINT; THENCE N 80° 31' 01" W 38.11 FEET TO A POINT; THENCE N 65° 06' 19" W 57.87 FEET TO A POINT; THENCE N 53° 47' 01" W 77.26 FEET TO A POINT; THENCE N 43° 44' 03" W 53.73 FEET TO A POINT; THENCE N 19° 24' 17" W 56.25 FEET TO A POINT; THENCE N 06° 37' 19" W 34.33 FEET TO A POINT; THENCE N 08° 39' 58" E 51.76 FEET TO A POINT IN THE SOUTH RIGHT-OF-WAY LINE, THENCE ALONG SAID SOUTH RIGHT-OF-WAY LINE THE FOLLOWING TWO (2) CALLS: THENCE N 84° 29' 49" E 324.23 FEET TO A POINT; THENCE ALONG A CURVE TO THE LEFT WITH CHORD BEARING N 81° 46' 09" E 343.25 FEET, A RADIUS OF 3689.63 FEET, AND AN ARC LENGTH OF 343.37 FEET TO THE POINT OF BEGINNING.

SAID PARCEL TO CONTAIN 26.315 ACRES, MORE OR LESS, PER SURVEY BY AARON M. DAUBY, IL PROFESSIONAL LAND SURVEYOR NO. 3878, DATED 05/3/2018.
SAID PARCEL BEING SUBJECT TO ALL RIGHTS-OF-WAY AND EASEMENTS, ALL RIGHTS-OF-WAY AND EASEMENTS, RECORDED OR OTHERWISE. ALL SITUATED IN THE COUNTY OF FRANKLIN, STATE OF ILLINOIS.

DESCRIPTION OF EASEMENT- NEW EASEMENT "A"

1.418 ACRES - PART OF THE KUHNS PROPERTY

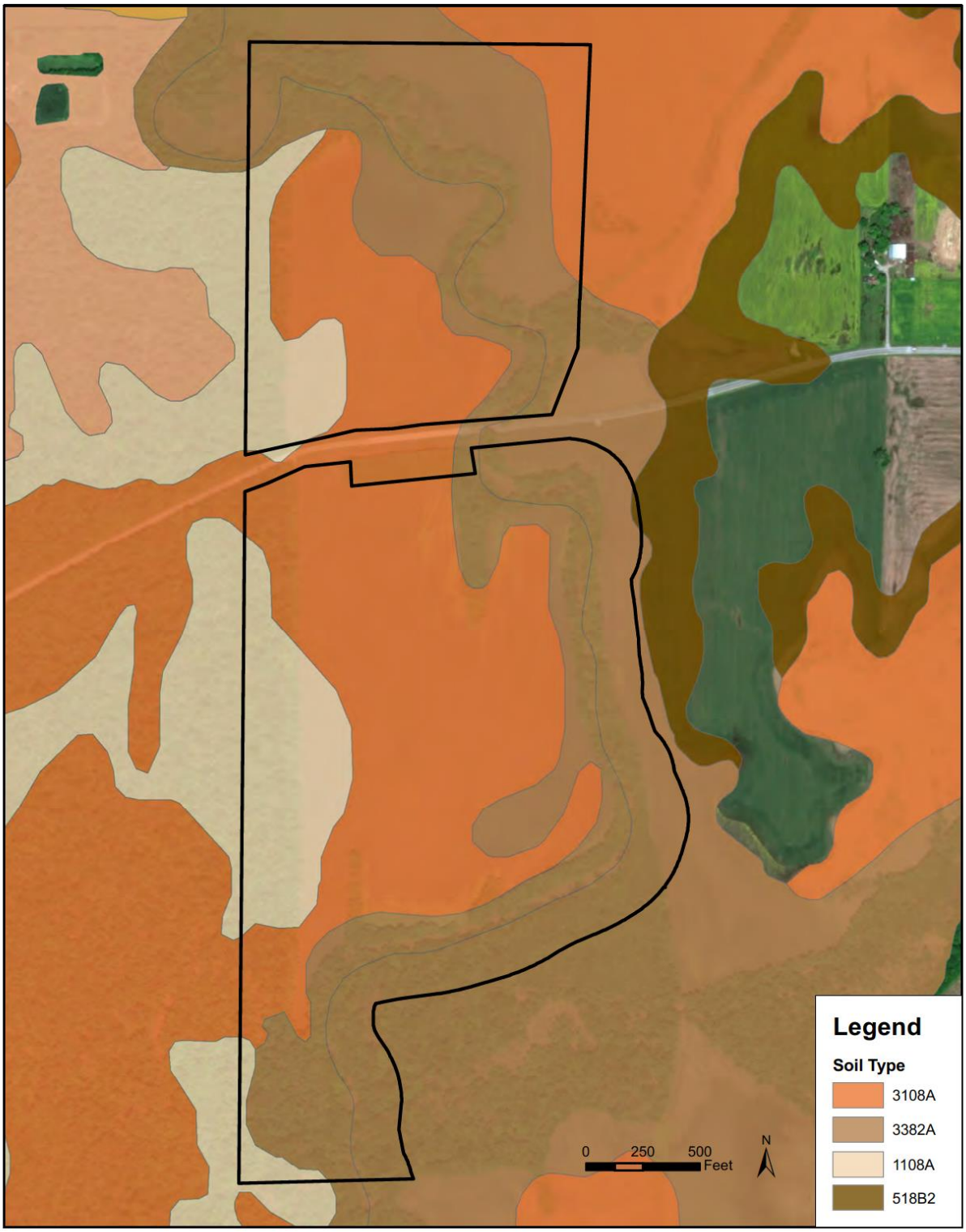
AN EASEMENT FOR RIGHTS OF INGRESS AND EGRESS, BEING PART OF THE EAST HALF OF SECTION 7, TOWNSHIP 6 SOUTH, RANGE 1 EAST OF THE THIRD PRINCIPAL MERIDIAN. SAID EASEMENT BEING THIRTY (30) FEET IN WIDTH, FIFTEEN (15) FEET EACH SIDE OF THE FOLLOWING DESCRIBED CENTERLINE:

COMMENCING AT AN IRON ROD SET AT THE NORTHEAST CORNER OF SAID SECTION; THENCE S 00° 17' 48" W 31.56 FEET ALONG THE EAST LINE OF SAID SECTION

