HORSE CREEK

STREAM AND WETLAND MITIGATION BANK

PROSPECTUS \\ JUNE 2020

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HORSE CREEK STREAM AND WETLAND MITIGATION BANK

SOUTH FORK FORKED DEER WATERSHED
HUC 08010205

Sponsor:

Wetland and Stream Restoration Services, LLC
Attn: Tom Rice
P.O. Box 40348
Nashville, TN 37204

Submitted to:

Interagency Review Team
Representing:
U.S. Army Corps of Engineers, Memphis District
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
Tennessee Department of Environment and Conservation
Tennessee Wildlife Resources Agency
Natural Resources Conservation Service
Tennessee Valley Authority

Prepared by:

Kimley-Horn
115 N. Liberty Street
Jackson, TN 38301
Contact: Dusty Mays
Dusty.Mays@Kimley-Horn.com

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1.0 OWNER

Project Sponsor

Wetland and Stream Restoration Services, LLC (WSRS)

P.O. Box 40348

Nashville, TN 37204

Attn: Tom Rice

Landowner

Tom Rice

5304 General Forrest Court

Nashville, TN 37215

2.0 AGENT

Kimley-Horn

115 N. Liberty Street

Jackson, TN 38301

Contact: Dusty Mays

Dusty.Mays@Kimley-Horn.com

For this project, WSRS has hired Kimley-Horn to provide assessment, design, and construction oversight services. Kimley-Horn has completed the design of over 450,000 linear feet of stream restoration and enhancement projects over the past 20 years. They have successfully completed mitigation plans, construction drawings, and construction phase oversight in TN, VA, NC, SC, OK, and TX. These restoration projects have also included more than 2,000 acres of wetland restoration and enhancement. In addition to having this depth of experience on the upfront assessment, design and construction portion of mitigation projects they also currently provide stream and wetland monitoring services on 10 separate mitigation sites.

3.0 PROJECT LOCATION

Horse Creek Stream and Wetland Mitigation Bank (HCSWMB) Site (hereinafter referred to as the "Bank" or the "Site") is in western Tennessee, approximately 4.5 miles South of the City of Henderson in Chester County. The Site can be accessed from US-45/TN-5, which it lies adjacent to (35.375724, -88.641293). The Site location is described more specifically in the following Table 1 and shown in Figure 1 in Appendix A.

4.0 ACCESS TO PROPERTY

The Bank is on privately owned property and can be accessed from US-45/TN-5, approximately 0.25 miles south of Clayton Rd. Access to the property should be coordinated with the Bank Sponsor or Agent.

5.0 PROJECT GOALS

A primary goal of the Bank is to improve ecological functions within the ecosystem by creating a healthy and self-sustaining aquatic environment with minimal human intervention, including long-term maintenance. Another purpose of the Bank is to provide stream and wetland mitigation credits to satisfy compensatory mitigation requirements for adverse impacts to Waters of the United States (hereinafter, "WOUS") and/or Waters of the State (hereinafter, "WOS"), that result from activities permitted under Section 404/401 of the Clean Water Act and Section 10 of the Rivers and Harbors Act, and/or the Tennessee Water Quality Act provided such activities have met all applicable requirements and are authorized by the U.S. Army Corps of Engineers, in conjunction with the following federal and state agencies: the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, the Natural Resources and Conservation Service, Tennessee Valley Authority, Tennessee Department of Environment and Conservation, and the U.S. Army Corps of Engineers, Memphis

Table 1: Project Information	
Level III Ecoregion	Southeastern Plains
Level IV Ecoregion	65e – Southeastern Plains and Hills
Watershed (8-digit HUC)	South Fork Forked Deer (HUC 08010205)
Watershed (12-digit HUC)	Clark Creeks-South Fork Forked Deer River (HUC
Location	US-45/TN-5 (35.375724, -88.641293)
303d Status	N/A
Existing Stream Total Length (feet)	Approximately 2,909 LF
Proposed Stream Total Length (feet)	Approximately 5,034 LF
Existing Wetland Total Area (acres)	Approximately 4.88 acres
Proposed Wetland Total Area (acres)	Approximately 27.8 acres
Project Area (acres)	Approximately 53 acres

District; all of which comprise the Interagency Review Team (IRT). The Bank will provide mitigation credits by restoring Horse Creek and three unnamed tributaries, restoring and enhancing wetlands, and restoring riparian areas on the Site. Credits will be used as compensatory mitigation within the established Service Area (Figure 2 in Appendix A) and described in Section 13.1. The proposed stream and wetland goals are outlined in Table 2 and Table 3 below.

6.0 PROJECT OBJECTIVES

Project objectives aim to improve overall ecological function and stability of Horse Creek and the three unnamed tributaries and to provide ecological and water quality benefits within the Clark Creeks-South Fork Forked Deer River (HUC 080102050105) watershed within the South Fork Forked Deer River basin (HUC 08010205). The Bank will consist of the restoration of Horse Creek and the three unnamed tributaries using natural channel design techniques to provide functional lift capable of restoring natural channel hydrologic, hydraulic, geomorphic, physicochemical, and biological characteristics. The proposed stream and wetland objectives are outlined in Table 2 and Table 3 below.

Table 2: Stream Goals and Objectives

Reach	Goals	Objectives
Horse Creek and Unnamed Tributaries	Improve Site hydrology	Remove hydrologic modifications (floodplain drainage ditches, berms, levees, graded/flat agricultural field, farm spoil areas) to improve overland and subsurface water exchange. Add floodplain microtopography to decrease stormwater runoff.
	Improve riparian buffer width and vegetation diversity	Establish a minimum 50-foot riparian buffer to be composed of planted native hardwood species, shrubs, and herbaceous vegetation; to provide shade, increase stream bank stability, nutrient filtration, and habitat.
	Improve floodplain connectivity	Reduce the Bank Height Ratio (BHR) and increase the entrenchment ratio where practical.
	Improve bedform diversity	Restore natural riffle/pool sequencing. Increase pool depth ratio. Install in-stream structures and implement Large Woody Debris (LWD).
	Restore natural channel geomorphology	Restore natural channel cross-sectional geometry with appropriate and stable dimensions to improve sediment transport capacity and competence. Create narrow, shallow riffles and wide, deep pools. Install bank stability measures such as toe protection, coir matting, and live stakes to establish high stream bank root density.
		Restore vertical profile with steeper riffles and flatter pools to improve natural riffle/pool sequencing. Install grade control in-stream structures to provide stream bed and bank protection.
		Restore natural pattern by increasing channel sinuosity to reduce flow velocities, promote the formation of natural riffles and pools, and improve lateral and vertical stability.
	Improve biological function and available habitat	Restore a dynamically stable stream channel that reduces sedimentation and increases re-oxygenation to encourage fish and macroinvertebrate colonization. Restore natural riffle/pool sequencing to provide a diversity of flow regimes and habitat. Increase LWD by installing in-stream wood structures to create habitat diversity. Reestablish a vegetative buffer and stable bank vegetative cover to decrease water temperatures.
	Improve water quality	Improve water quality by reducing non-point source pollution and sediment contribution from adjacent agricultural fields by reestablishing a vegetative buffer and stable, vegetated stream banks.

Table 3: Wetland Goals and Objectives		
Area	Goals	Objectives
Wetland Restoration	Increase habitat diversity	Restore bottomland hardwood forests incorporating small open pools and more scrub-shrub areas to provide habitat and refugia.
	Increase species diversity	Plant native tree and shrub species to re-establish riparian hardwood vegetation.
	Improve/Restore hydrologic regime	Improve hydrologic regime and wetland stability by grading areas impacted by historic land use and plugging drainage ditches. Re-connect streams to their historic floodplain to increase overbank flooding.
	Improve water quality	Create microtopographic relief to provide habitat and higher water retention. Improve water quality through increased sediment storage, filtration, and adsorption.
	Protect wetland areas from future alteration	Install conservation easement along wetland boundaries. Protect restored and enhanced stream and wetland areas with land use restrictions.
Wetland Enhancement	Increase habitat diversity	Restore bottomland hardwood forests incorporating small open pools and more scrub-shrub areas to provide habitat and refugia.
	Increase species diversity	Plant native tree and shrub species to re-establish riparian hardwood vegetation.
	Protect wetland areas from future alteration	Install conservation easement along wetland boundaries. Protect restored and enhanced stream and wetland areas with land use restrictions.

7.0 SITE CONSTRAINTS

The Site is readily accessible from US-45/TN-5 on the western side of the Site. The property was purchased in 2018. No title encumbrances or contradictory interests are known to exist. While several federally and state protected species are known to occur in Chester County, it is not anticipated that suitable habitat exists onsite for these species as the site has been historically manipulated by agricultural practices and aquatic and terrestrial conditions are currently significantly degraded. No historic properties are

Most of the Horse Creek watershed, which is comprised of mostly of agricultural land, is upstream of the Site. The Bank will not have control over waters flowing onto the Site from the upstream drainage area. Because of this, the potential hydrologic and physiochemical (SQT components) uplift could be limited.

8.0 STREAM & WETLAND ASSESSMENT

Representatives from Tioga Environmental Consultants assessed the Site and conducted a delineation of aquatic resources on May 25, 2020. Tioga's full report is included in Appendix F.

8.1 WATERSHED ASSESSMENT FORM – STREAM-SPECIFIC INFORMATION

See the Watershed Assessment Forms in Appendix D

8.2 WETLAND ASSESSMENT – WETLAND-SPECIFIC INFORMATION

A site assessment was conducted in May of 2020 and soil, vegetation, and hydrology data was recorded at various locations throughout the Site. Existing wetland boundaries can be found in the figures in Appendix A. Wetland Determination Data Forms for the Atlantic and Gulf Coastal Plain were completed at multiple locations on site and are included in Appendix F.

9.0 EXISTING AND PROPOSED CONDITIONS

See the Tennessee Stream Quantification Tool (TN SQT) Workbook for each individual stream reach in Appendix E. The SQT workbooks were informed by data collected using the SQT rapid data assessment method where possible.

10.0 BIOLOGICAL DATA

Benthic macroinvertebrate and water quality samples were collected for Horse Creek and Unnamed Tributary (UT) 1. Both streams had higher than desired Nitrogen, Phosphorous, and E. Coli values. Per the SQT workbook Horse Creek scored as 'Functioning at Risk' and UT1 scored as 'Not Functioning' in the physiochemical category. Both streams scored as 'Not Functioning' based on macroinvertebrate scores. See the sampling results in Appendix G.

11.0 MAPS

See Site figures in Appendix A.

12.0 SITE PHOTOS

See Site photos in Appendix B.

13.0 BASELINE CONDITIONS

The Site contains 4 perennial streams (Horse Creek, UT1, UT2, and UT3) and 4 ephemeral wet weather conveyance channels. Horse Creek enters the Site from the south and exits to the north. UT1 is an unnamed tributary to Webb Branch that enters the site from the south and flows northwest before exiting the Site on the west under US-45. UT2 and UT3 are tributaries to Horse Creek and enter the Site from the east. The 4 ephemeral channels are man-made ditches cut through or around agricultural fields to promote drainage. Hydrology within the Site has been heavily impacted by agricultural practices, including grading and ditching. Several wetland areas have been identified on the Site, typically within and at the terminus of field ditches. In undisturbed or restored conditions, it is anticipated that these wetlands would be larger with higher water tables and longer periods saturation/ inundation. Agricultural practices are still being performed on the site for row crops and will cease in the fall of 2020.

Most of the Site is underlain by Luka silt loam, Hatchie silt loam, and Savanna clay loam, which have little to no hydric rating. Luka silt loam encompasses Horse Creek and UT3, the most prominent streams on the site. Wetlands on the site are located in Luka and Hatchie silt loams, with the largest wetland located primarily in a section of Bibb silt loam at the northwest corner of the site. Bibb silt loam is noted as highly hydric and frequently flooded.

13.1 SERVICE AREA

The Bank's Service Area (see Figure 2 in Appendix A) has been prepared in accordance with the Memphis District's policy and practice and includes the full resident 8-digit HUC (South Fork Forked Deer) as the primary service area. The secondary service area includes the adjacent 8-digit HUCs that are also within the Hatchie-Obion watershed (HUC 080102).

The Site lies in the Southeastern Plains (65) Level III Ecoregion, which is characterized by generally flat elevation, sands, silts, and clays, and a mosaic land use of cropland, pasture, woodland, and forest. Portions of the Primary Service Area are within the Mississippi Alluvial Plain Level III Ecoregion, which is similar to the Southeastern Plains ecology but differentiated by its predominance of riverine bottomland hardwood composition, and the Mississippi Valley Loess Plains Level III Ecoregion, differentiated by oak-hickory and southern floodplain forests with slightly gentler stream gradients. Because the Bank is located within a river floodplain and coastal plain ecosystem, there is not likely to be an ecological difference between permitted impacts to resources and mitigation credits from the Bank to warrant an exclusion of the adjacent ecoregion.

Table 4: Service Area	
Primary Service Area	South Fork Forked Deer (08010205)
Secondary Service Areas	Upper Hatchie (08010207)
	Lower Hatchie (08010208)
	Lower Mississippi-Memphis (08010100)
	Forked Deer (08010206)
	North Fork Forked Deer (08010204)
Primary Service Area - Level III Ecoregions:	Southeastern Plains (65); Mississippi Alluvial Plain (73); Mississippi Valley Loess Plains (74)
Level IV Ecoregion:	Northern Hilly Gulf Coastal Plain (65e)
Primary Service Area - Counties	Carroll, Chester, Crockett, Dyer, Fayette, Gibson, Hardeman, Haywood, Henderson, Lauderdale, Madison, McNairy, Shelby, Tipton

13.2 STREAM

13.2.1 SUMMARY OF WATERSHED ASSESSMENT AND SQT ASSESSMENTS

The Site lies within a largely agricultural watershed that consists primarily of row crop and animal production with some forested areas. Intense agricultural practices have contributed to the degradation of streams within the Horse Creek and South Fork of the Forked Deer watersheds through increased peak runoff, channelization, siltation, and loss of productive habitat. All streams and conveyances on the Site have been ditched and straightened to expedite drainage for agricultural production. (see the Watershed Assessment Form in Appendix C)

Per SQT assessment, the hydrology for Horse Creek and UT1 received scores of 'Not Functioning' due to lack of buffers and intensity of pasture and crop land. The hydrology scores for UTs 2 and 3 received 'Functioning' scores due to more forested headwaters. All streams on the site are entrenched with no access to current or historic floodplains and thus scored 'Not Functioning' in the hydraulics category. Geomorphologic parameters were significantly lacking in each channel. Riparian zones were completely absent except for the left bank of UT2. No large woody debris was observed on the site. Bed form and habitat diversity were poor and channel pattern was non-existent.

Physiochemical and macroinvertebrate data was collected on Horse Creek and UT1. Both streams had higher than desired Nitrogen, Phosphorous, and E. Coli values. Horse Creek scored as 'Functioning at Risk' and UT1 scored as 'Not Functioning' in the physiochemical category. Both streams scored as 'Not Functioning' based on macroinvertebrate scores.

Poor overall watershed conditions and lack of lateral stability and riparian vegetation of the Site made it a candidate for establishing the proposed mitigation bank. All stream reaches had overall SQT scores of 'Not Functioning'. For more details see the SQT Assessment forms located in Appendix E.

13.3 WETLAND

13.3.1 CURRENT WETLAND HABITAT:

Wetlands are located sporadically across the site. These typically consist of low-lying areas in agricultural fields where surface water is caught or trapped and maintained by a shallow restrictive layer created through persistent agricultural practices. These wetlands are typically less than 0.5 acres in size and total approximately 4.1 acres combined. Sparse emergent vegetation was noted in these areas, but they have historically been maintained as the surrounding agricultural fields. Vegetation in the herbaceous layer consists of Virginia buttonweed (Diodia virgianii), small flower buttercup (Ranunculus abortivus), and very few small common rush (Juncus effuses). Woody vegetation is essentially absent from these wetlands.

The largest wetland on site is approximately 2.68 acres. The wetland is located in the northwest portion of the Site in an area that is undeveloped/non-agricultural, mostly likely due to the persistent saturation/inundation of the area. Vegetation consisted of button bush (Cephalanthus occidentalis), common rush, red maple (Acer rubrum), and black willow (Salix nigra) saplings, and various sedges (Carex spp.) were abundant.

13.3.2 HYDROLOGY

Primary hydrologic sources for existing and proposed wetlands consist of direct precipitation, inflow from adjacent land and neighbouring properties, and direct groundwater connections. There is currently no significant hydrologic contribution to wetlands from overbank flow from Horse Creek or the perennial tributaries.

13.4 SITE SELECTION CRITERIA

Several factors came into consideration when selecting this site. Factors considered include:

- the existence of extensive land alterations due to agricultural practices
- the number of streams scoring as "functioning-at risk" to "not functioning" as indicated by the SQT assessment conditions
- the potential for functional uplift
- the potential for the mitigation to be self-sustaining
- water quality issues in the area (i.e., excessive nutrients)
- lack of riparian buffer
- lack of floodplain connectivity in streams with high bank-height ratios
- the feasibility and comfort level for future site protection
- the lack of anticipated watershed land use changes or upstream development

13.5 ADJACENT LAND USE

The Site is bordered on the west by US-45 and then by row-crop agriculture and several small, private residence and businesses along US-45. To the south, the Site is bordered by crop and pasture fields. The Site is bordered to the east by predominantly forest and to the north by pasture, crop and pine plantation. The majority of the upstream watershed and immediately adjacent land has been dominated by agricultural practices for at least the last approximately 50+ years.

13.6 JURISDICTIONAL DELINEATION

Representatives from Tioga Environmental Consultants assessed the Site and conducted a delineation of aquatic resources on May 25, 2020. Tioga's full report is included in Appendix F.

13.7 PUBLIC NOTICE

Adjacent property owners are shown on Figure 1 in Appendix A and mailing addresses are provided below.

14.0 PROPOSED MITIGATION APPROACH

14.1 STREAM

14.1.1 MITIGATION APPROACH

The proposed stream mitigation activities on-site will consist of the restoration of approximately 5,034 existing linear feet of stream that has been impacted by long-term agricultural practices. The following will be completed to restore hydraulic, geomorphic and biologic function for the stream channels:

- Establish minimum 50-ft riparian hardwood buffers to promote channel stability and promote water quality.
- Install log vanes, brush and log riffles, log cross vanes and toe wood for stability and to act as large woody debris for in-stream habitat, as well as an uplift to biological function and fish/macroinvertebrate colonization.
- Perform stream restoration by constructing stream channels of appropriate dimension, pattern, and profile within the boundaries of the Site. Channel construction will include:
  - Restore Channel Dimension
    - Create a stable, bankfull channel with a Width-to-Depth ratio to promote sediment transport and bed and bank stability.
    - The re-established channel will be re-connected with its adjacent floodplain so that it has a bank height ratio of 1.0.
    - Where appropriate, channels will be narrowed as compared to the existing ditch and will include low-flow features to maintain adequate water depths for aquatic organisms and maintain appropriate stream power for sediment transport.
  - Restore Channel Pattern
    - The existing channels have been straightened and ditched. The proposed channel design will include expanding the current stream corridors to include meanders along the approximate existing alignments, and where appropriate realign existing channels to more logical and stable hydrologic and hydraulic connections to receiving resources.
    - Log vanes, log cross vanes, and toe wood will be used to ensure channel stability immediately after construction until mature vegetation is re-established adjacent to the channel.
  - Restore Channel Profile
    - Riffles and pools will be constructed within the re-established channel. Pool-to-pool spacing will be sized based on proposed channel slope and appropriate reference conditions.
    - Log Cross vanes and log/brush riffles will be added to the system to provide grade control as needed and provide scour potential to maintain pools in bends.

Owner	Acres	Parcel ID	Mailing Address
RUSSELL, TINE	5.3	077 01321 000	150 AUTUMN HILLS LANE, FINGER, TN 38334
BENDER, JOE A	5.4	077 01306 000	185 LEATH LANE, FINGER, TN 38334
MALECHA, MARK & SCARLET	7.4	077 01305 000	215 LEATH LANE, FINGER, TN 38332
DAVIS, BRANDON & BRANDY	18.3	077 01300 000	325 LEATH LANE, FINGER, TN 38334-1731
DOBBS, BRENT A & REBECCA	16.5	077 01304 000	465 LEATH LANE, FINGER, TN 38334
PARSON, MICHAEL & HEATHER	9.7	077 01303 000	525 LEATH LANE, FINGER, TN 38334
CONNOR, BOBBY TY & RACHEL A	10.3	077 01302 000	565 LEATH LANE, FINGER, TN 38334
CROOM, STEVE & ETHEL	59.4	067 02900 000	820 DUBERRY RD, FINGER, TN 38334
PETTIGREW, ANTHONY D	4.9	068 02703 000	4617 VARABLE AVENUE, LOUISVILLE, KY 40211
FARLEY, DAVID R	4.9	068 02709 000	655 DUBERRY ROAD, FINGER, TN 38334
SMITH, RAY T	16.3	068 02806 000	675 NOBLES ROAD, LURAY, TN 38352
SMITH, RAY T	7.1	068 02706 000	
LANDS, KIMBERLY W; VAN DYKE, WILLIAM S	41.2	068 02700 000	2168 FINGER LEAPWOOD ROAD, FINGER, TN 38334

14.1.2 FUNCTIONAL LIFT

The proposed mitigation approach will provide significant functional lift to hydrology, hydraulics, channel geomorphology and habitat.

Hydrology

The existing streams have been impacted by ditching, straightening, and poor buffer management. Proposed hydrologic improvements will be directly related to the lateral drainage area and include plugging ditches to increase time of concentration, water retention, and prolong baseflow. Land use management including creating riparian buffers will promote infiltration and reduce runoff.

Hydraulics

Functional lift related to the hydraulics of the restored streams will be achieved by providing a channel with properly sized bankfull dimension that is stable and has an appropriate stream power to transport sediment. Due to the ditched and incised condition of the existing channels, flows greater than bankfull are confined within the channels contributing to further degradation of the system. Bank height ratios along the existing channels range from 3 to greater than 6. The restored stream channels will have bank height ratios of 1.0. Rosgen C-Type channels are proposed which will gradually narrow into an E-Type streams. A culvert within UT1 will also be removed or replaced with a low-water crossing which will allow smoother hydraulic transitions and provide greater bank stability.

Geomorphology

Restoration of Horse Creek and the unnamed tributaries within the Site will provide functional lift by improving several geomorphologic parameters. Large woody debris is missing from the channels due to a long-term absence of riparian zones. Short-term large woody debris will be added via in-stream structures in bends and riffles and long-term woody debris will be introduced via created hardwood riparian buffers. Lateral stability will be improved through restoring C/E stream type pattern appropriate for the existing valley type, implementing structures to train flow away from banks, and the creation of riparian buffers. The lack of riparian zones will be corrected by planting new buffers with 50-ft minimum widths. The lack of diversity in pattern and profile will be addressed by a combination of full and partial channel realignment and altering the profile with constructed riffles and pools which will be maintained with grade control and scour inducing structures.

Physicochemical and Biology

The restoration plan will include establishment of a 50-foot-wide riparian buffer along the restored channels, stabilization of eroding banks, enhancing and establishing riparian/floodplain wetlands and eliminating standard agricultural practices from the stream and streamside buffers within the conservation easement. This will improve water quality by reducing erosion and sediment input and filtering out excess nutrients from adjacent agricultural lands. In-stream habitat will be improved by the installation of both woody and rock structures, as well as diversifying the bed profile and velocity regimes within the channel. The establishment of a riparian buffer will also help regulate temperatures and provide cover and food source for aquatic wildlife.

Summary

The following credit table is proposed based on the functional assessments and restoration potential for the stream reaches. Table 5 outlines the functional lift based on the Stream Quantification Tool. Proposed lengths and credits associated with the proposed channel restoration are estimates based on the conceptual design approach as shown in the Proposed Mitigation figure in Appendix A. These values were informed by a desktop analysis based on the SQT rapid data collection method for hydrology, hydraulics, biology, and physicochemical functional parameters. The SQT will be modified as the project progresses. Additional field data will be collected as needed using the SQT Data Collection Method during the mitigation plan phase.

Table 5: Functional Lift Summary (TN SQT in Appendix E)

Reach ID	Existing Stream Length (feet)	Proposed Stream Length (feet)	Change in Functional Condition (PCS - ECS)	Functional Lift (Credits)
Horse Creek	1,318	1,632	0.40	728
UT1	931	1,024	0.46	479
UT2	595	1,693	0.36	862
UT3	65	685	0.39	391
	Total Stream Length	**5,034**	**Total Potential Credits**	**2,460**

14.2 WETLAND

14.2.1 MITIGATION APPROACH

Wetlands currently present within the Site have been historically impacted through vegetation removal, grading, and hydrologic manipulation for agricultural purposes. Areas that are historically wetlands but are not currently functioning, identified by soil conditions and topography, are proposed for restoration that will re-establish the natural hydrologic and vegetative characteristics commonly found in bottomland hardwood forests through a combination of grading, ditch removal, and native planting. The existing wetlands on Site will be enhanced to reestablish bottomland hardwood vegetative communities to improve the biodiversity and stability of the riparian wetland system and provide continuity of habitat and hydrologic function that has been disturbed by regular agricultural use and clearing.

A portion of Wetland 5 in the northeastern portion of the property is proposed as preservation in accordance with the federal Mitigation Rule (33 CFR 332.3 (h)) which allows for preservation credit where the following criteria are met:

- Important biological functions to the watershed – the early successional riverine wetlands in this area enable flood storage adjacent to the highway, filtering of surface water before it enters the adjacent river, groundwater recharge, and important wildlife refuge in a developing corridor.
- Significant contribution to ecological sustainability of the watershed (qualitative) – this area will mature into an established bottomland hardwood system with close monitoring as the Bank is operated and under long-term management, which will enable the management of invasive species should they become prevalent and also permanent protection that would not be afforded if the property were left unprotected.
- Is appropriate and practicable – as part of the overall mitigation property, it is both appropriate and practical to include this area.
- Resources are under threat – land adjacent to a major highway such as US-45 and in close proximity to developing areas, such as Jackson and in the path between Memphis and Nashville, is prime for development unless otherwise protected.
- Permanently protected – the project area will be protected by a conservation easement.

The preservation credits are being proposed in conjunction with the restoration and enhancement of the remainder of the Site.

14.2.2 FUNCTIONAL LIFT

The HCSWMB will restore, enhance, and protect the wetland conditions that make up portions of the riparian buffer around Horse Creek. Through the implementation of this project, the bank sponsor will improve vegetative biodiversity and continuity of riparian habitat, as well as improve water quality along historically mismanaged headwater riparian corridors.

While wetland conditions exist for portions of the Site, the existing emergent wetlands are not consistent in quality or biodiversity with the reference hardwood communities that exist in along the South Fork of the Forked Deer River to the north and east of the Site. Reestablishing the proper wetland vegetative community will restore the natural historic function of the wetland systems. Research suggests that the existing scrub-shrub communities, if allowed to dominate the space, will not transition to hardwood communities naturally. This is especially true where land-use/practices create disruptions in the development of a canopy to shade out dense scrub-shrub vegetation and support growth of shade-tolerant hardwood saplings. Where restoration or enhancement is proposed, the Bank Sponsor intends to remove agricultural practices from the riparian zones, enhance hydrologic and soil conditions, and manage the transition of vegetative communities from the emergent wetland type to high value bottomland hardwood wetlands with vegetative diversity to match adjacent hardwood communities and historic conditions.

Table 6: Wetland Mitigation Approach

Mitigation Type	Wetland Area (Ac)	Ratio	Potential Credits
Restoration	10.1	1:1	10.1
Enhancement	1.2	2.5:1	0.48
Preservation	1.5	6:1	0.25
Total Area	12.8	Total Potential Credits	10.83

14.2.3 REFERENCE SITE

A specific reference site has not yet been located. A reference site will be chosen at a future date to establish baseline conditions for the project wetlands. Performance standards will be based on meeting wetland hydrology, soil, and vegetation criteria of the reference site and/or those criteria commonly found in riparian bottomland hardwood forests.