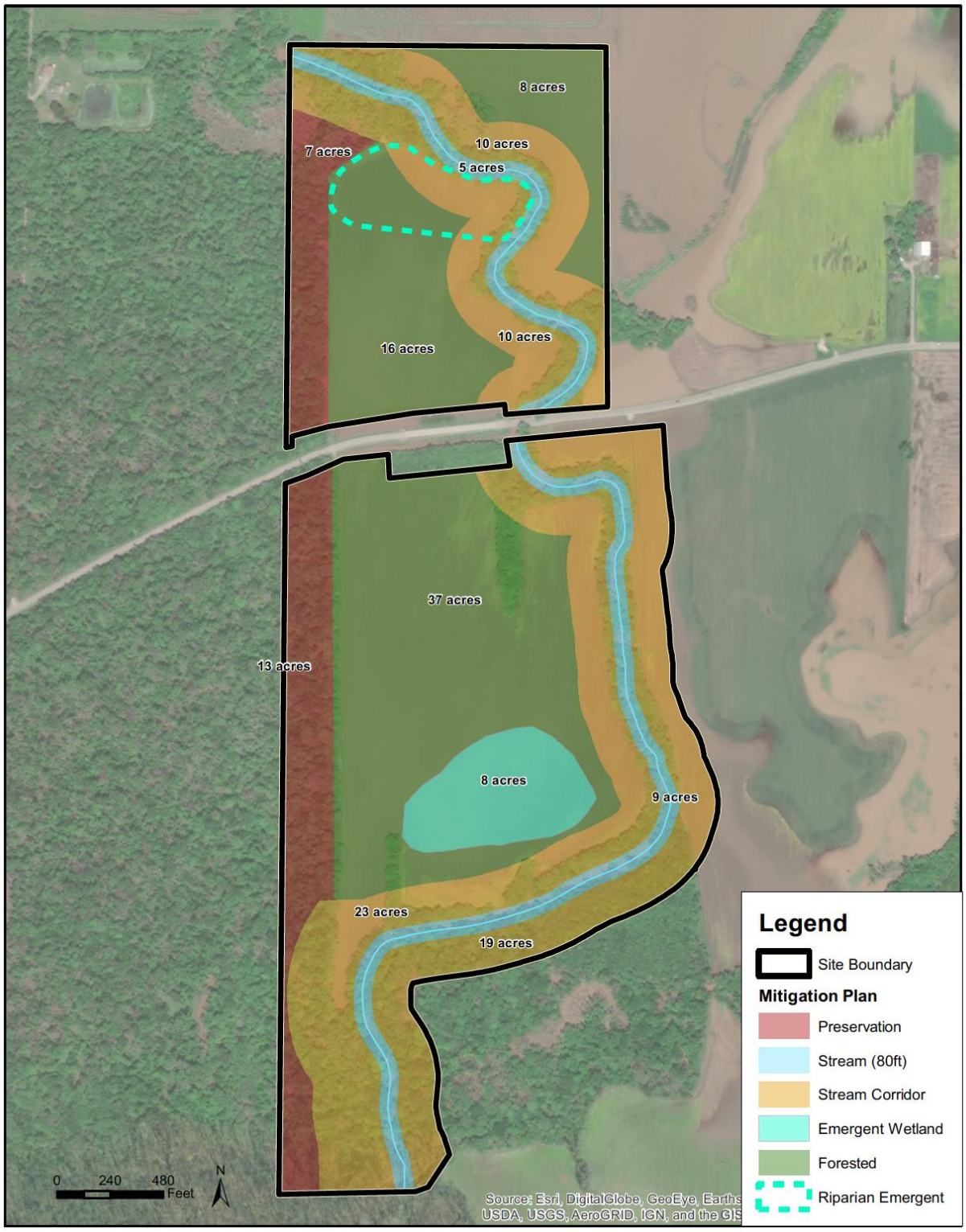
Appendix 4

Mitigation Work Plan Drawings

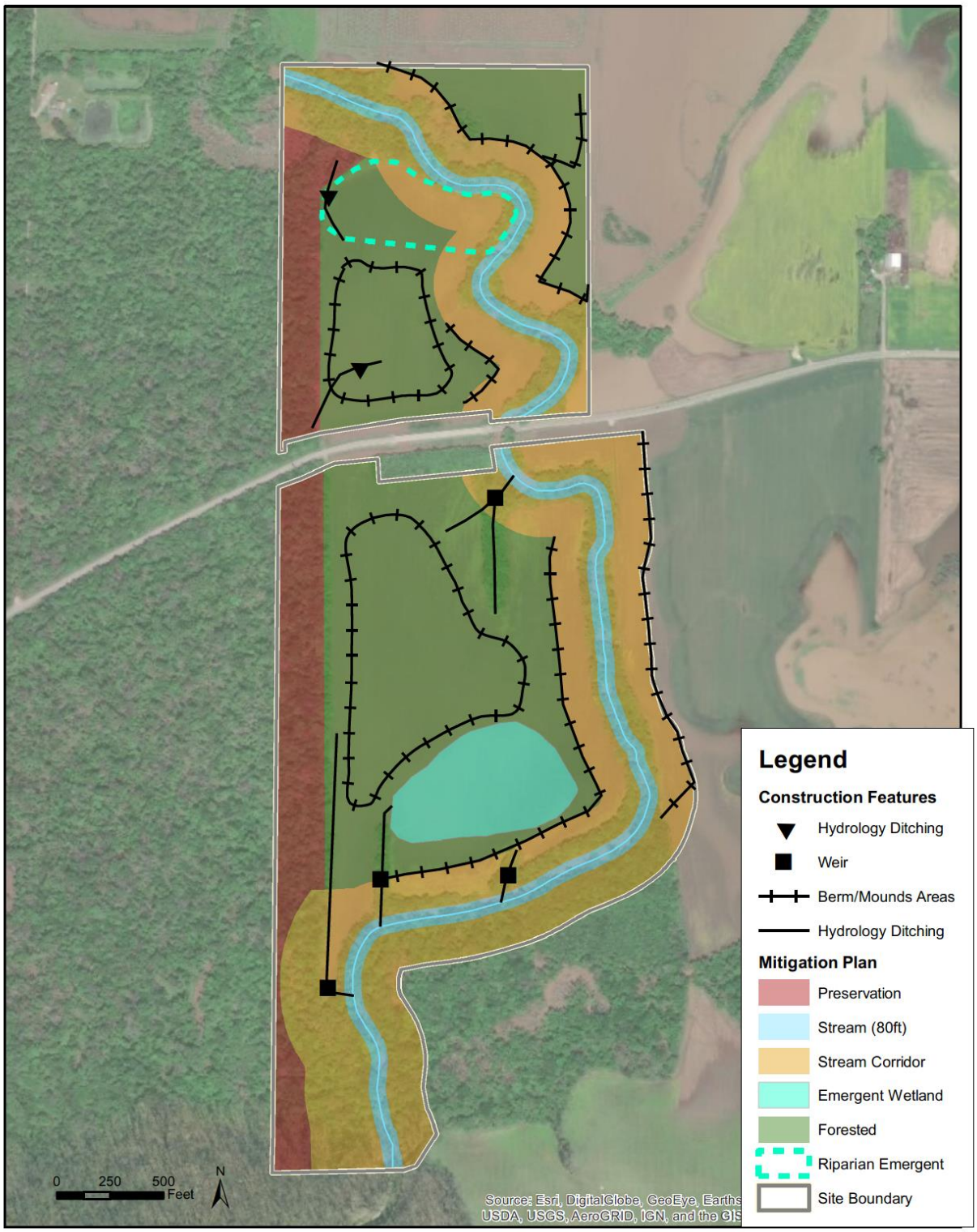
Little Muddy Soils



Mitigation Plan Map



Construction Features

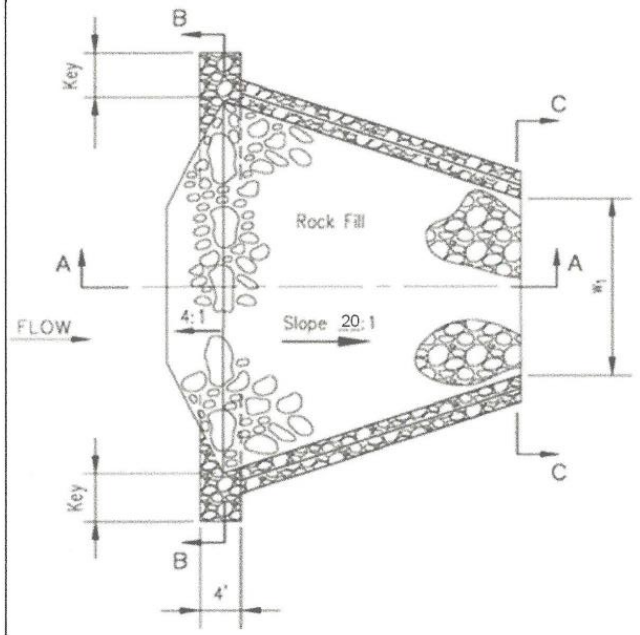


Wetlands Forever, Inc.

Little Muddy River Mitigation Bank

T6S, R1E Sec. 6&7 Perry County, IL

Benchmark EL 100
Description
Downstream Riffle Elevation



(h2 = h1 + 0.5')

Riffle No	Sta	Control Elev	h_1	h_2	h_3	h_4	W_1	Estimated Rock (Tons)
1	0+00	103.0	3.5	4.0	10.0	1.7	40.0	650
2	10+00	102.0	2.0	2.5	10.0	1.7	40.0	300
3	20+00	101.5	1.5	2.0	10.0	1.7	35.0	200
						Total Stone		1150 Tons

REFERENCE TABLE		
GRAD. NO.	h_4 (D_{100})	D_{50}
A-4	1.3 *ft*	7.4 *in*
A-5	1.7 *ft*	9.8 *in*
A-6	2.0 *ft*	12.1 *in*
A-7	2.5 *ft*	14.6 *in*

NOTE:
1. Rock gradation shall meet IDOT requirements for GRAD. NO. 5 riprap, quality designation "A", or as designated by engineer.
2. Use largest available stones from available material as shown for the emergent boulders and crest stone.
3. Riffle slope shall be 20:1 or flatter where fish passage is required.

NOT TO SCALE

Designed
Drawn Wayne Kinney 9/25/17
QUINONES
Checked
Approved
Date

STREAM BANK STABILIZATION
ROCK RIFFLE DETAILS

USDA NRCS Natural Resources Conservation Service

File No. IL-ENG-165A
Drawing No.

Landowner	Mike Thompson	Stream	Little Muddy River	Location	6&7 T6S R1E	Perry County, IL	Sheet 1 of 2

Landowner
Mike Thompson
Stream
Little Muddy River
Location
6&7 T6S R1E
Perry County, IL
NOT TO SCALE
SECTION A–A
Existing Stream Bed
Crest
Emergent Boulders
Existing Stream Bed
SECTION B–B
Key Depth = 5 Ft.
Min Cover
Back Fill
"V" Shaped Crest Control El.
Original Stream Bottom
Stream Bottom Approximate Width
Back Fill
Key Depth = 5 Ft.
SECTION C–C
Stream Bottom Approximate Width
Sheet 2 of 2
File No. IL-ENG-165B
Drawing No.
USDA NRCS
Natural Resources Conservation Service
STREAM BANK STABILIZATION
ROCK RIFFLE DETAILS
Designed Wayne Kinney Date 9/25/17
Drawn
QUINONES 2/08
Checked
Approved

Appendix 5

Long Term Management and Maintenance Plan Agreement

LONG-TERM MANAGEMENT AND MAINTENANCE PLAN AGREEMENT

LITTLE MUDDY RIVER WETLAND AND STREAM MITIGATION

BANK – ADDENDUM ONE (1)

This Plan will guide the long-term management of the Little Muddy River Wetland and Stream Mitigation Bank, sponsored by Wetlands Forever, Inc. in Franklin and Perry Counties, Illinois. The property ownership is held by Wetlands Forever, Inc..

The Plan takes effect when the performance standards have been met and the Project Close-out Report is approved by the USACE – St. Louis District Regulatory Branch. Initial time lines for Long Term Management Plan are scheduled to begin is estimated to occur in 2025. Wetlands Forever, Inc. acting as a representative of Wetlands Forever, Inc. established an endowment (reference Financial Assurances Appendix 6) to fund long-term management at the Mitigation Site by the Long-Term Steward (Heartlands Conservancy - Steward). Following transfer of management responsibilities upon Mitigation Bank closure, Wetlands Forever, Inc. to the Steward, authority and responsibility for implementing the long-term management plan will reside with the Steward.

LONG-TERM MANAGEMENT GOALS AND OBJECTIVES

The Mitigation Bank possesses wetland habitat and wildlife values important to the Steward, the people of the State of Illinois, and the people of the United States. The Mitigation Bank provides high quality restored, enhanced and preserved wetlands and contains jurisdictional waters of the United States and the State of Illinois. Individually and collectively, these habitat and wildlife values comprise the "Conservation Values" of the Mitigation Bank.

The goal of long-term management is to ensure that the Conservation Values of the Mitigation Site are managed, monitored and maintained over the long term by transferring management responsibilities to a qualified long-term Steward upon Mitigation Bank closure. Long-term management is intended to be adaptive, as defined in the federal mitigation rule (U.S. Army Corps of Engineers 2008) cited below:

Adaptive management means the development of a management strategy that anticipates likely challenges associated with compensatory mitigation projects and provides for the implementation of actions to address those challenges, as well as unforeseen changes to those projects. It requires consideration of the risk, uncertainty, and dynamic nature of compensatory mitigation projects and guides modification of those projects to optimize performance. It includes the selection of appropriate measures that will ensure that the aquatic resource functions are provided and involves analysis of monitoring results to identify potential problems of a compensatory mitigation project and the identification and implementation of measures to rectify those problems.

The wetlands at the Mitigation Bank will not be altered without obtaining all appropriate permits and clearances from regulatory agencies.

Long-term management is intended to promote the long-term functionality of forested wetlands.

Long-term management objectives for the Mitigation Bank are as follows:

- Maintain diverse forested wetland communities dominated by native species;
- Establishment of a Climax Bottomland Hardwood Forest;
- Maintain riparian corridor that provides linkages along the Little Muddy River;
- Maintain buffer habitat that supports overall site functionality for wetland habitats;
- Maintain improved habitat conditions for wildlife.