15.0 SITE PROTECTION

A Conservation Easement will be placed on the Site that will restrict conflicting activities within the mitigation area that may compromise the functions and services of the aquatic resources. WSRS will maintain financial responsibility of the mitigation site throughout the monitoring phase until final approval and closure of the Site by the IRT. Once final approval is granted, and the Site is closed, an endowment fund will be available for protection and maintenance of the mitigation Site, consistent with the Conservation Easement.

16.0 LONG-TERM MANAGEMENT

After the required monitoring period is complete, performance standards are met, and the project is formally closed out, the long-term stewardship of this project will be the responsibility of WSRS. The long-term steward will focus on ensuring easement integrity is maintained and that the landowner is observing the established restrictions for the easement. Long-term management consists of annual inspection of projects to assure that conservation easements or other site protection management agreements are not being violated. Sufficient funds have been retained to cover the costs of the annual site inspections, and for enforcing land use restrictions through litigation if necessary.

17.0 HISTORIC PROPERTIES

According to the National Register of Historic Places, there are no properties listed within or near the mitigation site. A search of the Tennessee Historical Commission database did not identify any records for historic properties on the mitigation site. Due to the type of work being done and the location of the streams (open agricultural fields), impacts to potential historic properties not identified by these organizations are unlikely to occur.

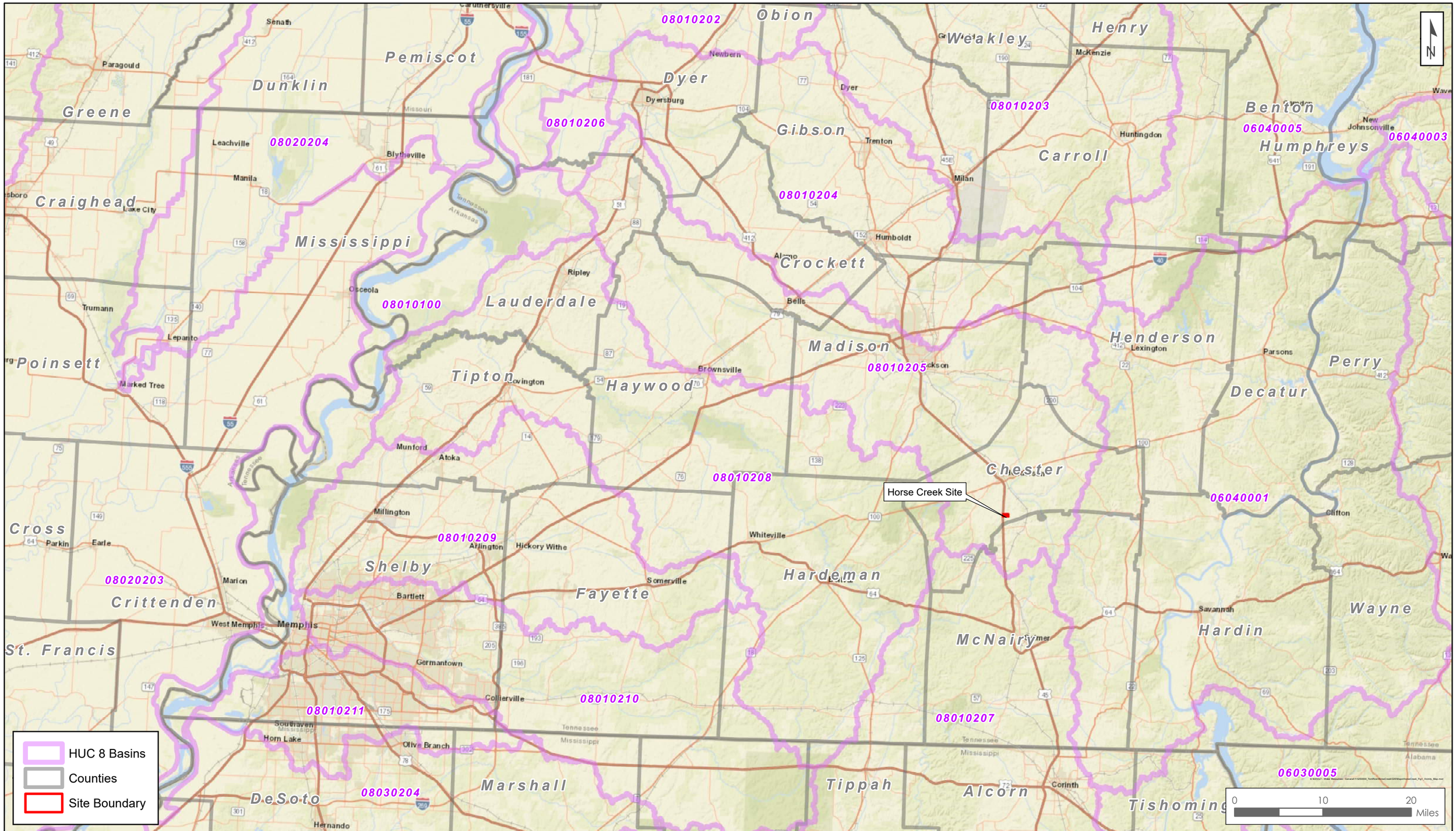
18.0 THREATENED AND ENDANGERED SPECIES

A review of the Tennessee Department of Environment and Conservation Rare Species database identified the endangered or threatened species in Chester County (Table 7). None of the species listed in Table 7 have been observed by biologists during Site field work. Implementation of the Mitigation Site has the potential to improve native habitats for these and other native species of wildlife. No other species surveys are planned for the Site.

Table 7: Threatened and Endangered Species

Type	Category	Scientific Name	Common Name	Global Rank	State Rank	Federal Status	State Status
Vascular Plant	Flowering Plant	Helianthus verticillatus	Whorled Sunflower	G1Q	S1	LE	E
Vascular Plant	Flowering Plant	Prenanthes barbata	Bearded Rattlesnake-root	G3	S2	--	S
Invertebrate Animal	Crustacean	Creaserinus hortoni	Hatchie Burrowing Crayfish	G1	S1	--	E
Vertebrate Animal	Fish	Etheostoma cervus	Chickasaw Darter	G2G3	S2S3	--	D
Vascular Plant	Flowering Plant	Pseudognaphalium helleri	Heller's Catfoot	G4G5	S2	--	S
Vascular Plant	Flowering Plant	Rhynchosia latifolia	Prairie Rhynchosia	G5	S1	--	S

Appendix A: Figures



Prepared By: Kimley»Horn

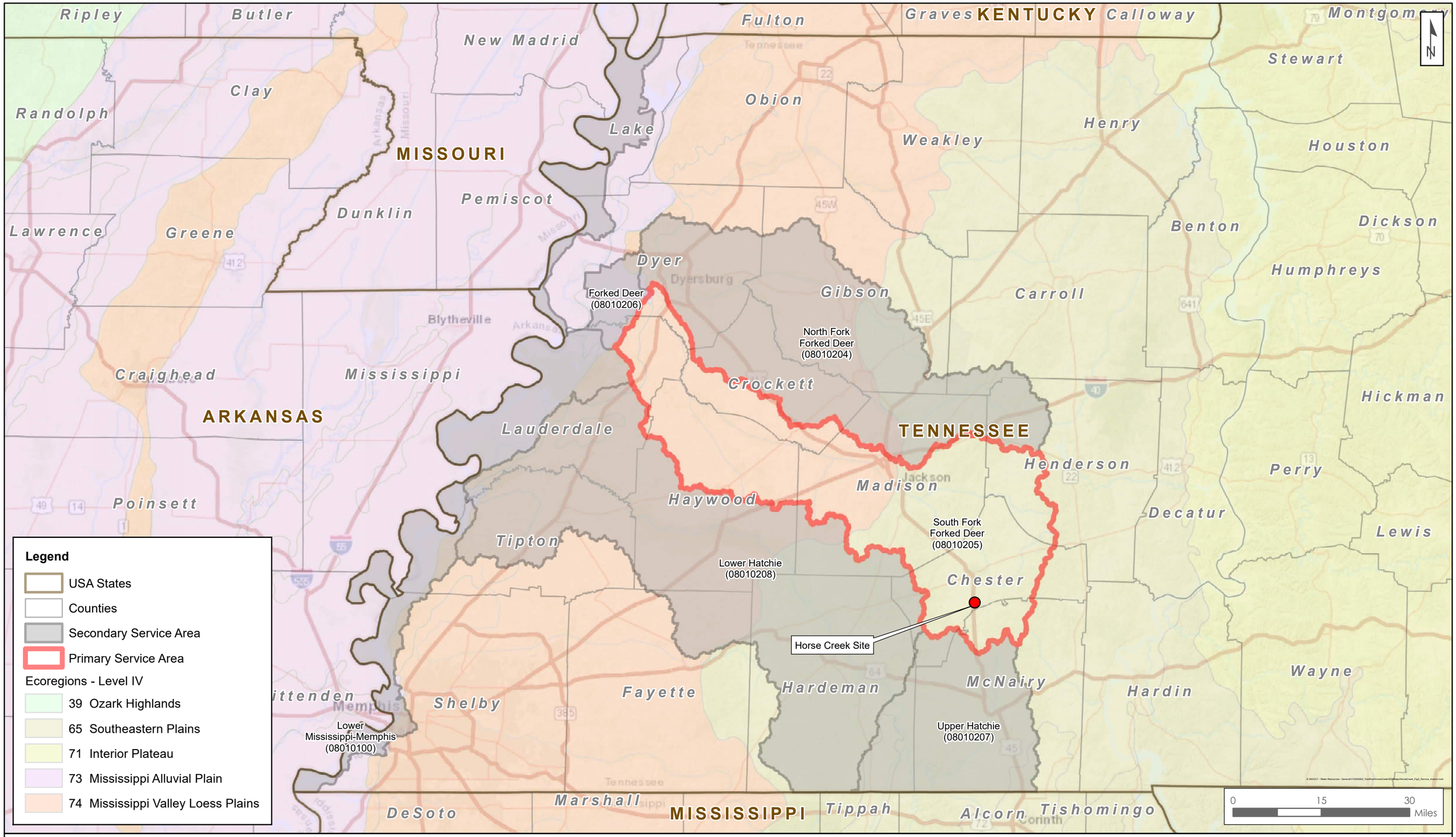
Prepared For: Wetland & Stream Restoration Services

Horse Creek Stream and Wetland Mitigation Bank

Vicinity Map

Figure #1
Chester County, TN

6/16/2020



Prepared By:

Kimley»Horn

Prepared For:

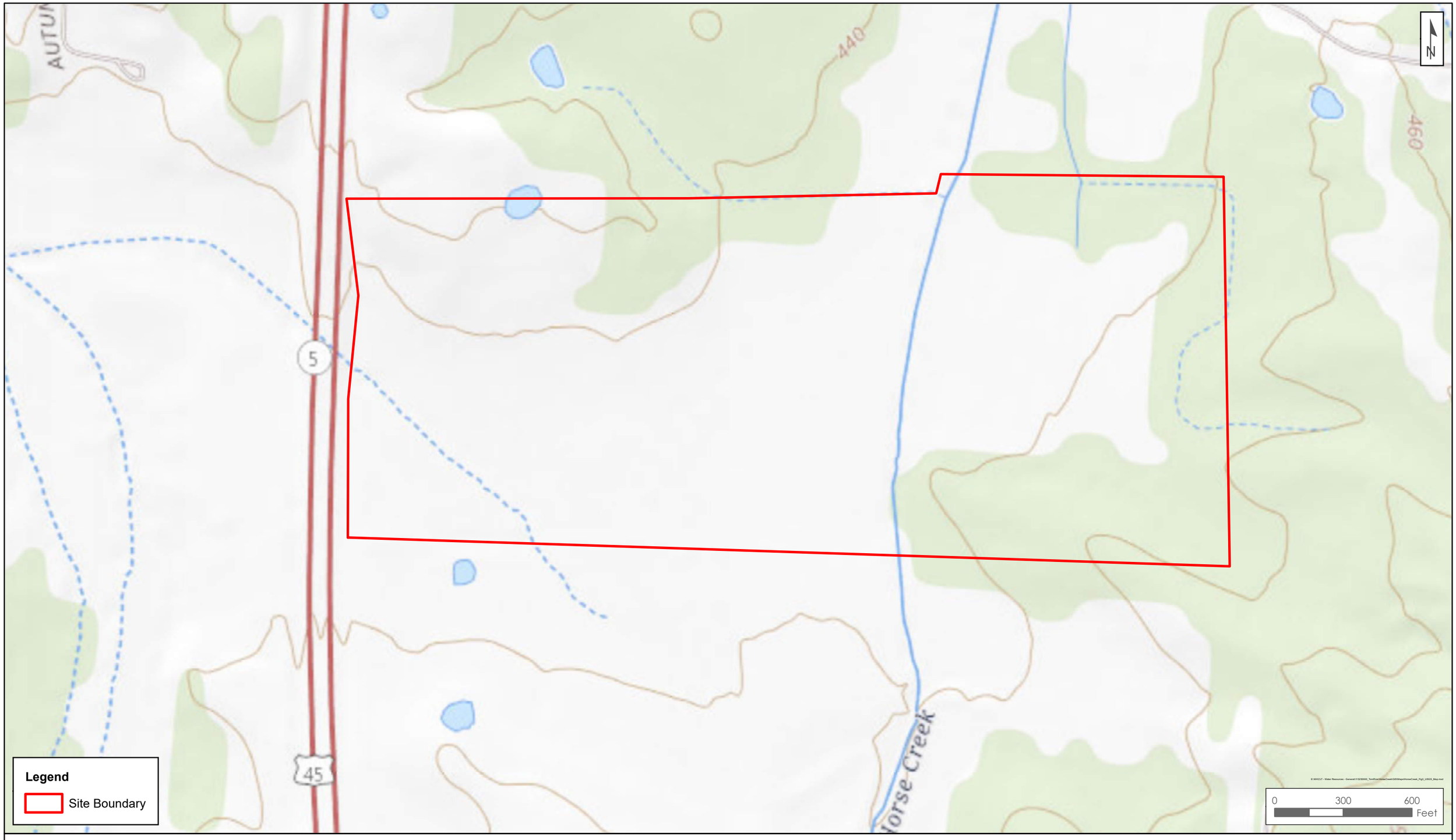
Wetland & Stream Restoration Services

Horse Creek Stream and Wetland Mitigation Bank

Service Area Map

Figure #2
Chester County, TN

6/23/2020



Prepared By:

Kimley»Horn

Prepared For:

Wetland & Stream Restoration Services

Horse Creek Stream and Wetland Mitigation Bank

Service Area Map

Figure #2
Chester County, TN

6/24/2020

Prepared By:

Kimley»Horn

Prepared For:

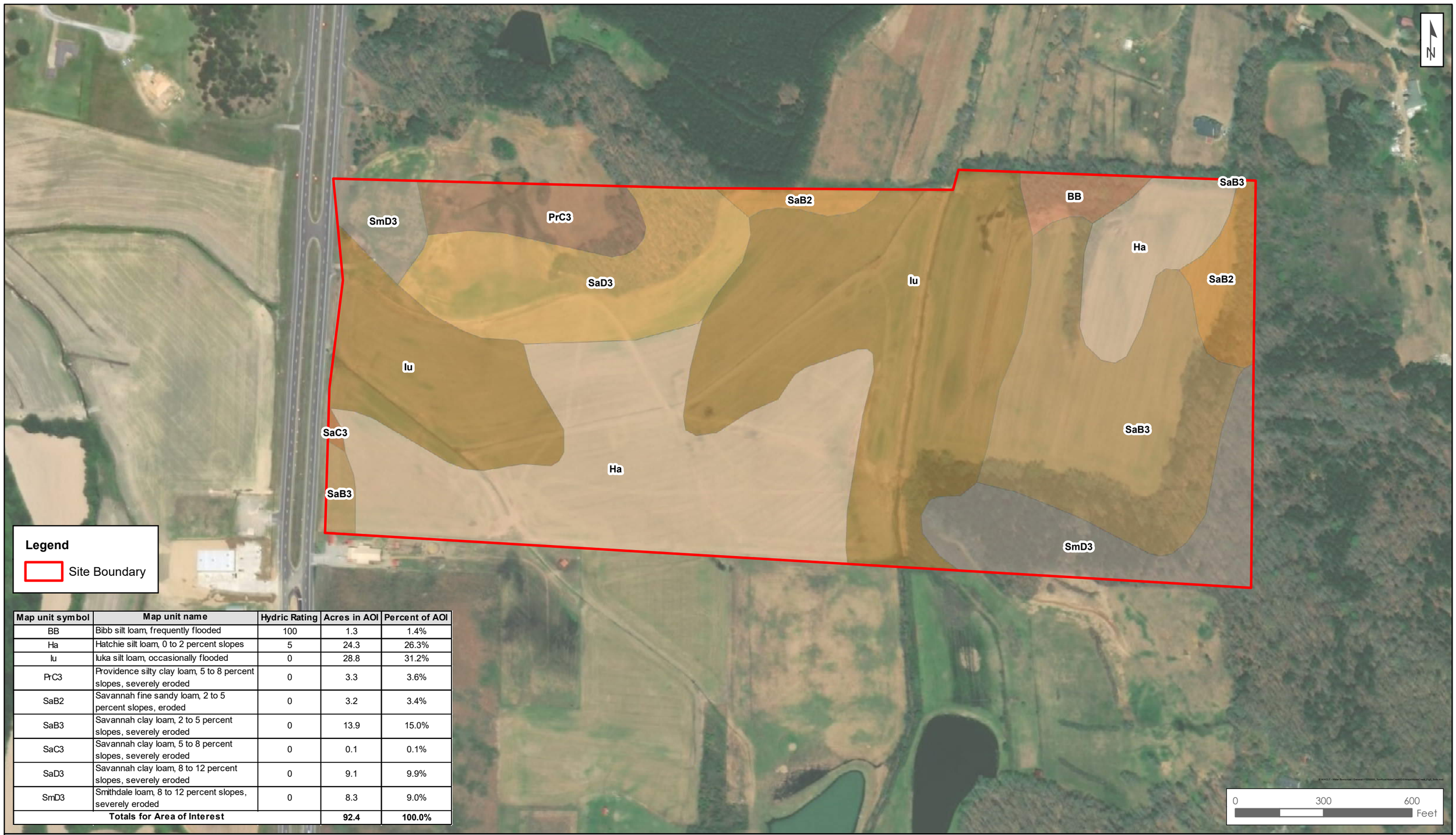
Wetland & Stream Restoration Services

Horse Creek Stream and Wetland Mitigation Bank

Historic Aerials Map

Figure #4
Chester County, TN

6/22/2020



Map unit symbol	Map unit name	Hydric Rating	Acres in AOI	Percent of AOI
BB	Bibb silt loam, frequently flooded	100	1.3	1.4%
Ha	Hatchie silt loam, 0 to 2 percent slopes	5	24.3	26.3%
Iu	Iuka silt loam, occasionally flooded	0	28.8	31.2%
PrC3	Providence silty clay loam, 5 to 8 percent slopes, severely eroded	0	3.3	3.6%
SaB2	Savannah fine sandy loam, 2 to 5 percent slopes, eroded	0	3.2	3.4%
SaB3	Savannah clay loam, 2 to 5 percent slopes, severely eroded	0	13.9	15.0%
SaC3	Savannah clay loam, 5 to 8 percent slopes, severely eroded	0	0.1	0.1%
SaD3	Savannah clay loam, 8 to 12 percent slopes, severely eroded	0	9.1	9.9%
SmD3	Smithdale loam, 8 to 12 percent slopes, severely eroded	0	8.3	9.0%
Totals for Area of Interest			**92.4**	**100.0%**

Prepared By:

Kimley»Horn

Prepared For:

Wetland & Stream Restoration Services

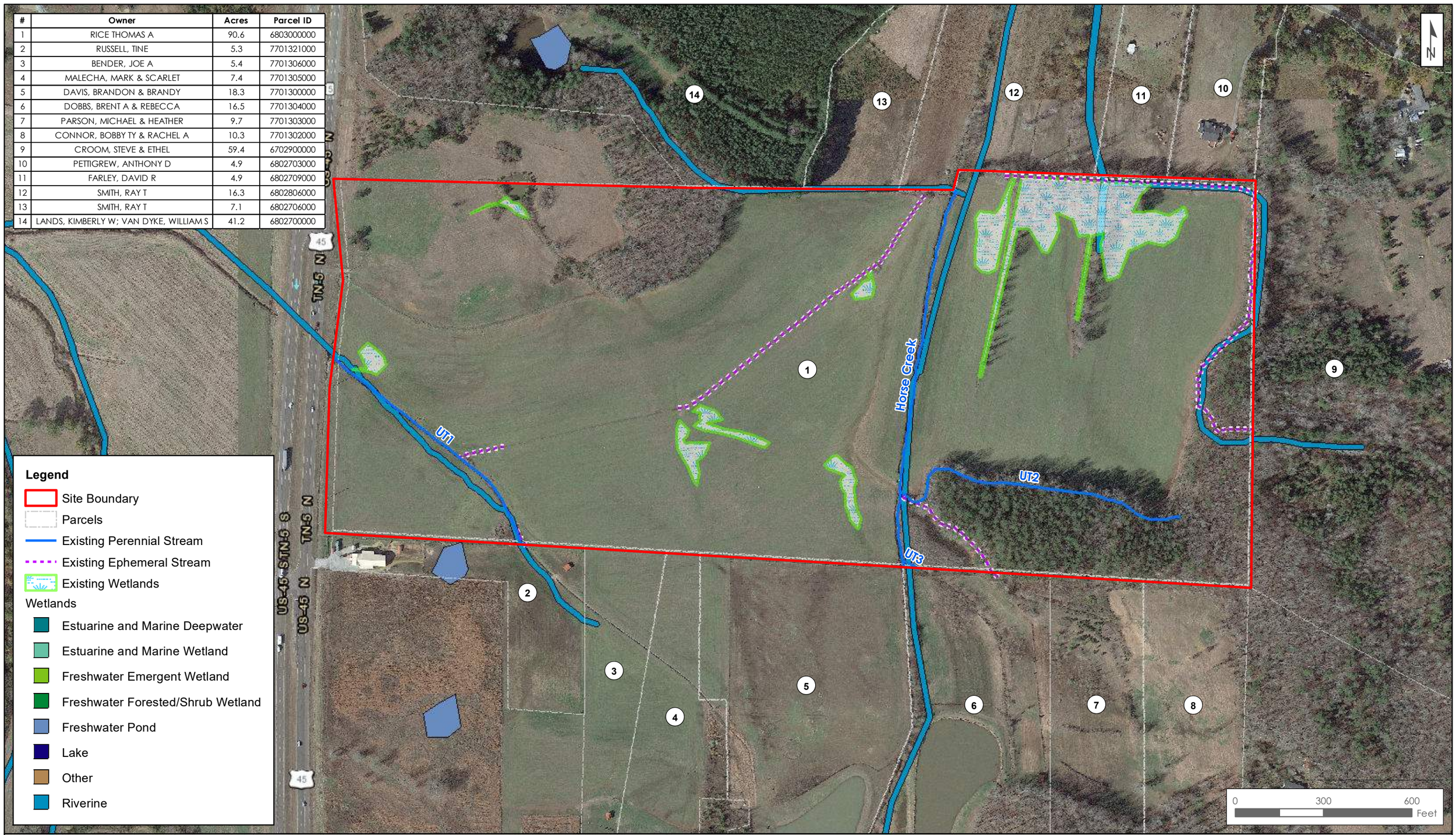
Horse Creek Stream and Wetland Mitigation Bank

Soils Map

Figure #5
Chester County, TN

6/24/2020

#	Owner	Acres	Parcel ID
1	RICE THOMAS A	90.6	6803000000
2	RUSSELL, TINE	5.3	7701321000
3	BENDER, JOE A	5.4	7701306000
4	MALECHA, MARK & SCARLET	7.4	7701305000
5	DAVIS, BRANDON & BRANDY	18.3	7701300000
6	DOBBS, BRENT A & REBECCA	16.5	7701304000
7	PARSON, MICHAEL & HEATHER	9.7	7701303000
8	CONNOR, BOBBY TY & RACHEL A	10.3	7701302000
9	CROOM, STEVE & ETHEL	59.4	6702900000
10	PETTIGREW, ANTHONY D	4.9	6802703000
11	FARLEY, DAVID R	4.9	6802709000
12	SMITH, RAY T	16.3	6802806000
13	SMITH, RAY T	7.1	6802706000
14	LANDS, KIMBERLY W; VAN DYKE, WILLIAM S	41.2	6802700000



Prepared By:

Kimley»Horn

Prepared For:

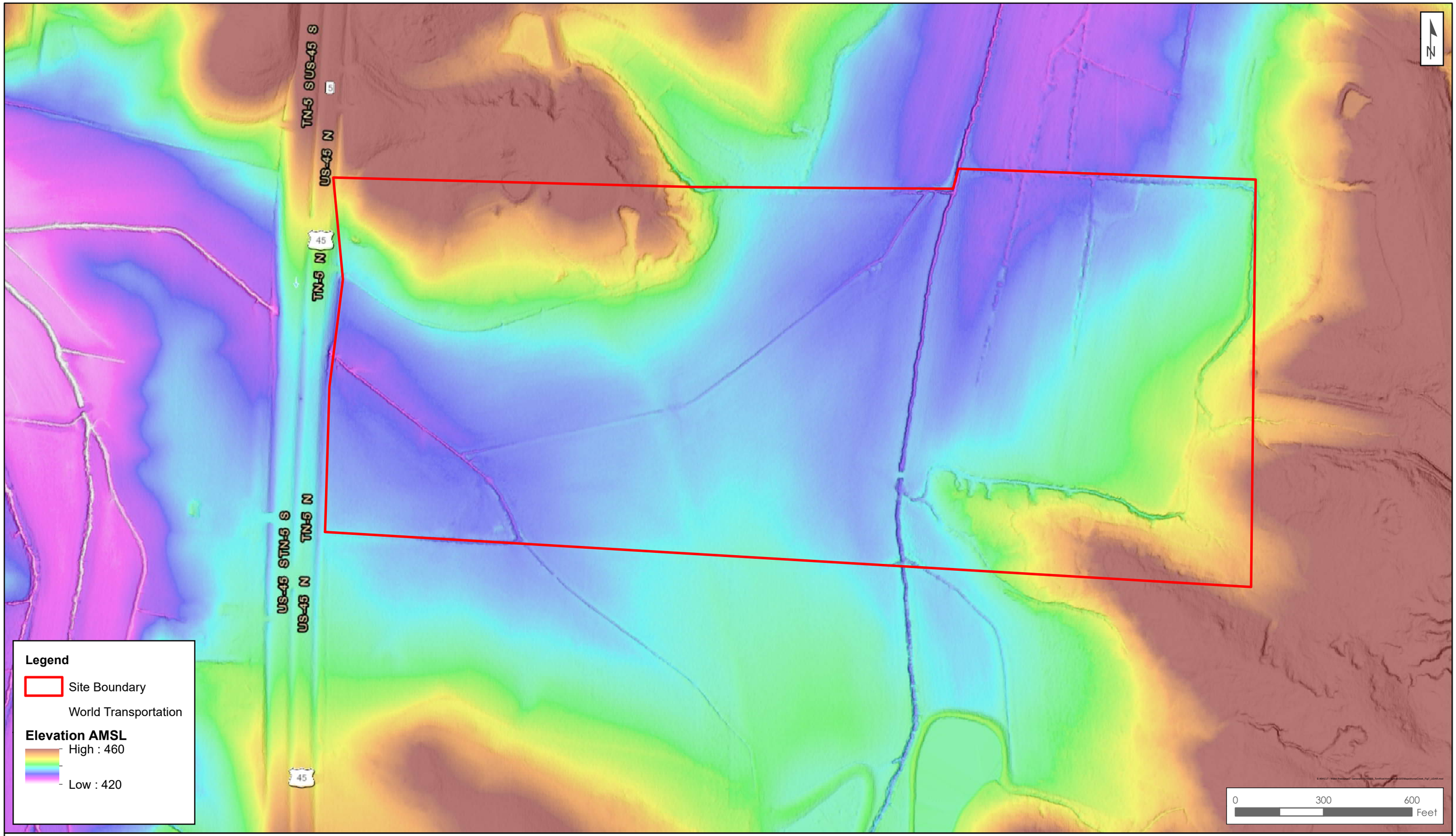
Wetland & Stream Restoration Services

Horse Creek Stream and Wetland Mitigation Bank

Existing Conditions

Figure #6
Chester County, TN

6/24/2020



Prepared By:

Kimley»Horn

Prepared For:

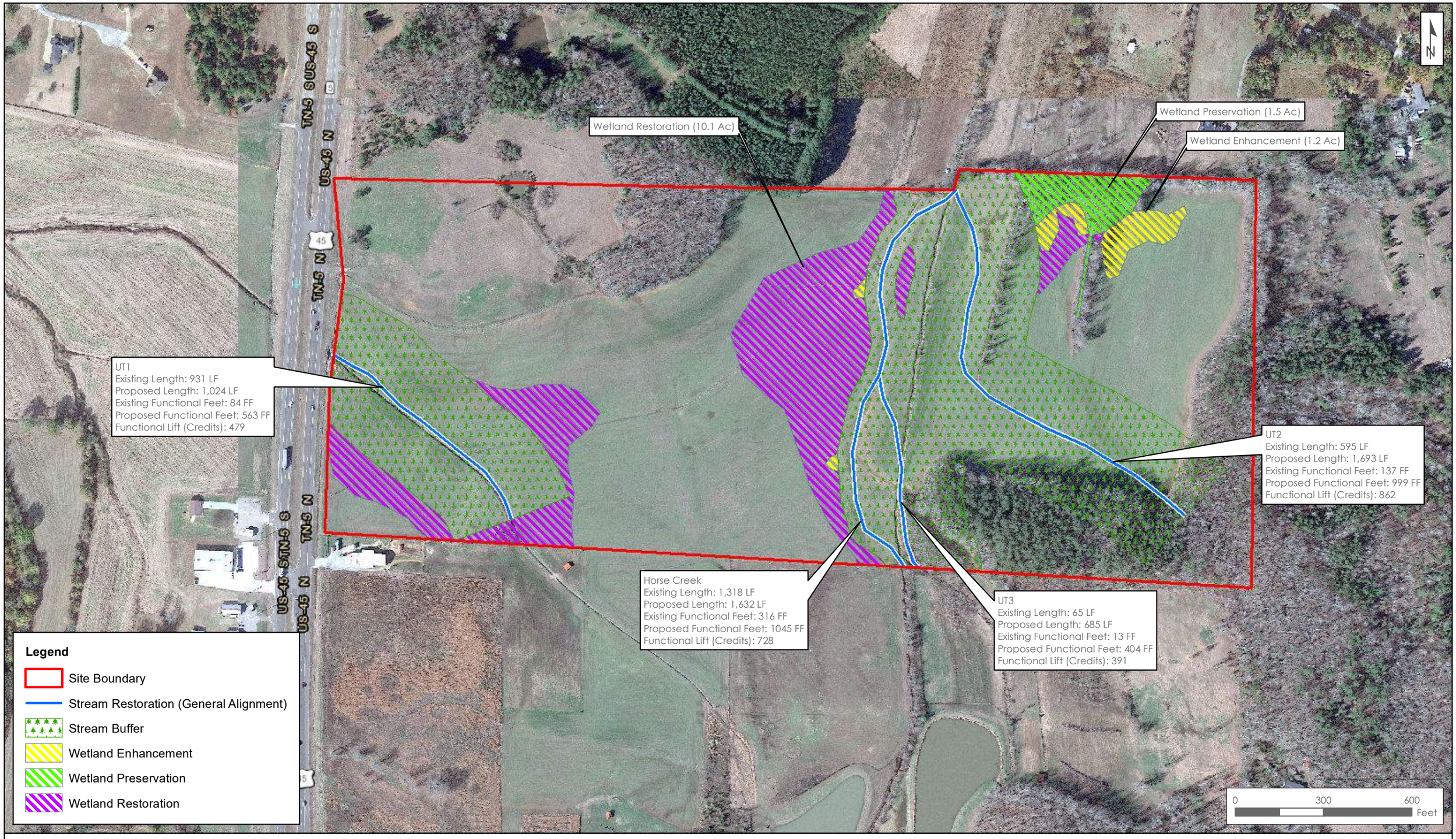
Wetland & Stream Restoration Services

Horse Creek Stream and Wetland Mitigation Bank

LiDAR Map

Figure #7
Chester County, TN

6/24/2020



Prepared By:

Kimley»Horn

Prepared For:

Wetland & Stream Restoration Services

Horse Creek Stream and Wetland Mitigation Bank

Proposed Mitigation Map

Figure #8
Chester County, TN

6/24/2020

Appendix B: Site Photos

Kimley»Horn

Horse Creek Stream and Wetland Mitigation Bank
Photograph Sheet

KHA Job No.: 115250011
KHA Rep.: TJT
Date: 6/18/2020
Page: 1 of 3

Photo No. 1

Remarks: Horse Creek, Upstream end of reach - Downstream View (Facing North)

Photo No. 2

Remarks: Horse Creek, Downstream end of reach - Upstream View (Facing South)

Photo No. 3

Remarks: UT 1, Middle of reach - Downstream View (Facing Northwest toward US-45)

Photo No. 4

Remarks: UT 1, Middle of reach - Upstream View (Looking Southeast)

Kimley»Horn

Horse Creek Stream and Wetland Mitigation Bank
Photograph Sheet

KHA Job No.: 115250011
KHA Rep.: TJT
Date: 6/18/2020
Page: 3 of 3

Photo No. 5

Remarks: UT 2 - Upstream View (Facing East)

Photo No. 6

Remarks: UT 2 - Downstream View (Facing West)

Photo No. 7

Remarks: UT 3 - Upstream view (Facing East)

Photo No. 8

Remarks: UT 3 - Downstream View (Facing West)

Kimley»Horn

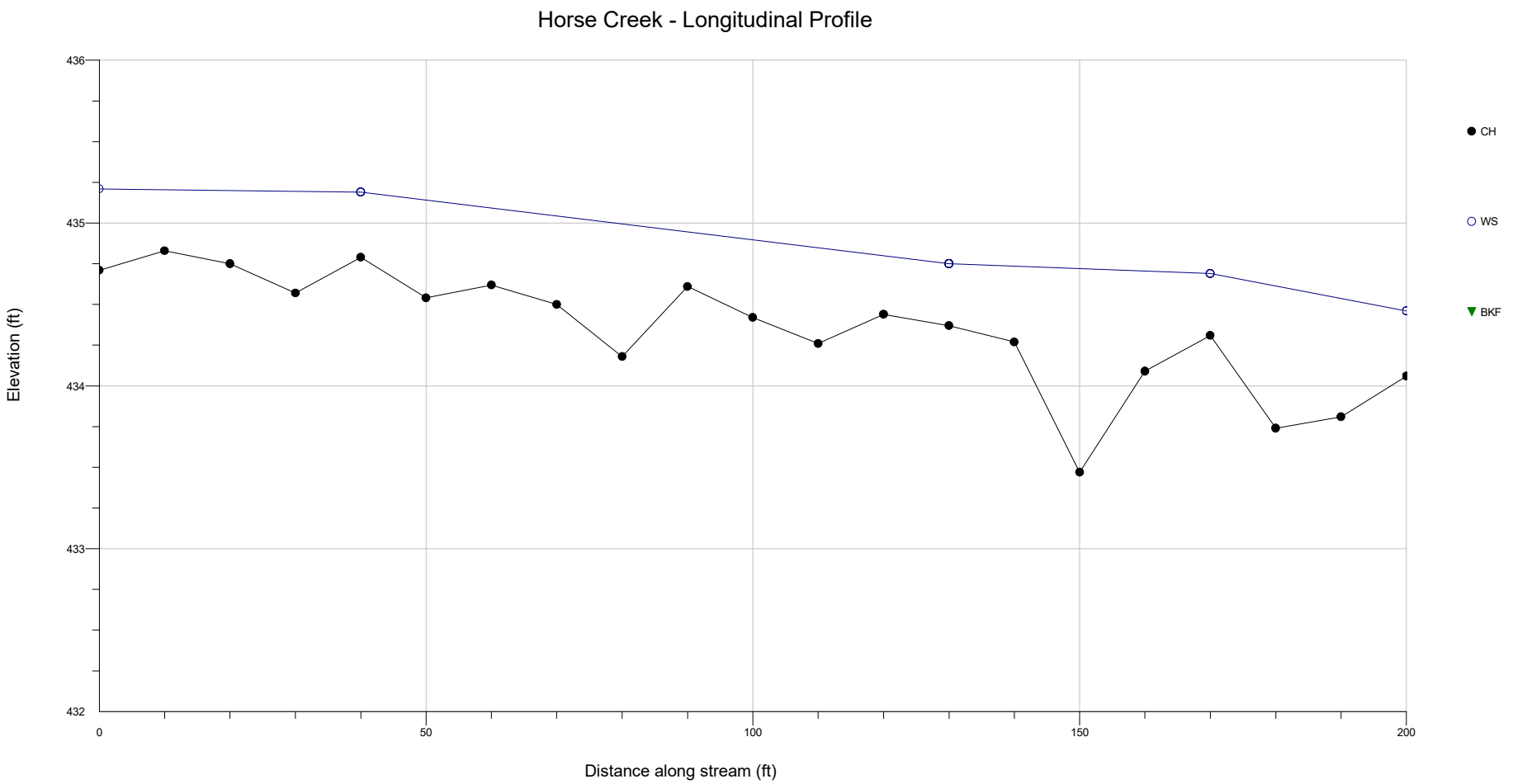
Horse Creek Stream and Wetland Mitigation Bank
Photograph Sheet

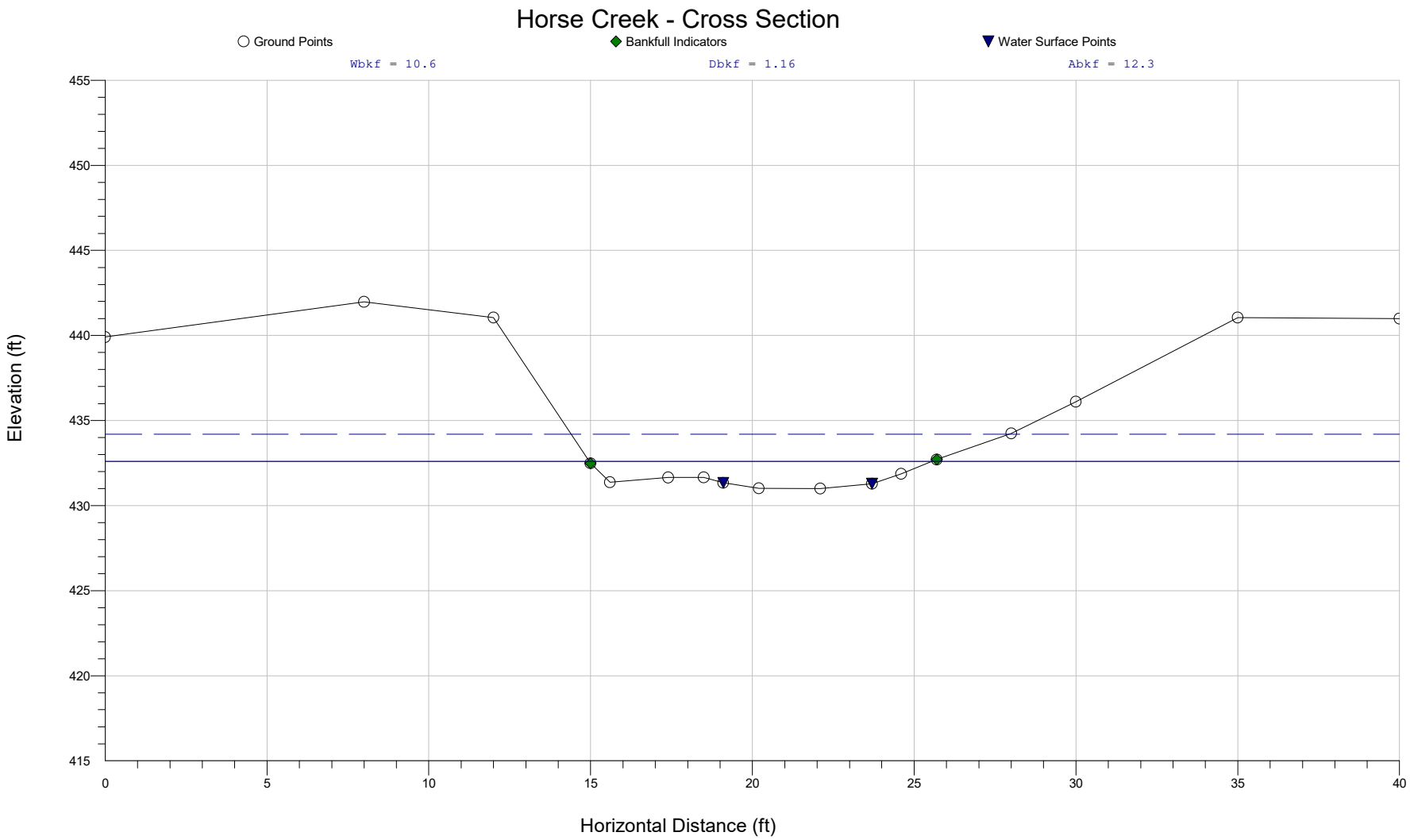
KHA Job No.: 115250011
KHA Rep.: TJT
Date: 6/18/2020
Page: 4 of 3

Photo No. 9	Photo No. 10
	
Remarks: Typical conditions in scrub/shrub wetland in Bibb soils in northeast of site	Remarks: Typical wetland conditions in west agricultural fields