Limits of Responsibility

The Steward will not be responsible for Mitigation Bank failure attributed to natural catastrophes such as flood, drought, disease, regional pest infestation, and others that are beyond their reasonable control. Active management is not expected for ecological change that comes about as a result of processes such as climate change, fluctuating river levels, and sedimentation due to overbank flood deposits that may affect the wetlands. Over time, natural successional processes will occur that may reduce wetland functioning or reduce wetland area.

LONG-TERM MANAGEMENT AND MAINTENANCE

The Plan describes long-term management needs, roles and responsibilities of the Steward. The Steward will retain qualified staff and/or contractors with adequate ecological and biological qualifications to manage the Mitigation Bank. Prior to taking over management of the Mitigation Bank, the Steward will have ample time to work with Wetlands Forever, Inc. and Wetlands Forever, Inc. (WFI) while the Mitigation Bank remains under Wetlands Forever, Inc. management responsibility in order for the Steward to become comfortable with the tasks associated with long term Mitigation Bank management. Permits necessary to implement management actions on the Mitigation Bank will be held by the Steward in the form of Permanent and Perpetual Conservation Easement. The Steward will be compensated by Wetlands Forever, Inc. through an Endowment for management, maintenance and monitoring period associated with the conservation easement. The management and maintenance endowment will provide financial support of long-term operations and maintenance associated with a forested wetland, riparian corridor and upland oak habitat. However, the Steward, at their discretion, may provide a higher level of monitoring and operation and maintenance than is described in this plan.

The restoration sites long-term management should reflect activities that are associated with long term timberland management. The bank sponsor employed a Consulting Forester, Mr. Bill Calvert, Breese IL to develop a long term management plan for the site, specifically Item 6 - Planned Management Activity Schedule for Forestry Practices, attached. Secondly, the mitigation team referenced the following study to evaluate management actions and costs for long term stewardship and endowment purposes. The combination of these two documents outlines the management and endowment requirements for the Mitigation Bank.

Bair, Lucas S.; Alig, Ralph J. 2006. Regional cost information for private timberland conversion and management. Gen. Tech. Rep. PNW-GTR-684. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 26 p.

This document outlined two basic tenants for timberland management – establishment and intermediate management costs. Under the mitigation banking scope of work, the establishment of the site will be addressed. The second management action will be the intermediate management cost that include at a minimum the following; pre-commercial thinning, fertilizer and herbicide. These costs reflect a slightly different goal for historical timberland management, a commercial harvest and yield in board feet be realized at the end of the management timeframe. For this project, the end result is to establish a climax bottomland hardwood forest (Oak-Hickory).

The management techniques utilized in the first fifteen years of the mitigation bank, its ultimate Close-out and initial Long Term Stewardship will be deemed "establishment and intermediate" maintenance for the site. The bank sponsor will employ pre-commercial thinning techniques designed to reduce competition and increase growth. Since the site is not being managed for yield requirements, the addition of fertilizers and herbicides are not deemed necessary. Therefore, upon Close-out Report, intermediate management cost will address additional timber stand improvement techniques (pre-thinning or release) and minor herbicide requirements.

The definition of a climax forest is the last stage of succession. A climax forest should be relatively stable and not require intervention by man to maintain their structure and productivity. Management for climax forests is suitable where ecosystem and wildlife values are prominent management objectives.

Climax is the last stage of succession (Oak-Hickory forest). It differs from earlier successional stages, as it exhibits the following characteristics:

1). More stable;

2) More vertical structure;

3) Inhabited by long lived species;

4) The last stage of succession;

5) High diversity; and

6) Biological population regulation.

Climax is sustainable without management intervention and performs many ecological services in nutrient cycling, air and water purification, and regulating hydrology. Species richness and diversity increase as succession approaches climax (Hamilton, etal 1999).

As described here, the evolution and climax of a Bottomland Hardwood Restoration site has few long term maintenance requirements.

The mitigation bank planting regime includes climax forest tree species for the Little Muddy mitigation site (see Patterns of Natural Succession in Bottomland Forest, figure 3, Examples "A" and "C – poorly drained" as reference sites). Thus, in order to capture an acreage cost, the Long Term Management Plan will recognize Table 5 of the Bair-Alig study for Per-Acre decadal and intermediate management costs for high-management-intensity stands (planted). This sites falls within the Corn Belt for Hardwoods/ Acre and its 2016 dollars equal $37.70/acre or $6,000 per 10 year period for the site (159 acres).

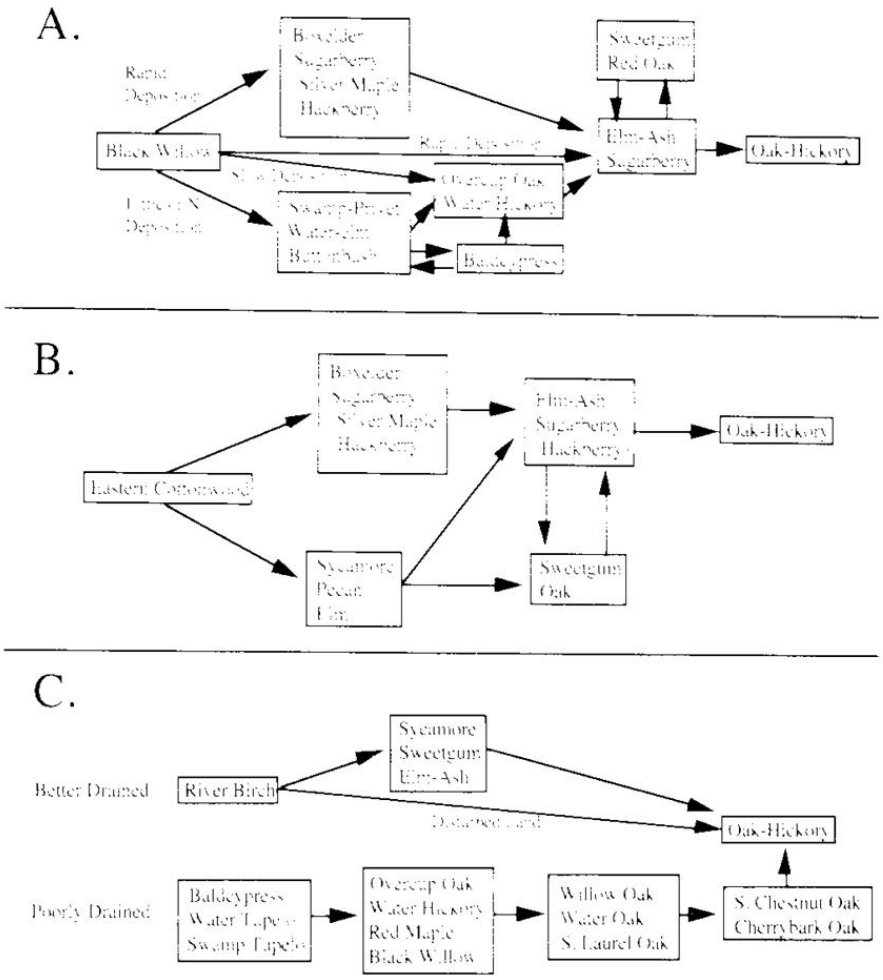


Figure 3. Patterns of natural succession in bottomland forests. A represents succession beginning on poorly drained sites at low elevations in major river bottoms. B represents succession beginning on better-drained higher-elevation sites in major river bottoms, and C represents succession in minor river bottoms (after Hodges 1997).

Table 5—Per-acre decadal and intermediate management costs for high-management-intensity stands (i.e., planted) in the four regions with planting in the contiguous United States, 2002 dollars

Region	Softwoods	Hardwood
	Dollars per acre	
Pacific Northwest West:		
Decadal management	39.00	35.46
Precommercial thin	95.55	N/A
Fertilizer	44.67	N/A
Southeast:		
Decadal management	21.50	16.71
Precommercial thin	65.11	N/A
Fertilizer	50.76	14.82
Herbicide	58.48	58.48
South Central:		
Decadal management	21.61	16.80
Precommercial thin	65.11	N/A
Fertilizer	50.76	14.82
Herbicide	58.48	58.48
Corn Belt:		
Decadal management	24.49	37.70

Softwood includes planted pines in the South and Douglas-fir in the Pacific Northwest West.

Hardwood establishment costs in the South are for bottomland hardwood.

Source: Adams et al. 1996, Amacher et al. 1997, Dubois et al. 2003, Huang et al. 2004, Shabman and Zepp 2000, Stranturf et al. 2000.

ENDOWMENT ESTIMATE:

- The Endowment amount will be updated for the 2016 dollars, per US Inflation Rate Calculator, $37.70 in 2002 equates to $52.18 in 2018;
- Multiplied by 159 acres for the site equates to 159 x $52.18 = $8,296.62, say $8,300.00;
- The amount of $8,300.00 would be the amount for decadal expenses for the timber management;
- WFI proposes to establish an endowment account that generates that amount every ten years, $8,300.00;

- Utilizing a Endowment Calculator identified as "Endowment Calculator for Northwest Minnesota Foundation, at *www.nwmf.org/endowment-calculator/"*
- Two estimates were generated, the first was the establishment amount to get the mitigation bank to year 15, WFI will be under obligation til that date at a minimum. The first ten (10) years as sponsor, followed by Mitigation Bank Close-out Report. Then the first Long Term Steward action will follow that by 5 years;
- The placement of $25,000.00 into an account estimated at 7.50% Earnings generates a total earnings of $34,624.00 by year 15;
- Year 11 thru 15, based on grant distribution, the Long Term Steward withdraws $16,834.00 from the endowment for inspections and timber management, leaving a balance of $42.790.00.
- The placement of $42,790.00 to start a 10 year calculator that cycles consistency. Thus, every 10 years the endowment generates $16,095.00. However, the remaining total amount in the account is $61,254.00. This amount should adequately cover costs for maintenance and management at the site in perpetuity.

MONITORING

General Monitoring Protocol

Long-term monitoring will employ adaptive management of the Mitigation Bank. Since the wetlands are intended to be self-sustaining, performance standards are purposefully less rigorous than those identified and used during Mitigation Bank establishment and operational period. Unless otherwise noted, monitoring will occur annually during the growing season in order to trigger necessary management activities that will protect wetland functions and to maintain a consistent annual record of wetland conditions. More frequent monitoring visits, such as a spring, mid-summer, and fall visit, are recommended in order to manage the site. Reports will be submitted to the USACE – Rock Island District Regulatory Branch for a period of five (5) years following the Close-Out Report. After the five submission of the Monitoring Report, subsequent reports do not need to be submitted to the regulatory agencies. The Steward will have access to the monitoring reports prepared by MIH during the 8-year performance monitoring period.