Photo No. 11	Photo No. 12
	
Remarks: Typical agricultural ephemeral ditch in west field	Remarks: Typical agricultural ditch converting to wetland in east field

Appendix C: Geomorphic Data


Horse Creek - Longitudinal Profile
Elevation (ft)
436
435
434
433
432
0
50
100
150
200
Distance along stream (ft)
CH
WS
BKF


Horse Creek - Cross Section
Ground Points
Bankfull Indicators
Water Surface Points
Wbkf = 10.6
Dbkf = 1.16
Abkf = 12.3
Elevation (ft)
455
450
445
440
435
430
425
420
415
0
5
10
15
20
25
30
35
40
Horizontal Distance (ft)

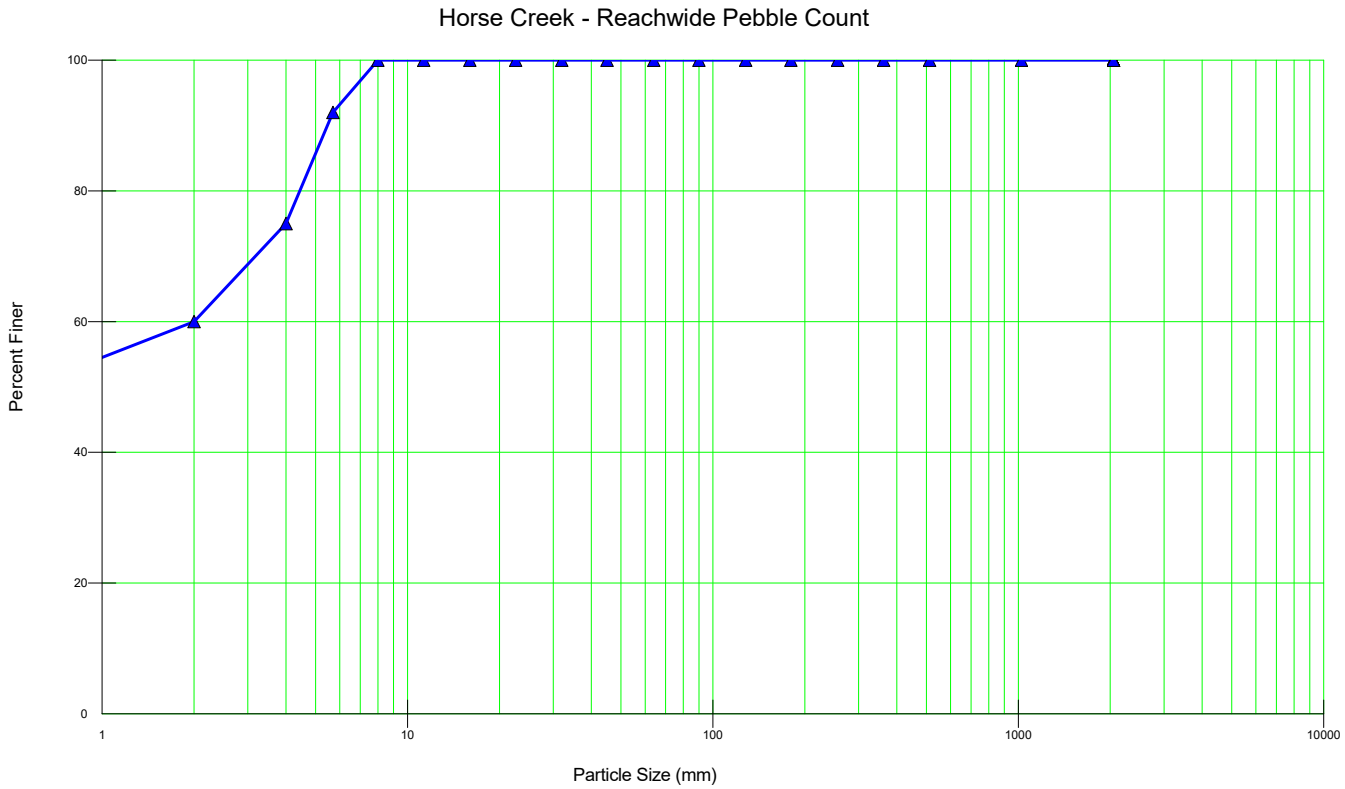
RIVERMORPH PARTICLE SUMMARY

River Name: Horse Creek
Reach Name: Horse Creek
Sample Name: Reachwide Pebblecount
Survey Date: 05/19/2020

Size (mm)	TOT #	ITEM %	CUM %
0 - 0.062	0	0.00	0.00
0.062 - 0.125	0	0.00	0.00
0.125 - 0.25	0	0.00	0.00
0.25 - 0.50	0	0.00	0.00
0.50 - 1.0	0	0.00	0.00
1.0 - 2.0	60	60.00	60.00
2.0 - 4.0	15	15.00	75.00
4.0 - 5.7	17	17.00	92.00
5.7 - 8.0	8	8.00	100.00
8.0 - 11.3	0	0.00	100.00
11.3 - 16.0	0	0.00	100.00
16.0 - 22.6	0	0.00	100.00
22.6 - 32.0	0	0.00	100.00
32 - 45	0	0.00	100.00
45 - 64	0	0.00	100.00
64 - 90	0	0.00	100.00
90 - 128	0	0.00	100.00
128 - 180	0	0.00	100.00
180 - 256	0	0.00	100.00
256 - 362	0	0.00	100.00
362 - 512	0	0.00	100.00
512 - 1024	0	0.00	100.00
1024 - 2048	0	0.00	100.00
Bedrock	0	0.00	100.00

D16 (mm)	1.27
D35 (mm)	1.58
D50 (mm)	1.83
D84 (mm)	4.9
D95 (mm)	6.56
D100 (mm)	8
Silt/Clay (%)	0
Sand (%)	60
Gravel (%)	40
Cobble (%)	0
Boulder (%)	0
Bedrock (%)	0

Total Particles = 100.



RIVERMORPH BEHI SUMMARY REPORT

River Name: Horse Creek
Reach Name: Horse Creek

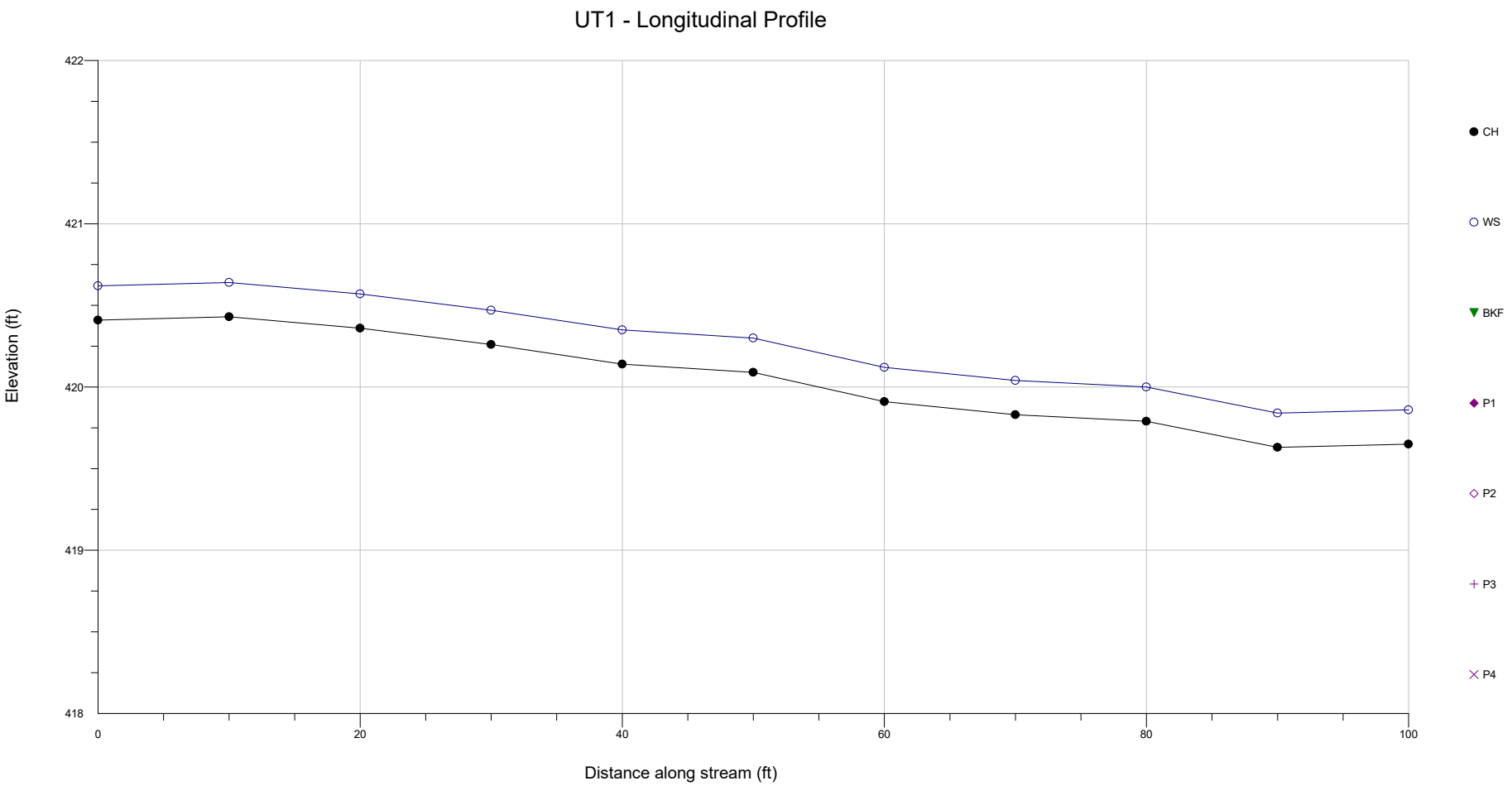
Table 1. Bank Identification Summary

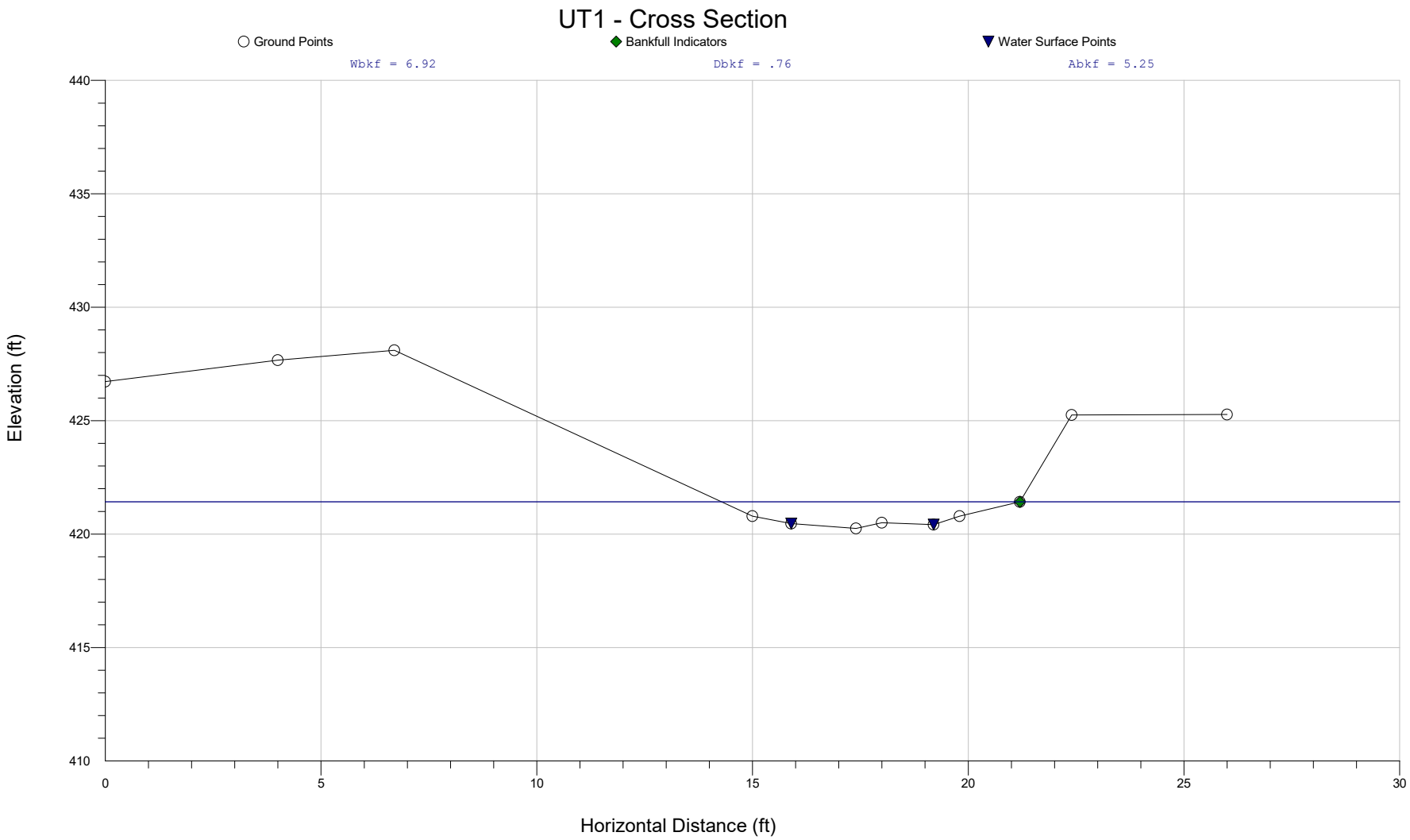
Bank	Name
1	Right Bank (05/19/2020)
2	Left Bank (05/19/2020)

Table 2. Predicted Annual Bank Erosion Rates

Bank	BEHI Numeric Rating	BEHI Adjective Rating	NBS Adjective Rating	Length ft	Loss cu yds/yr	Loss tons/yr
1	40.3	Very High	Low	1318	292.8889	380.7556
2	31.6	High	Low	1318	49.7911	64.7284
Totals				2636	342.68	445.484