Hydrology Monitoring

The primary source of hydrology is surface water from the Little Muddy River for the property. Continued monitoring of wetland hydrology in the general region of the Mitigation Bank wetlands will ensure that wetland hydrology continues to be present on the site, a requirement for the persistence of the wetlands. To determine whether a stable hydrologic condition exist between the site and the Little Muddy River, the Steward will observe and photograph the site annually in late spring or early summer, looking for indicators of hydrologic function, that being vegetation, standing water, and sediment deposits.

Vegetation Monitoring

The cover of native herbaceous wetland plants is expected to be self-sustaining by Mitigation Bank Closure and the end of the performance standard monitoring and will not be monitored over the long-term. However, the cover of invasive non-native plants, and estimated stem counts of native woody plants along the edges of the wetlands will be monitored over the long-term.

Non-native Invasive Species

The establishment and spread of invasive non-native species is one of the greatest long-term threats to the functioning of the Mitigation Bank. The Steward will monitor the Mitigation Site as necessary to meet the intent of the Illinois Department of Natural Resources for its Noxious Weed Policy. Any non-regulated weed control activities, such as non-chemical weed removal, will commence without regulatory input. During Mitigation Bank establishment, invasive weed control was conducted. New infestations of noxious weed species should be identified during the annual inspection and a management strategy employed to eliminate the invasive species.

LONG-TERM MANAGEMENT AND MAINTENANCE PLAN AGREEMENT

LITTLE MUDDY RIVER WETLAND AND STREAM MITIGATION

BANK – ADDENDUM ONE (1)

HEARTLANDS CONSERVANCY

By:_____

PROJECT MANAGER, REGULATORY

BRANCH, U.S. ARMY CORPS OF ENGINEERS

By:_____

WETLANDS FOREVER, INC., MITIGATION BANK SPONSOR

By:_____

Forest Management Plan
for

Little Muddy River Wetland and Stream Mitigation Bank-Addendum 1
Wetlands Forever, Inc.
c/o Michael Thompson
112 Sunset Drive
Bartelso, Illinois 62218
(618) 204-0199

Prepared by

William A. Calvert
14419 Rod and Gun Road
Breese, Illinois 62230
(618) 526-4251

June 13, 2018

Forested Acres: 99.0
Plan Expiration Date: June 13, 2028

Forest Management Plan for Little Muddy Wetland and Stream Mitigation Bank-Addendum 1, Wetlands Forever, Inc., c/o Michael Thompson

1. Goals and Resource Concerns:

Long term care and maintenance of established RPM (Root Production Method) trees is needed to insure the success and survival of the tree planting. The goal is to use existing forest practices to maintain the trees for continued health and growth into biological maturity.

Completing the practices will allow more stable vegetative cover, protection from soil erosion, and produce hard mast forests that provide for wildlife habitat, timber production, recreation, and aesthetics.

2. Location and Description of Property:

A. Part of the Southeast1/4 of Section 6, T6S-R1E, Perry County, Illinois, part of the Southeast ¼ and the Southwest ¼, Section 6, T6S-R1E, Tyrone Township, Franklin County, Illinois, and part of the Northeast ¼ and the Southeast 1/4, Section 7, T6S-R1E, Tyrone Township, Franklin County, Illinois . Total acreage is 158.50 acres and the forested acreage planted in RPM trees is 99.0 acres.

B. Access: DuQuoin Illinois east on Park Street.

C. Surrounding land use is agricultural row crop production (field) and forest.

D. The property has been owned since 2017. The property has been in row crop production until now.

E. Boundaries are surveyed and known.

3. Detailed Stand Descriptions and Analysis

A. Existing Forestland

1. Stand 1: 99.0 acres currently row cropped
2. Bottomlands. No Aspect. 0-5% slopes
3. Soils: a. 3382A Belknap Silt Loam, Site Index for Pin Oak-90 and Cottonwood-100. Average annual growth: 72 cubic feet per acre per year.

b. 3108A, 1108A Bonnie Silt Loam, Site Index for Pin Oak-90 and Cottonwood– 100. Average annual growth: 72 cubic feet per acre per year.

4. Forest cover type: Oak-Hickory Bottomland Hardwood.
5. Stand Age Class: Even aged
6. Size Class, Canopy – Sapling timber,
7. Invasive and/or exotic species: None
8. Advance regeneration and understory conditions. Some elm, hackberry, box elder, sycamore, cottonwood, and green ash regeneration.
9. Forest Inventory Data:
   a. Trees/acre: 109
   b. Basal Area/acre: Approx. 20-30 square feet per acre

c. Volume/acre: <10 board feet (Doyle Scale)
d. Average Diameter: 1 inches (DBH)
e. Stocking Level: Fully stocked (Gringich)
f. Percent Stocking: <100%
g. Species Level Summary: Trees planted include shell bark hickory, pecan, pin oak, over cup oak, Shumard's oak, swamp white oak, and bur oak.

10. Timber Quality and Timber Production Assessment: The stand has overall good timber quality and production is acceptable.
11. Timber Harvest or Forest Practices Assessment: The stand has a small average diameter and a timber sale may be possible in 60 years.
12. Active Conservation Practices or Projects: No active projects or erosion problems on the property.

B. Afforestation or Reforestation: No afforestation or reforestation needed

4. Detailed Stand Recommendations:

A. Stand Specific Objectives:

1. Increase Oak and Hickory growth and production.
2. Description of Silvicultural Treatments:

a. Tree Pruning: Tree pruning of the healthy crop trees, such as oak, hickory, and pecan is needed to maintain apical dominance (growing straight) and keeping the trees from bushing out. Guidelines for pruning should include not cutting for than 1/3 of the limbs at one time and not cutting any branches larger than 1/3 of the main stem. Larger limbs should be "headed off" at a branch or connection. Cuts should be made to the callous tissue on the stem. Wound dressing is not necessary. Pruning will help the health and quality of the trees, as well as increase upward growth. Pruning should be competed at 7.5 years and 12.5 years after planting. (see attachment on tree pruning).

b. Timber Stand Improvement (TSI) is needed to improve the forest. TSI includes removing poor quality trees such as elm, crooked hickories, and hackberry, and thinning over crowded trees while encouraging the production and growth of swamp white oak, pin oak, bur oak, Shumard's oak, and other desirable straight trees, such as pecan and shellbark hickory. Emphasis should be on removing poorer quality trees around crop trees, such as oak and hickory to help the trees in natural reseeding by providing for sun light to the forest floor. Remove unwanted trees at least past the dripline or that are interfering with the crown branches. Undesirable trees should be removed at least 15 feet from the trunk of the oaks and desirable trees. Grapevines also need to be removed when too numerous and choking trees. Some of the larger, older cull trees can be left for wildlife or utilized for firewood. Garlon, Stalker or Pathfinder II or 50% roundup mixed with 50% water are herbicides recommended in treating cuts for removing poor quality trees. Rodeo (roundup labeled for waterways), should be used around the wetter areas in the stand. (See attachment explaining timber stand improvement) Invasive species control should be completed before TSI. TSI can start at 20 years and become completed every ten years until age 50 for the stand.

c. Invasive species can quickly over take and out compete native vegetation in a forest. Special attention needs to be make so as to control the invasive species become predominate. Species that can become nuisances include bush honeysuckle, autumn olive, multiflora rose, winter creeper, and Japanese honeysuckle.

3. Appropriate quantified treatment targets based upon stand objectives, silviculture, and desired future conditions:

a. Stocking or Density:

Basal Area to Remove: Over the course of 40 years remove to a residual 40 basal area per acre.

b. Desired Species Composition: Oak-Hickory-Bottomland forest

c. Desired Stocking Percent: 55%

e. Under Planting Specifications: No under planting is needed at this time, unless stocking falls below 109 trees per acre.

4. Timber Harvest Schedule and Harvest Projections: A timber harvest can occur in about 60 years.

5. Conservation Opportunities, Constraints, and Concerns:

A. Recreation and Aesthetics: Planting and maintaining the trees will increase recreation and aesthetic opportunities, such as hiking and hunting.

B. Air, Soil, and Water Quality Conservation:

1) No prominent issues exist.

2) No site specific Illinois Forestry Best Management Practices are necessary to conserve soil and water quality.

C. Wetland Protection: There are some wetlands on the property. Care should be taken when driving ATV's and other equipment through these areas, so as not to cause ruts or surface erosion. Rodeo (roundup labeled for waterways), should be used around the wetter areas in the stands.

D. Fish, Wildlife, and Biodiversity:

1) Increasing the wildlife habitat and diversity will be accomplished by TSI and will help the wildlife by creating brushy areas, and promoting mast trees such as oak and hickory.

2) Wildlife habitat improvement must be consistent with the IDNR State Wildlife Action Plan. This includes enhancing oak dominance by conducting timber stand improvement to remove shade tolerant species that compete with oaks, and invasive species control to eliminate competition for oaks. For more information contact IDNR wildlife biologist Carl Handel at (618) 295-2877.

E. Forest Health and Protection:

1) Detection and/or Management of Existing and Imminent Insects and Diseases: No insects or diseases are known in the Stand. Emerald ash borer could be a problem if there was an infestation.

2) No other physical or environmental aspects are known.

F. Threatened and Endangered Species:

1) No threatened or endangered species, nor nature preserves, land or water reserves or Illinois Natural Inventory Areas (INAI) occur on the property according to the IDNR ECOCAT (Ecological Compliance Assessment Tool) website.

For more information on Illinois Natural Area Inventory Sites, contact Debbie Newman, Illinois Nature Preserves Biologist (618) 684-3840. For more information on Endangered and Threatened species, contact Mark Phipps, District Heritage Biologist at mark.phipps@illinois.gov .

G. Identify and Protect Special Sites:

1) No cultural, archeological, or historical sites are located on the property.

If any artifacts or sites are discovered, please notify the Illinois State Historic Office (ISHA) at (217)-785-5031.