Total Reach Ln: 1318 Total Loss (tons/yr) per ft of Reach: 0.3380


UT1 - Longitudinal Profile
Elevation (ft)
422
421
420
419
418
0
20
40
60
80
100
Distance along stream (ft)
CH
WS
BKF
P1
P2
P3
P4


UT1 - Cross Section
Ground Points
Bankfull Indicators
Water Surface Points
Wbkf = 6.92
Dbkf = .76
Abkf = 5.25
Elevation (ft)
440
435
430
425
420
415
410
0
5
10
15
20
25
30
Horizontal Distance (ft)

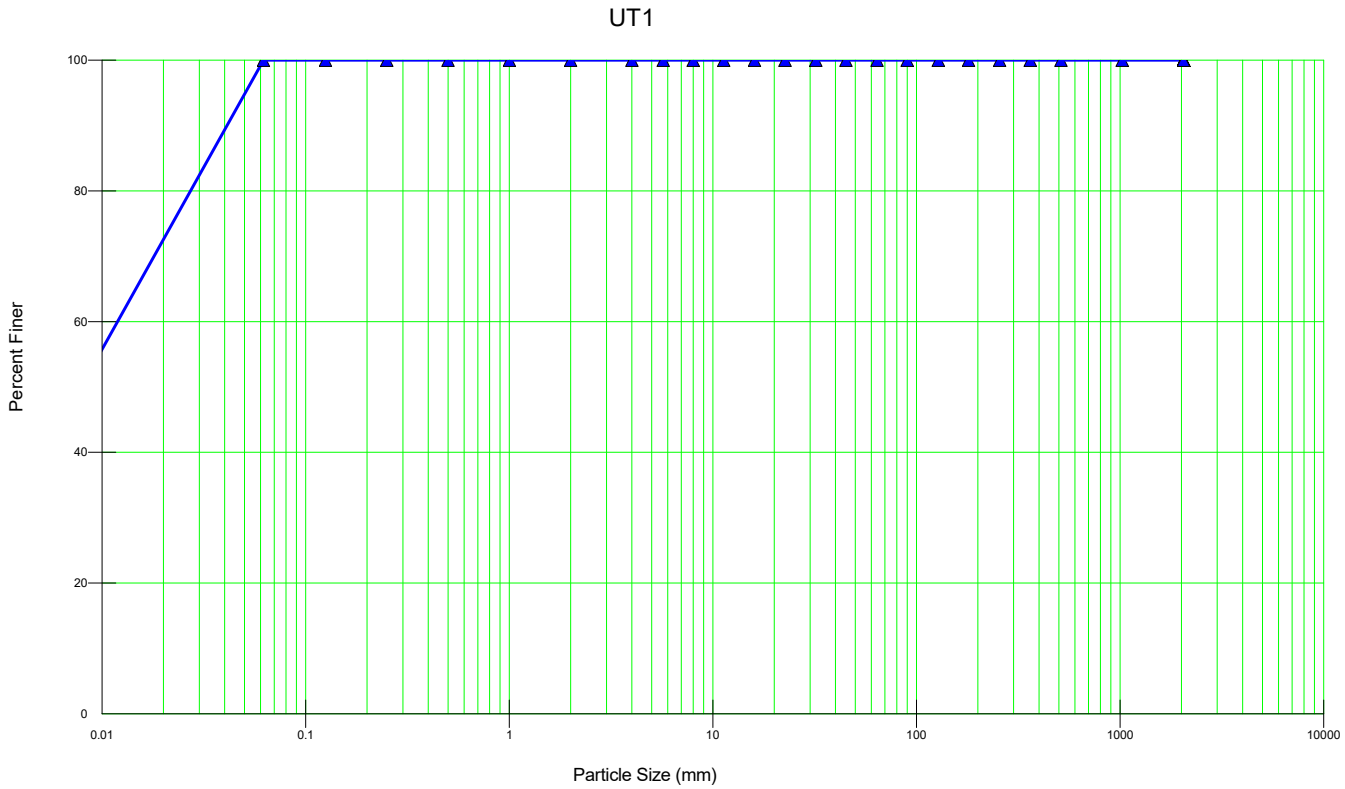
RIVERMORPH PARTICLE SUMMARY

River Name: Horse Creek
Reach Name: UT1
Sample Name: UT1
Survey Date: 05/19/2020

Size (mm)	TOT #	ITEM %	CUM %
0 - 0.062	100	100.00	100.00
0.062 - 0.125	0	0.00	100.00
0.125 - 0.25	0	0.00	100.00
0.25 - 0.50	0	0.00	100.00
0.50 - 1.0	0	0.00	100.00
1.0 - 2.0	0	0.00	100.00
2.0 - 4.0	0	0.00	100.00
4.0 - 5.7	0	0.00	100.00
5.7 - 8.0	0	0.00	100.00
8.0 - 11.3	0	0.00	100.00
11.3 - 16.0	0	0.00	100.00
16.0 - 22.6	0	0.00	100.00
22.6 - 32.0	0	0.00	100.00
32 - 45	0	0.00	100.00
45 - 64	0	0.00	100.00
64 - 90	0	0.00	100.00
90 - 128	0	0.00	100.00
128 - 180	0	0.00	100.00
180 - 256	0	0.00	100.00
256 - 362	0	0.00	100.00
362 - 512	0	0.00	100.00
512 - 1024	0	0.00	100.00
1024 - 2048	0	0.00	100.00
Bedrock	0	0.00	100.00

D16 (mm)	0.01
D35 (mm)	0.02
D50 (mm)	0.03
D84 (mm)	0.05
D95 (mm)	0.06
D100 (mm)	0.06
Silt/Clay (%)	100
Sand (%)	0
Gravel (%)	0
Cobble (%)	0
Boulder (%)	0
Bedrock (%)	0

Total Particles = 100.



RIVERMORPH BEHI SUMMARY REPORT

River Name: Horse Creek
Reach Name: UT1

Table 1. Bank Identification Summary

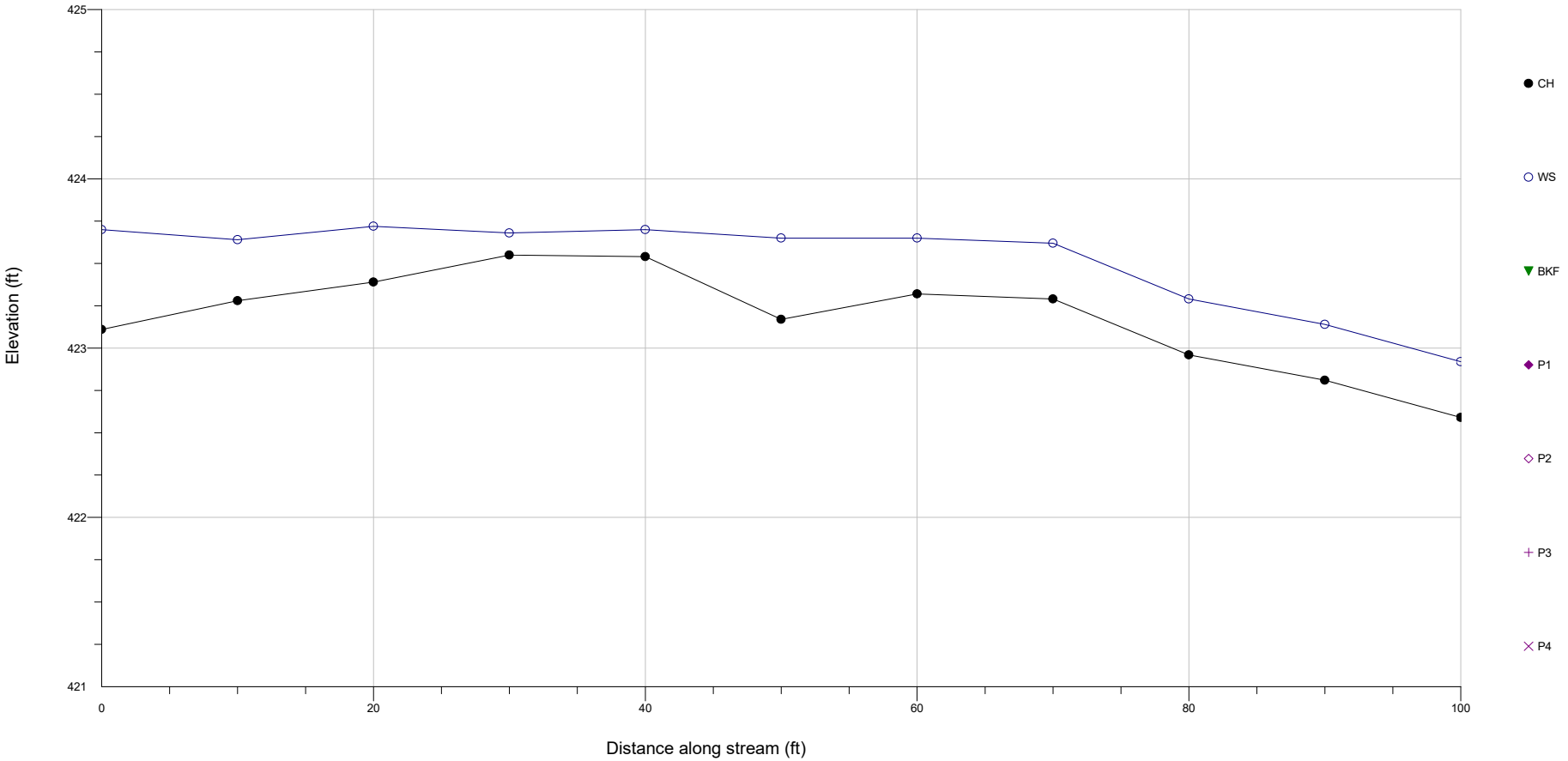
Bank	Name
1	UT1 - BANCS - Right Bank (05/19/2020)
2	UT1 - BANCS - Left Bank (05/19/2020)

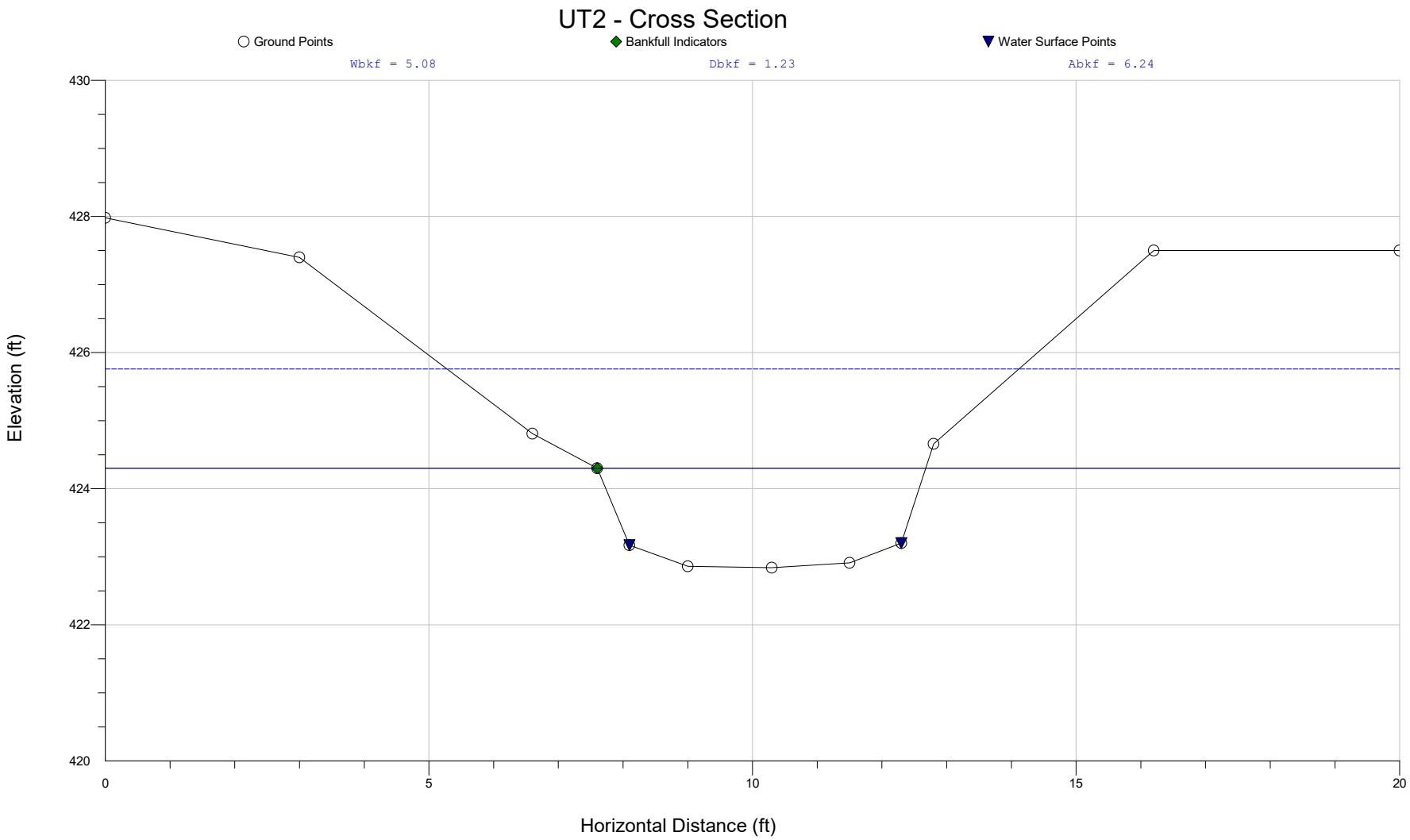
Table 2. Predicted Annual Bank Erosion Rates

Bank	BEHI Numeric Rating	BEHI Adjective Rating	NBS Adjective Rating	Length ft	Loss cu yds/yr	Loss tons/yr
1	34.2	High	Moderate	931	27.5852	35.8607
2	35.8	High	Moderate	931	27.5852	35.8607
Totals				1862	55.1704	71.7214

Total Reach Ln: 931 Total Loss (tons/yr) per ft of Reach: 0.0770

UT2 - Longitudinal Profile




UT2 - Cross Section
Ground Points
Bankfull Indicators
Water Surface Points
Wbkf = 5.08
Dbkf = 1.23
Abkf = 6.24
Elevation (ft)
430
428
426
424
422
420
0
5
10
15
20
Horizontal Distance (ft)