6. Planned Management Activity Schedule for Forestry Practices

Std(s)	Description	Yr.	Acres	Cost ($/ac)	Yr. Comp.
1	Pruning	7.5	99.0	300.00	
1	Pruning	12.5	99.0	200.00	
1	TSI	20.0	99.0	200.00	
1	TSI	30.0	99.0	150.00	
1	TSI	40.0	99.0	100.00	
1	TSI	50.0	99.0	100.00	
1	Monitor for Invasive Sp	Annually	99.0	3.00	
1	Mark Boundary	Annually	99.0	3.00	
1	Plan Update	2028	99.0	12.00	

7. Long Term Objectives for Mitigation Bank

- Maintain diverse forested wetland communities dominated by native species;
- Establishment of a Climax Bottomland Hardwood Forest;
- Maintain riparian corridor that provides linkages along the Little Muddy River;
- Maintain buffer habitat that supports overall site functionality for wetland habitats;
- Maintain improved habitat conditions for wildlife.

Attachments:

A. Timber Stand Improvement
B. Crop Tree Release
C. Glossary of Forest Terms
D. Pruning Trees

Appendix 6

(Third Party Agreement, Letter of Credit Agreement, Construction Estimate)

THIRD-PARTY RESPONSIBILITY AGREEMENT

THIRD-PARTY RESPONSIBILITY AGREEMENT

WHEREAS, HeartLands Conservancy is not-for-profit corporation organized under the laws of the State of Illinois and,

WHEREAS, HeartLands Conservancy has obtained approval of their Board of Directors for there participation and execution of this Agreement, and

WHEREAS, Wetlands Forever, Inc., hereinafter referred to as the "Sponsor" has drafted and executed a Mitigation Bank Instrument/Plan for the purpose of establishing a Wetland and Stream Mitigation Bank on real estate located in Franklin and Perry Counties, Illinois, and

WHEREAS, the said Little Muddy River Wetland and Stream Mitigation Banks, hereinafter referred to as the Mitigation Bank, requires the sponsor to undertake certain activities and sets certain performance standards relative to the real estate upon which the mitigation site project is located and further authorized the U. S. Army Corps of Engineers (USACE) to monitor the activity and performance of the sponsor concerning those requirements, and

WHEREAS, the USACE and the Mitigation Bank Instrument/Plan required financial assurances from the sponsor for the performance of their obligations there under.

THEREFORE IT IS STIPULATED AND AGREED TO BY AND BETWEEN THE PARTIES AS FOLLOWS:

1. The Sponsor shall obtain a letter of credit from Germantown Bank of Clinton County in the sum of $75,000.00 payable to Heartland Conservancy in the form and content agreeable to the sponsor, HeartLands Conservancy and the USACE.

2. The letter of credit shall be conditioned on the sponsor performing its obligations under the Mitigation Site Plan.

3. If payment of all or any portion of the proceeds of the letter of credit is received by HeartLands Conservancy, then HeartLands Conservancy shall either

(A) Apply said funds toward the completion of the obligations of the Mitigation Site Plan.

HeartLands Conservancy

By:_____

PROJECT MANAGER, REGULATORY BRANCH, U.S. ARMY CORPS OF ENGINEERS

By:_____

WETLANDS FOREVER, INC., MITIGATION BANK SPONSOR

MANAGER

By:_____

LETTER OF CREDIT IN LIEU OF DEVELOPER'S BOND

LETTER OF CREDIT NUMBER XXX

April 15, 2017

TO: HeartLands Conservancy
406 East Main
Mascoutah, IL 62258

RE: Wetlands Forever
LITTLE MUDDY RIVER WETLAND AND STREAM MITIGATION BANK

We hereby issue in your favor our Irrevocable Standby Letter of Credit Number XXX in the amount of $75.000.00 (Seventy-Five Thousand and 00/100ths). This Letter of Credit expires April 15, 2018 at our counters.

Available against drafts drawn at sight on Germantown Trust & Savings Bank, 205 Germantown Road, Breese, IL 62230 bearing the clause: "Drawn under Irrevocable Standby Letter of Credit XXX dated April 15, 2017." Each draft must be accompanied by the following documents:

1. A certificate purportedly signed by HeartLands Conservancy stating:

   "The US Army Corps of Engineers (USACE) has full and final authority to determine whether Wetlands Forever, Inc. has specifically performed and fulfilled some and/or all obligations, covenants, terms and conditions of the Little Muddy River Wetland and Stream Mitigation Bank (SRWSMB). Wetlands Forever, Inc. has defaulted on some or all of the obligations, covenants, terms and conditions of the SRWSMB and HeartLands Conservancy has been directed by the USACE to drawn against this Letter of Credit."

2. The original Letter of Credit.

It is a condition of this Letter of Credit that it will automatically reduce upon receipt by Germantown Trust & Savings Bank from HeartLands Conservancy the attached Reduction Certificate , "Exhibit A", properly completed and purportedly signed by HeartLands Conservancy.

All banking charges except those of the issuing bank are for the account of the beneficiary.

Partial draws are permitted.

This Letter of Credit is deemed to be automatically extended without amendment for additional one year periods from the current expiration date or any future expiration date, unless at least 60 calendar days prior to the then current expiration date, Germantown Trust & Savings Bank notifies you in writing of non-renewal and delivers by registered or certified mail, or overnight courier, at the address stated above. In any event, this Letter of Credit will not renew beyond April 15, 2021, which is the full and final expiry date.

This Letter of Credit may be cancelled prior to the expiration date upon our receipt of a written consent to cancel from the Beneficiary when accompanied by the original Letter of Credit.

This Letter of Credit sets forth in full the terms of our undertaking, and such undertaking shall not in any way be modified, amended or amplified by reference to any document, instrument or agreement referred to herein or in which this Letter of Credit is referred to or to which the Letter of Credit relates and any such reference shall not be deemed to incorporated herein by reference any document, instrument or agreement.

Special Condition(s)

1. Germantown Trust & Savings Bank has no obligation or right to inquire into the correctness of any herein described statement.

Payment will be made at the counters of Germantown Trust & Savings Bank, Clinton County, Illinois.

Unless otherwise stated, all documents are to be forwarded to us by mail or hand delivered to our counters. Documents are to be directed to: Germantown Trust & Savings Bank, Attn: Floyd Trame, 205 Germantown Trust & Saving Bank, Breese, IL 62230.

We hereby engage with drawers and/or bona fide holders of drafts shown and negotiated in conformity with the terms of this credit will be duly honored upon presentation.

This credit is subject to the Uniform Customs and practice for documentary credits (1995 revision) International Chamber of Commerce Publication No 500.

Sincerely,

Floyd Trame
Vice President

EXHIBIT "A"

CERTIFICATE OF REDUCTION

Year 1 (Ending 2018): No reduction;

Year 2 (Ending 2019): No reduction;

Year 3 (Ending 2020): 50% reduction based upon submittals of monitoring reports and meeting 2 year performance standards;

Year 4 (Ending 2021): No reduction;

Year 5 (Ending 2022): Reduction (50%) will be based upon achievement of 5th year performance standards.

Post Construction Estimate for Financial Assurances: This assumes all construction is complete and only replanting, some level of monitoring, operations and maintenance is required and a close out report generated.

Little Muddy River Wetland and
Stream Mitigation Bank

Post Construction Estimate
Per Phase

Little Muddy River Wetland and
Stream Mitigation Bank
Post Construction Estimate

	Description		Units	Unit Costs	Total Cost
1.00	Construction				
	1.10	Construction (Dirt work and trees) (Loss of 20%)	100	$320.00	$32,000.00
2.00	Annual Monitoring (8 years)				
	2.10	Monitoring (years)	6	$5,000.00	$30,000.00
3.00	Post Construction O&M				
	3.10	Operation and Maintenance (yrs)	8	$100.00	$8,000.00
4.00	Final Delineation Report				
	4.10	Report	1 Lump Sum		$5,000.00
		TOTAL			$75,000.00

APPENDIX 7

FLORISTIC QUALITY INDEX TABLES

APPENDIX 8

AQUATIC INSTREAM RESTORATION AND ILLINOIS STREAM METHOD

GOAL – Stream Mitigation Bank

Protection and restoration of streambank riparian corridor habitat and improved stream aquatics, which contributes to the enhancement and habitat diversity of the Big Muddy River watershed.

OBJECTIVE

- Enhanced opportunities for wildlife and human use by elimination of existing annual row-cropped farm field and restoration of a diverse wooded wetland.

- Restore and enhance the riparian stream corridor buffer.
- Reduces erosion and sedimentation, thereby improving water quality.

Riparian Reaches:

R1 = North of Park Street, Northwest Corner, Preservation on 1 side and Preservation on 2nd side;

R1A = North of Park Street, Northwest Corner, Preservation on 1 side and Restoration on 2nd side;

R2 = North of Park Street, Center of River Reach, Restoration on 1 side and Restoration on 2nd side;

R3 = North of Park Street, Center of River Reach, Restoration on 1 side and Restoration on 2nd side;

R4 = North of Park Street, Center of River Reach, Restoration on 1 side and Preservation on 2nd side;

R5 = North of Park Street, Abuts Highway Bridge, Restoration on 1 side and Restoration on 2nd side;

R6 = South of Park Street from Reach 5 to first curve, Preservation on 1 side 50 feet and Restoration on 2nd side;

R6A = South of Park Street from Reach 5 to first curve, Preservation on 1 side and Restoration on 2nd side;

R7 = South of Park Street around curve heading south, Restoration on 1 side and Restoration on 2nd side;

R8 = South of Park Street around curve heading west, Restoration on 1 side and Preservation on 2nd side;

R9 = South of Park Street around curve heading west, Restoration on 1 side and Preservation on 2nd side;

R10 = South of Park Street, Preservation Perry-Franklin from tillable to Cane Creek, 300 wide on Perry and 175 wide on Franklin


Stream Riparian Corridor
Legend
Preservation
Restoration
Reach 1A
Reach 1
Reach 2
Reach 3
Reach 4
Reach 5
Reach 6
Reach 6A
Reach 7
Reach 8
Reach 8
Reach 9
Reach 10
Park Street Rd
Lone Oak Ln
Foutch Dr
E Park Street Rd
37
7
Google earth
© 2018 Google
Image Landsat / Copernicus
N
2000 ft

Illinois Stream Mitigation Method

Date: 11/5/2018 14:43

Project Name:
ORM Number
Stream Mitigation Summary Worksheet

I. Required Mitigation	**Debits**
A. Total Debits = (calculated from worksheets data)	0

II. Credit Summary	**Credits**
B. Riparian Buffer Enhancement	39495.9
C. Stream Restoration	25493.2
D. Total Proposed Non-Bank Mitigation = B + C	64989.1

Proposed Mitigation Credits (A) = Total Debits (D)	**Yes or No**
	Yes

Illinois Stream Mitigation Method

Project Name:
ORM Number:
Stream Restoration Worksheet

Factor	Stream Reach 1	Stream Reach 2	Stream Reach 3	Stream Reach 4
Priority	0.2			
Net Benefit	2			
Monitoring	0.5			
Site Protection	0.4			
Mitigation Construction Timing	0.3			
Sum Factors **(m)** =	3.4	0	0	0
Stream Length in Reach (do not count each bank separate) **(lf)=**	7498			
Credits **(c) = (m)x(lf)**	25493.2	0	0	0
Mitigation Factor	1			
Credits Reach	25493.2	0	0	0

Total Channel Restoration Credits Generated = 25493.2

Illinois Stream Mitigation Method

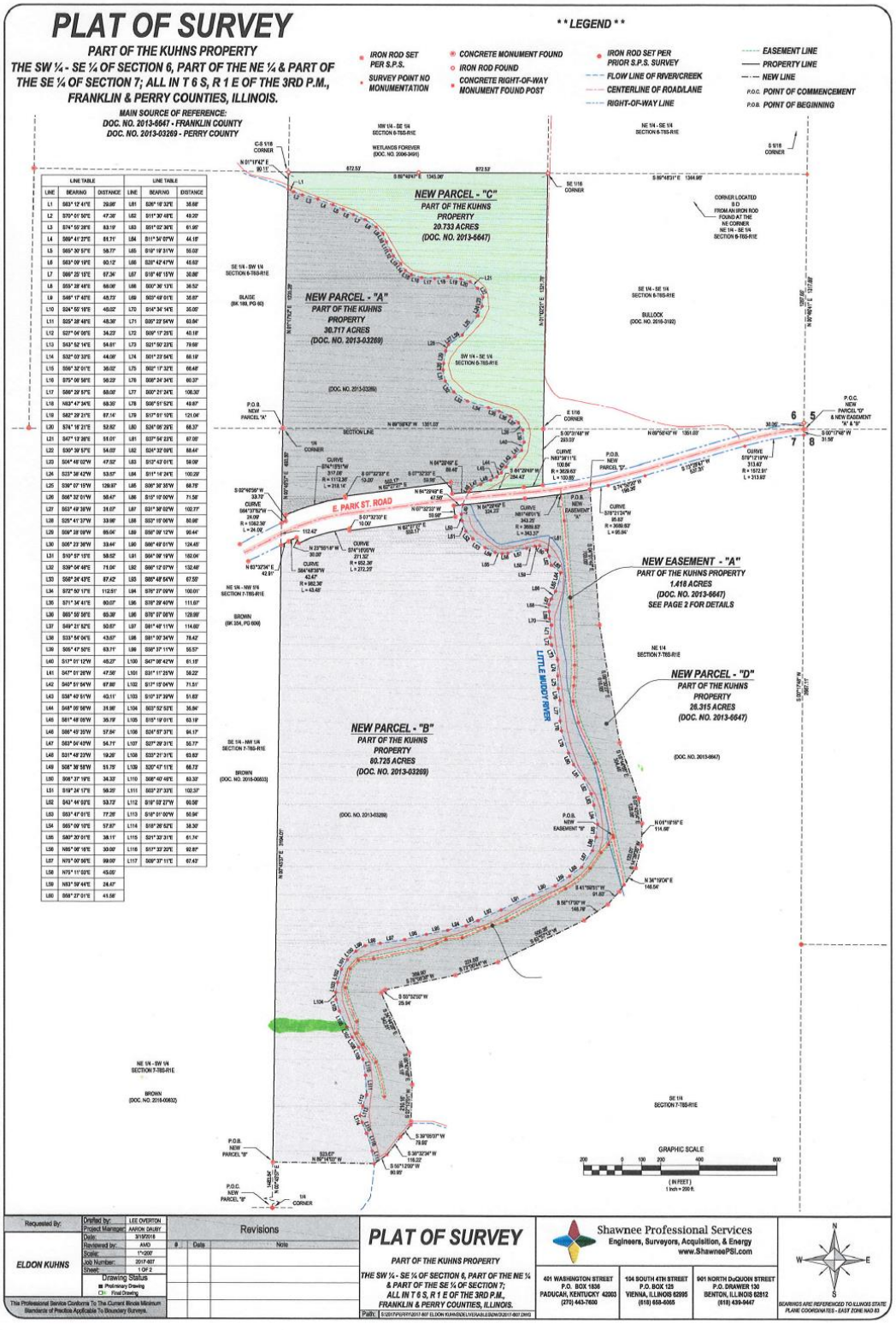
Project Name: Date:
ORM Number:
Riparian Worksheet

Agree Length Mod Restoration 2

Factor	Stream Reach 1	Stream Reach 2	Stream Reach 3	Stream Reach 4	Stream Reach 5	Stream Reach 6	Stream Reach 7	Stream Reach 8	Stream Reach 9	Stream Reach 10	Stream Reach 1A	Stream Reach 6A
Priority	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Net Benefit Streamside A	0.4	1.8	1.8	1.8	1.8	0.1	1.8	1.8	0.75	0.65	1.8	1.8
Net Benefit Streamside B	0.45	1.8	1.8	0.45	1.8	1.8	1.8	0.45	0.45	0.45	0.45	0.45
Supplemental Buffer Credit	0.425	1.8	1.8	1.125	1.8	0.95	1.8	1.125	0.6	0.55	1.125	1.125
Monitoring	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Site Protection	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Mitigation Construction Timing	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Temporal Lag (Years)	0	0	0	0	0	0	0	0	0	0	0	0
Sum of Factors **(m)** =	2.425	6.55	6.55	4.525	6.55	4	6.55	4.525	2.95	2.8	4.525	4.525
Linear Feet of Buffer (do not count each bank separate) **(lf)** =	361	410	1131	205	355	142	2041	1686	312	624	230	227
Credits **(c) = (m) x (lf) =**	875.425	2685.5	7408.05	927.625	2325.25	568	13368.55	7629.15	920.4	1747.2	1040.75	1027.175
Mitigation Factor	1	1	1	1	1	1	1	1	1	1	1	1
Credits Reach	875.425	2685.5	7408.05	927.625	2325.25	568	13368.55	7629.15	920.4	1747.2	1040.75	1027.175

Total Riparian Credits Generated 39495.9

Buffer width (on one side of the stream) Equal to or greater than	% Buffer that needs planting		
	*Buffer Creation and Restoration Exotic Removal and (51-100%)Planting	Buffer Enhancement Exotic Removal and (10-50%)Planting	Buffer Preservation (<10%)Planting
300 feet	2.4	0.95	0.65
275 feet	2.3	0.9	0.625
250 feet	2.2	0.85	0.6
225 feet	2.1	0.825	0.55
200 feet	2	0.8	0.5
175 feet	1.8	0.75	0.45
150 feet	1.6	0.7	0.4
125 feet	1.4	0.65	0.35
100 feet	1.2	0.6	0.3
75 feet	0.8	0.4	0.2
50 feet Minimum Buffer Width (MBW) for credit	0.4	0.2	0.1
25 feet required	0	0	0



LINE TABLE			LINE TABLE		
LINE	BEARING	DISTANCE	LINE	BEARING	DISTANCE
L1	S83° 12' 41"E	29.08'	L51	S26° 18' 32"E	36.68'
L2	S75° 01' 50"E	47.28'	L52	S11° 30' 48"E	49.20'
L3	S74° 55' 28"E	83.19'	L53	S51° 02' 36"E	61.95'
L4	S69° 41' 23"E	86.71'	L54	S11° 34' 07"W	44.15'
L5	S65° 30' 57"E	58.77'	L55	S19° 19' 31"W	55.03'
L6	S63° 09' 19"E	90.12'	L56	S39° 42' 47"W	45.63'
L7	S66° 25' 15"E	57.34'	L57	S18° 46' 15"W	30.88'
L8	S55° 28' 48"E	66.08'	L58	S00° 36' 13"E	36.52'
L9	S46° 17' 40"E	48.73'	L59	S03° 49' 01"E	36.87'
L10	S34° 55' 15"E	45.02'	L70	S14° 34' 14"E	35.05'
L11	S25° 28' 48"E	48.38'	L71	S05° 23' 54"W	63.84'
L12	S27° 04' 06"E	34.23'	L72	S09° 17' 25"E	40.18'
L13	S43° 52' 14"E	54.01'	L73	S21° 50' 23"E	79.68'
L14	S32° 07' 33"E	44.08'	L74	S01° 23' 54"E	66.19'
L15	S56° 32' 01"E	36.02'	L75	S02° 17' 32"E	66.46'
L16	S75° 06' 56"E	56.23'	L76	S08° 24' 34"E	60.37'
L17	S66° 29' 57"E	68.03'	L77	S00° 21' 24"E	106.30'
L18	N83° 47' 34"E	68.35'	L78	S05° 51' 52"E	49.87'
L19	S62° 29' 21"E	87.14'	L79	S17° 01' 10"E	121.04'
L20	S74° 16' 21"E	52.82'	L80	S26° 05' 29"E	66.37'
L21	S47° 13' 26"E	51.01'	L81	S33° 54' 23"E	67.00'
L22	S30° 39' 57"E	54.03'	L82	S24° 32' 09"E	68.44'
L23	S04° 49' 02"W	47.02'	L83	S13° 43' 01"E	59.08'
L24	S23° 36' 42"W	53.02'	L84	S11° 14' 24"E	100.29'
L25	S39° 07' 15"W	129.02'	L85	S05° 36' 35"W	66.70'
L26	S66° 32' 01"W	58.43'	L86	S10° 18' 00"W	71.56'
L27	S63° 49' 58"W	31.07'	L87	S31° 36' 02"W	102.77'
L28	S25° 41' 37"W	33.98'	L88	S03° 19' 06"W	80.86'
L29	S09° 28' 09"W	85.04'	L89	S05° 09' 12"W	90.44'
L30	S05° 23' 36"W	33.44'	L90	S06° 48' 01"W	124.45'
L31	S10° 57' 15"E	58.52'	L91	S04° 58' 19"W	182.04'
L32	S39° 04' 48"E	71.04'	L92	S06° 12' 07"W	132.48'
L33	S58° 24' 43"E	87.42'	L93	S05° 48' 54"W	67.52'
L34	S72° 50' 13"E	112.01'	L94	S76° 27' 09"W	100.01'
L35	S71° 34' 41"E	80.07'	L95	S76° 28' 40"W	111.67'
L36	S65° 50' 55"E	65.38'	L96	S76° 07' 08"W	129.99'
L37	S49° 21' 52"E	50.67'	L97	S81° 48' 11"W	114.60'
L38	S33° 54' 04"E	43.67'	L98	S81° 50' 34"W	78.42'
L39	S05° 47' 50"E	63.71'	L99	S06° 37' 11"W	55.57'
L40	S17° 01' 12"W	45.27'	L100	S47° 06' 42"W	61.15'
L41	S47° 01' 26"W	47.58'	L101	S31° 11' 25"W	59.22'
L42	S46° 51' 54"W	67.89'	L102	S17° 15' 04"W	71.51'
L43	S38° 40' 51"W	40.11'	L103	S10° 37' 39"W	51.63'
L44	S48° 05' 56"W	31.98'	L104	S03° 52' 53"E	35.84'
L45	S61° 48' 05"W	35.79'	L105	S15° 19' 01"E	63.19'
L46	S66° 45' 35"W	57.04'	L106	S24° 57' 37"E	64.17'
L47	S63° 04' 40"W	54.71'	L107	S27° 29' 31"E	55.77'
L48	S31° 48' 23"W	19.28'	L108	S33° 21' 31"E	63.82'
L49	S08° 36' 58"W	55.75'	L109	S20° 47' 11"E	66.73'
L50	S06° 37' 19"E	34.33'	L110	S08° 40' 49"E	63.33'
L51	S19° 24' 17"E	56.25'	L111	S03° 27' 33"E	102.37'
L52	S43° 44' 03"E	53.73'	L112	S19° 02' 27"W	60.58'
L53	S03° 47' 01"E	77.28'	L113	S18° 01' 00"W	50.94'
L54	S65° 00' 10"E	57.87'	L114	S18° 29' 52"E	38.30'
L55	S80° 20' 01"E	38.11'	L115	S21° 32' 31"E	61.74'
L56	N85° 06' 16"E	30.00'	L116	S17° 32' 20"E	92.87'
L57	N75° 00' 56"E	99.09'	L117	S09° 37' 11"E	67.43'
L58	N75° 11' 03"E	45.05'			
L59	N83° 59' 44"E	24.47'			
L60	S66° 27' 01"E	41.58'			

Revisions			
#	Date	Note	

Requested By:	
Drafted by:	LEE OVERTON
Project Manager:	AARON DAUBY
Date:	3/18/2018
Reviewed by:	AMD
Scale:	1"=200'
Job Number:	2017-607
Sheet:	1 OF 2
Drawing Status	■ Preliminary Drawing ☐ Final Drawing

This Professional Service Conforms To The Current Illinois Minimum Standards of Practice Applicable To Boundary Surveys.

Path: S:\2017\PERRY\2017-607 ELDON KUHNS\DELIVERABLES\DWG\2017-607.DWG

MIDWEST STREAMS, INC

STREAM
TECHNICAL
RESOURCE
EVALUATION
AND
MANAGEMENT
SERVICE

Wayne Kinney, Stream Specialist
6324 Wilson Road
Oakdale, IL 62268
Phone 618-830-6318 (mobile)
Email: streamdoc1@gmail.com

Sept., 25, 2017

Wetlands Forever, Inc.

C/O Mike Thompson

112 Sunset Drive

Bartelso, IL 62218

15 years experience in analysis design and construction supervision in streambank stabilization

over 500 completed projects in Illinois

low-cost solutions

fast service

innovative designs

proven results

RE: Little Muddy River Mitigation

On Sept. 15, 2017 we met to review the Little Muddy River in T6S, R1E, Sec. 6&7 in Perry and Franklin Co, IL for potential development of a mitigation site to include streambank mitigation. The area of interest is approximately 9350 ft.

The Little Muddy River drains 145 sq. miles of rural land at this point. Our investigation found this reach to be relatively stable with only slight erosion of the streambanks, but it should be noted that the banks are nearly vertical for nearly the entire reach. Although there is no stream gage available on this stream the USGS Streamstats program predicts the 2-yr. peak discharge at 4260 cu. ft./sec. based on flow records of nearby streams.

Your observation that there is very frequent flooding in this reach is verified by the quick hydraulic analysis done with the single cross section survey during our investigation. The channel slope taken from the USGS topographic maps is a very low 0.75 ft./mile or 0.000142 ft./ft. Using this slope data and the cross-section data the channel capacity is calculated at 900 to 950 cfs or about 22% of the 2-yr. predicted flow of 4260cfs. Typically, stable streams will have a channel capacity of 40 to 80% of the 2-yr. discharge. With no gage data to develop a flow frequency curve we can only say that this channel will flood often. However, the vertical banks and the presence of woody debris in the channel could indicate that this channel is enlarging to adjust to increased flow to achieve a capacity closer to the expected 40 to 80% level of the 2-yr. storm.

If in fact the channel is enlarging, the process appears to be slowed by the low velocity of 1.9 ft./sec. at channel capacity. Such low velocity would limit the erosive forces on the banks and therefore slow the erosion process.

The channel bed appears to be very stable with no indication of downcutting or past incision. The stream cross over points all appear to be vertically stable and composed primarily of silty material deposited by the stream, although mush of this material may be in suspension during high flow events.

Taking these conclusions into account there are a few things to consider that would improve the Little Muddy River. The first of these is to consider the use of Rock Riffle Grade Control Structures to increase the depth of the pools and create roughness over the riffle which will result in reaeration and improve the dissolved oxygen (DO) levels. The TMDL study on the Little Muddy River did not include this reach, but the area studied downstream showed an impairment cause by low DO and recommended reaeration using Rock Riffles. Based on this finding and the low gradient it seems likely that reach also is impaired by low DO.

Our hydraulic analysis shows that due to the low gradient of Little Muddy River the use of Rock Riffles up to 4 or 5 feet high would not increase the out of bank flows. This is possible as the flow over the riffle backslope would have a gradient of 5% (20H:1V) and would increase velocity to compensate for any lost cross-sectional area in the vicinity of the riffle structure. These finding are preliminary and will need to be refined prior to any final design involving Rock Riffles, but it is safe to say that riffles 2 to 3 feet high would be feasible.

At a gradient of 0.75 ft./mile a single 2 ft. high riffle at the downstream end of the proposed mitigation area would create a pool that extends through the entire 9350 ft. (2 ft./0.75 ft. mile = 2.66-mile pool). Of course, at this time we are not certain of the exact gradient in the proposed reach.

This presents a couple of opportunities and some difficulties. With the ability to construct riffles 2 or 3 ft. tall without impacting flooding provides an opportunity to install several riffles to increase aquatic habitat, provide reaeration to increase DO and reduce effective bank height which will further reduce lateral bank erosion.

The difficulty is that even a 2-ft. riffle at the downstream end of the proposed project will create a backwater above the upstream property line. Therefore additional riffles installed upstream of this would create more backwater upstream. Even though the hydraulic analysis indicate there would be no increase in flooding, this may create a concern for upstream property owners that must be taken into consideration.

To achieve the most benefit from any potential riffles there are three locations identified on the attached aerial. These locations are below meander bends and are intended to create maximum pool depths in these meander bends (pools). The height of these riffles, if they are feasible due to backwater effects upstream, could be anywhere from 1.5 ft. to 3.5 ft. in height. I have calculated the stone required and anticipated cost for each riffle based on height as follows:

1.5 ft. high Riffle ------200 tons RR-5 Stone----------$10,000

2.0 ft. high Riffle ------300 tons RR-5 Stone ----------$15,000

3.0 ft. high Riffle --------650 tons RR-5 stone ----------$32,500

Heights and locations are provided at this time simply for comparison purposes and any final decisions would be made as plans are developed for the proposed mitigation site.

One additional advantage of the Rock Riffle Structures is that very little damage would be done to the riparian area unlike installing a linear section of bank protection with bio-engineering and/or stone protection methods.

Other improvements to the Little Muddy River could be the use of structures to improve aquatic habitat. These could include boulder clusters, J-hooks, rootwads, lunker structures, etc. that could be added to increase habitat and increase DO through the turbulence created.

I suggest any further planning on improvements to the Little Muddy River be made after consulting with a multi-disciplinary team including fisheries, IEPA, COE, etc.

Call if you have any questions.

Sincerely,

Wayne Kinney, Pres.

Midwest Streams, Inc.

6324 Wilson Road

Oakdale, IL 62268

(618) 830-6318

Wetlands Forever, Inc.

Little Muddy River Mitigation Bank

T6S, R1E Sec. 6&7 Perry County, IL

Stream Stabilization I & E Form

ILLINOIS NRCS - Version 3.4- modified 3/2010 R.Book

County Perry T. 6S R. 1E Sec. 6&7

Date 9/25/17 By Wayne Kinney

Stream Name Little Muddy River UTM Coord. 38.02566 189.1354

Landowner Name Mike Thompson

Drainage Area 145.15 sq. mi. Clear Cells

Regional Curve Predictions:

Bankfull dimensions Width 104 ft. Depth 6.3 ft. Cross Sectional Area 657 sq. ft.

Reference Stream Gage:

none Station No. - Drainage Area - Gage Q_2 - Regression -

0 - REFERENCE STREAM DATA ONLY

USGS Flood-Peak Discharge Predictions:

Valley Slope: 3.7 *ft./mi. (user-entered)*

ft/mi (from worksheet) Rainfall 3.50 in *(2 yr, 24 hr)* Regression Q_2 3563 cfs

0.0007 *ft./ft.* Regional Factor 0.983 Adjusted Q_2 -

Typical Range for Bankfull Discharge: 1420 to 2860 cfs

Local Stream Morphology:

Channel Description: (c) Clean, winding, some pools and shoals

Manning's "n" 0.04

Basic Field Data:

Bankfull Width 60 ft.

Mean Bankfull Depth 8.54 ft.

Width/Depth Ratio 7.03

Max. Bankfull Depth 11.3 ft.

Width at twice max. depth 2000 ft. (22.6 ft.)

Entrenchment Ratio 33.33

Stream Length ft.

Valley Length ft.

Contour Interval feet

Estimated Sinuosity

Channel Slope:

Surveyed: 0.000142 *ft./ft.*

Estimated: *ft./ft.*

Radius of Curvature (Rc) ft.

Rc/Bankfull width: 0.00

Bankfull Q from:

Cross-Section 877 *cfs*

Basic field data 951 *cfs*

Selected Q 950 *cfs*

Bankfull Velocity Check: *(typical Illinois streams will have average bankfull velocity between 3 and 5 ft/sec.)*

Bedload: D_{90} 1 *in.* D_{50} *in.*

GOAL: Develop confidence by matching velocities from different sources.

Velocity required to move D_{90}: 2.1 *ft./sec.*

Velocity from Cross-Section data: 1.71 *ft./sec.*

Velocity from basic field data: 1.86 *ft./sec.*

Velocity from selected Q: 1.9 *ft./sec.*

Channel Evolution Stage I Stream Type (Rosgen) E

Notes

Natural Open Channel Flow

back to I&E form

Project:	Mike Thompson
Assisted by:	Wayne Kinney
Date:	9/25/2017
Channel Slope (*S*):	0.000142 ft/ft
Manning's *n*:	0.040
Flow Depth:	11.3 ft

$$Q = \frac{1.486}{n} A R^{\frac{2}{3}} S^{\frac{1}{2}}$$

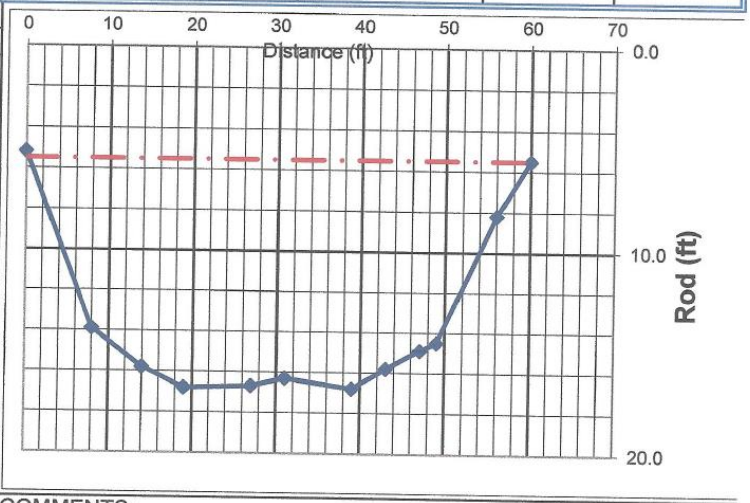
assuming uniform, steady flow

☑ Use this Cross-Section for Bankfull Determination

	Trial Depth 1	Trial Depth 2	Trial Depth 3
Selected Flow Depth:	11.3 ft		
Channel Flow (*Q*):	877.2 cfs		
Channel Velocity:	1.7 ft/sec		
Cross-Sectional Area (*A*):	512.3 sq.ft.		
Hydraulic Radius (*R*):	7.6 ft		

Survey Data:

Grade Rod (ft)	Distance (ft)
5.2	0
13.9	8
15.8	14
16.8	19
16.7	27
16.3	31
16.8	39
15.8	43
14.9	47
14.5	49
8.2	56
5.5	60



COMMENTS:

Rock Riffle Design Drawing Preparation

Landuser: Mike Thompson
Stream: Little Muddy River
Perry County, Illinois
Location: 38.02566 189.1354
Sec.: 7 Twp.: 6S Range: 1E

Date: 9/25/2017
By: Wayne Kinney

Given the following bankfull data from the I&E form:			Then the guidelines below should be followed for:		
Q =	877	cfs	No net increase in flood stage or backwater: Maximum riffle height =	5.8	ft
V =	1.71	ft/sec	Structural integrity: Minimum riprap size =	12	inches
width=	60.0	ft			

Benchmark EL: 100.00 ft
Description: Downstream Riffle Elevation

Key Depth: 5 ft
Riffle Slope: 20

REFERENCE TABLE		
IDOT Class	h_4 (D_{100})	D_{50}
4	1.3 ft	7.4 in
5	1.7 ft	9.8 in
6	2.0 ft	12.1 in
7	2.5 ft	14.6 in

Selected rock gradation: 5

NOTE: Gradation 5 is the same as former RR-5.

For definitions of dimensions, refer to IL-ENG-165A and IL-ENG-165B

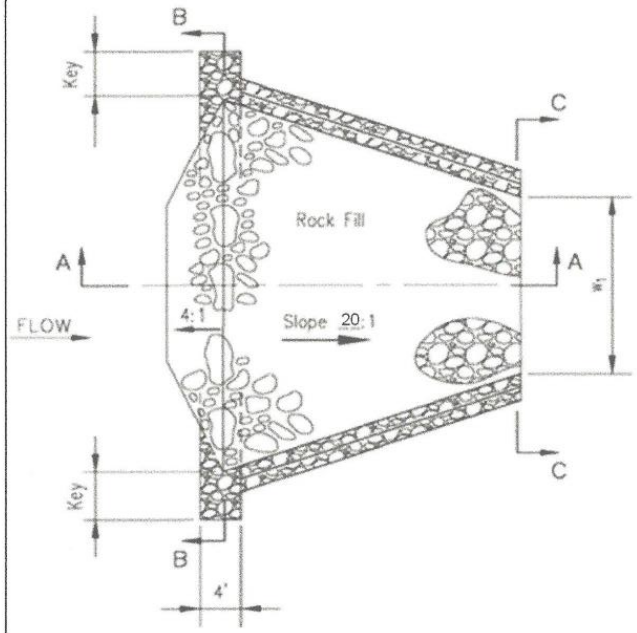
Riffle No.	STA	Control EL (ft)	h_1	h_2	h_3	h_4	W_1	Estimated Rock (Tons) Calculated	Estimated Rock (Tons) USE
1	0+00	103.0	3.5	4.0	10.0	1.7	40.0	654	650
2	10+00	102.0	2.0	2.5	10.0	1.7	40.0	305	300
3	20+00	101.5	1.5	2.0	10.0	1.7	35.0	200	200
							Total Stone:	1150 Tons	

Notes:

Benchmark EL 100
Description
Downstream Riffle Elevation

(h2 = h1 + 0.5')

Riffle No	Sta	Control Elev	h_1	h_2	h_3	h_4	W_1	Estimated Rock (Tons)
1	0+00	103.0	3.5	4.0	10.0	1.7	40.0	650
2	10+00	102.0	2.0	2.5	10.0	1.7	40.0	300
3	20+00	101.5	1.5	2.0	10.0	1.7	35.0	200
						Total Stone		1150 Tons



REFERENCE TABLE		
GRAD. NO.	h_4 (D_{100})	D_{50}
A-4	1.3 *ft*	7.4 *in*
A-5	1.7 *ft*	9.8 *in*
A-6	2.0 *ft*	12.1 *in*
A-7	2.5 *ft*	14.6 *in*

NOTE:
1. Rock gradation shall meet IDOT requirements for GRAD. NO. 5 riprap, quality designation "A", or as designated by engineer.
2. Use largest available stones from available material as shown for the emergent boulders and crest stone.
3. Riffle slope shall be 20:1 or flatter where fish passage is required.

NOT TO SCALE

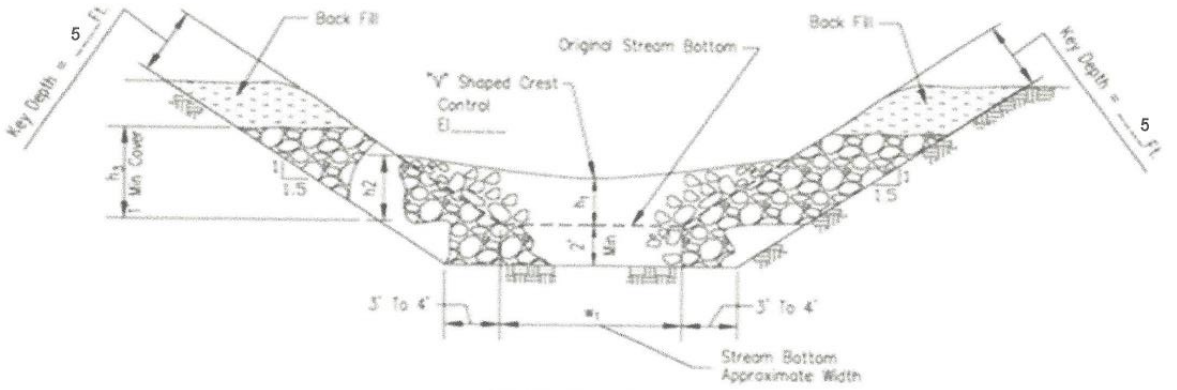
Designed Wayne K Kinney 2008 Date 9/25/17
Drawn QUINONES
Checked
Approved

STREAM BANK STABILIZATION
ROCK RIFFLE DETAILS

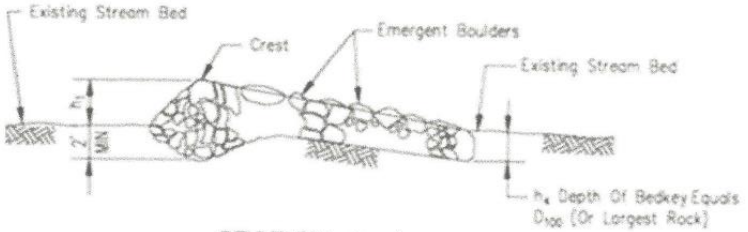
USDA NRCS Natural Resources Conservation Service

File No. IL-ENG-165A
Drawing No.
Sheet 1 of 2

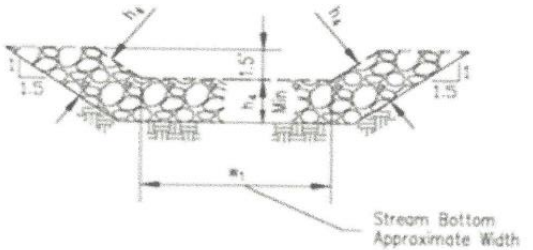
Landowner	Mike Thompson	Stream	Little Muddy River	Location	6&7 T6S R1E	Perry County, IL



SECTION B–B



SECTION A–A



SECTION C–C

NOT TO SCALE

Landowner	Mike Thompson	Stream	Little Muddy River	Location	6&7	T6S R1E	Perry County, IL

Designed Wayne Kinney Date 9/25/17
Drawn QUINONES
Checked 208
Approved

STREAM BANK STABILIZATION
ROCK RIFFLE DETAILS

USDA NRCS Natural Resources Conservation Service

File No. IL-ENG-165B
Drawing No.
Sheet 2 of 2

APPENDIX 9

WETLAND DETERMINATION FORMS