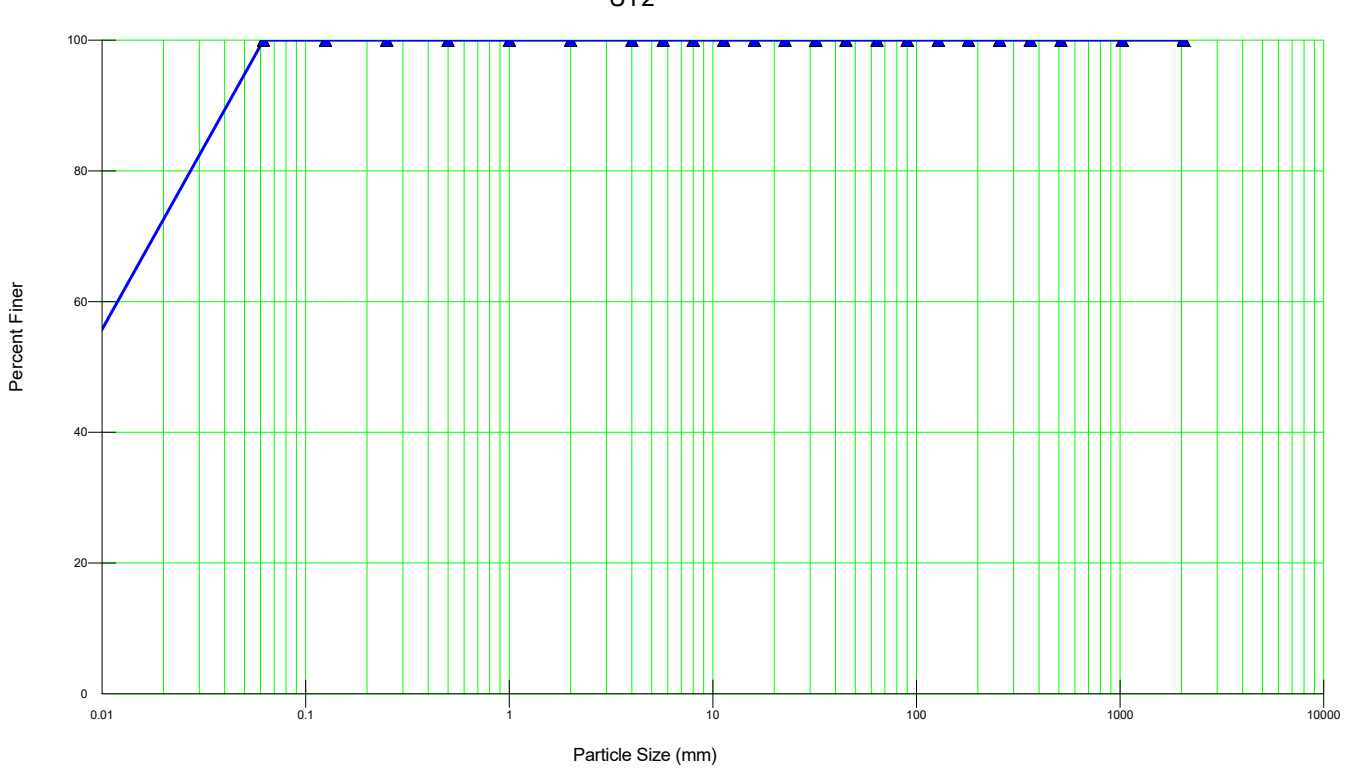
RIVERMORPH PARTICLE SUMMARY

River Name: Horse Creek
Reach Name: UT2
Sample Name: UT2 - Pebblecount - Reachwide (05/19/2020)
Survey Date: 05/19/2020

Size (mm)	TOT #	ITEM %	CUM %
0 - 0.062	100	100.00	100.00
0.062 - 0.125	0	0.00	100.00
0.125 - 0.25	0	0.00	100.00
0.25 - 0.50	0	0.00	100.00
0.50 - 1.0	0	0.00	100.00
1.0 - 2.0	0	0.00	100.00
2.0 - 4.0	0	0.00	100.00
4.0 - 5.7	0	0.00	100.00
5.7 - 8.0	0	0.00	100.00
8.0 - 11.3	0	0.00	100.00
11.3 - 16.0	0	0.00	100.00
16.0 - 22.6	0	0.00	100.00
22.6 - 32.0	0	0.00	100.00
32 - 45	0	0.00	100.00
45 - 64	0	0.00	100.00
64 - 90	0	0.00	100.00
90 - 128	0	0.00	100.00
128 - 180	0	0.00	100.00
180 - 256	0	0.00	100.00
256 - 362	0	0.00	100.00
362 - 512	0	0.00	100.00
512 - 1024	0	0.00	100.00
1024 - 2048	0	0.00	100.00
Bedrock	0	0.00	100.00

D16 (mm)	0.01
D35 (mm)	0.02
D50 (mm)	0.03
D84 (mm)	0.05
D95 (mm)	0.06
D100 (mm)	0.06
Silt/Clay (%)	100
Sand (%)	0
Gravel (%)	0
Cobble (%)	0
Boulder (%)	0
Bedrock (%)	0

Total Particles = 100.



RIVERMORPH BEHI SUMMARY REPORT

River Name: Horse Creek
Reach Name: UT2

Table 1. Bank Identification Summary

Bank	Name
1	UT2 - BANCS - Right Bank (05/19/2020)
2	UT2 - BANCS - Left Bank (05/19/2020)

Table 2. Predicted Annual Bank Erosion Rates

Bank	BEHI Numeric Rating	BEHI Adjective Rating	NBS Adjective Rating	Length ft	Loss cu yds/yr	Loss tons/yr
1	37	High	Low	1089	18.9244	24.6017
2	37	High	Low	1089	18.9244	24.6017
Totals				2178	37.8488	49.2034

Total Reach Ln: 1089 Total Loss (tons/yr) per ft of Reach: 0.0452

Appendix D: Assessment Forms

Watershed Assessment Form

Overall Watershed Condition	FAIR	Rater(s): KJH
Discussion: The Site lies within a largely agricultural watershed that consists primarily of row crop and animal production with some forested areas. Intense agricultural practices have contributed to the degradation of streams within the Horse Creek and South Fork of the Forked Deer watersheds through increased peak runoff, channelization, siltation, and loss of productive habitat.		Date: 06/24/2020

Purpose: This form is used to aid in the site selection process and gage a stream's restoration potential. The form includes descriptions of watershed processes and stressors that exist outside of the stream, can limit the restoration potential, and **will not** be addressed as part of the proposed project. The "watershed" is a combination of both the **catchment** draining to the stream project area and the **lateral drainage area** containing the stream. The **catchment** is the area draining to the stream's upper boundary above the project. The **lateral drainage area** is the areas draining to the stream from either side of the channel within the project boundary. Therefore, the watershed is equal to the catchment and the lateral drainage area.

WATERSHED ASSESSMENT

	Categories	Description of Watershed Condition			Rating (P/F/G)
		Poor	Fair	Good	
1	Impervious cover in Watershed (Hydrology)	Greater than 20%	Between 10% and 20%	Less than 10%	G
2	Percent Land Use Change in Watershed (Hydrology)	Rapidly urbanizing/urban. Impervious cover in watershed increased by more than 5% in 5 years.	Single family homes/suburban. Impervious cover in watershed increased by less than 5% but more than 2.5% in 5 years.	Rural communities and/or slow growth area or primarily forested. Impervious cover in watershed increased by less than 2.5% in 5 years.	G
3	Road Density in Watershed (Hydrology)	Roads located in or adjacent to lateral drainage area and/or throughout catchment and/or major roads proposed in 10 year DOT plans. Road Density > 2.5 miles of road length per square mile of watershed drainage area.	No roads in or adjacent to the lateral drainage area, some roads in catchment. No more than one major road proposed in 10 year DOT plans. Road Density between 1.5 and 2.5 miles of road length per square mile of watershed drainage area.	No roads in watershed. No proposed roads in 10 year DOT plans. Road Density < 1.5 miles of road length per square mile of watershed drainage area.	G
4	Percent Forested in Catchment (Hydrology)	Less than 20%	Between 20% and 70%	Greater than 70%	F
5	Catchment Impoundments (Hydrology) These include small dams, farm ponds, and large impoundments which are greater than 20 feet in height or structures with the capacity to have 30 acre feet in storage. These features will remain in place.	Large impoundment on the main stem or tributaries directly tied to project and/or multiple small impoundments; these impoundments limit flow in tributaries and/or the main stem throughout catchment.	No impoundments on the main stem; small impoundments on tributaries that limits flow and may affect the main stem.	No impoundments in catchment area.	P
6	Catchment Forested Riparian Corridor (Geomorphology)	<50% of streams (including tributaries) within catchment has > 25 feet corridor width.	50-80% of streams (including tributaries) within catchment has > 25 feet corridor width.	>80% of contributing streams (including tributaries) within catchment has > 25 feet corridor width.	P
7	Fine Sediment Deposition in Lateral Drainage Area (Geomorphology and Physicochemical)	>60% of bottom substrate affected by recent deposition; significant amount of fine material accumulating in pools, bends, bars and benches.	30-60% of bottom substrate affected by recent deposition; fine material in pools, bends and some on bars and benches.	< 30% of bottom substrate affected by recent deposition; small amount of deposition on bars and benches, little to no deposition in pools	P
8	Streams within the Catchment Area Currently Assessed as Impaired (Physicochemical)	> 30% of stream miles in catchment on 303(d) list	< 30% of stream miles in catchment on 303(d) list.	No streams within catchment on 303(d) list.	G
9	Agricultural Land Use in Catchment (Physicochemical)	Livestock access to stream and/or intensive cropland immediately upstream of project reach.	Livestock access to stream and/or intensive cropland upstream of project reach. A sufficient reach of stream is between agricultural land use and project reach.	There is little to no agricultural land uses or livestock and cropland within catchment causes no impact to water quality or biology.	P
10	Process Wastewater Outfalls in Watershed (Physicochemical)	At least one major and several minor PWOs within the watershed and less than one mile of project reach.	A few NPDES permits within drainage area and none OR a minor one within one mile of project reach.	No NPDES permits within the lateral drainage area and none within one mile of project reach.	G
11	Aquatic Organism Barriers in Watershed (Biology)	Aquatic organism barriers (including impoundment(s)) located within 1 mile upstream or downstream of project area has a negative effect on aquatic organism passage.	Barrier exists but does not adversely affect aquatic organism passage OR a small blockage exists that is creating a minor fish passage barrier.	No barrier within watershed OR barriers provide beneficial effect on project area and allows for aquatic organism passage.	G
12	Organism Recruitment from Catchment (Biology)	No potential sources for organismal recruitment from upstream of project stream reach.	Potential sources for organismal recruitment 1km to 5km upstream of project stream reach.	Potential sources for organismal recruitment within 1km upstream of project stream reach.	P
13	Other				

Appendix E: Stream Quantification Tool Spreadsheet

TN SQT v1.0
Quantification Tool Spreadsheet Reach 4

Reach Information and Reference Standard Stratification

Project Name:	Horse Creek Mitigation Bank
Reach ID:	Horse Creek
Upstream Latitude:	35.373257
Upstream Longitude:	-88.635001
Downstream Latitude:	35.376895
Downstream Longitude:	-88.634493
Existing Stream Type:	G
Proposed Stream Type:	C
Ecoregion:	65abei
Drainage Area (sqmi):	0.94
Proposed Bed Material:	Sand
Existing Stream Length (feet):	1318
Proposed Stream Length (feet):	1632.4
Proposed Stream Slope (%):	1
Proposed Flow Type:	Perennial/Intermittent
Data Collection Season:	January - June
Macro Collection Method:	SQKICK
Valley Type:	Unconfined Alluvial

Notes

1. Users input values that are highlighted based on restoration potential
2. Users select values from a pull-down menu
3. Leave values blank for field values that were not measured
4. These field values do not apply to ephemeral channels.

FUNCTIONAL LIFT SUMMARY

Exisiting Condition Score (ECS)	0.24
Proposed Condition Score (PCS)	0.64
Change in Functional Condition (PCS - ECS)	0.40
Existing Stream Length (feet)	1318
Proposed Stream Length (feet)	1632.4
Additional Stream Length (feet)	314.4
Existing Stream Functional Feet (FF)	316
Proposed Stream Functional Feet (FF)	1045
Functional Lift (Proposed FF - Existing FF)	728

MITIGATION SUMMARY

728 Credits

FUNCTION BASED PARAMETERS SUMMARY

Functional Category	Function-Based Parameters	Existing Parameter	Proposed Parameter
Hydrology	Catchment Hydrology	0.48	0.48
	Reach Runoff	0.59	0.94
Hydraulics	Floodplain Connectivity	0.00	1.00
Geomorphology	Large Woody Debris	0.00	0.82
	Lateral Migration	0.20	1.00
	Riparian Vegetation	0.00	0.94
	Bed Material		
	Bed Form Diversity	0.32	1.00
	Sinuosity	0.00	1.00
Physicochemical	Bacteria	0.93	0.93
	Organic Enrichment		
	Nitrogen	0.00	0.00
	Phosphorus	0.00	0.00
Biology	Macroinvertebrates	0.23	0.23
	Fish		

FUNCTIONAL CATEGORY REPORT CARD

Functional Category	ECS	PCS	Functional Lift
Hydrology	0.54	0.71	0.17
Hydraulics	0.00	1.00	1.00
Geomorphology	0.10	0.95	0.85
Physicochemical	0.31	0.31	0.00
Biology	0.23	0.23	0.00

TN SQT v1.0
Quantification Tool Spreadsheet Reach 4

EXISTING CONDITION ASSESSMENT					Roll Up Scoring				
Functional Category	Function-Based Parameters	Measurement Method	Field Value	Index Value	Parameter	Category	Category	ECS	ECS
Hydrology	Catchment Hydrology	Watershed Land Use Runoff Score	0.45	0.48	0.48	0.54	Functioning At Risk	0.24	Not Functioning
	Reach Runoff	Stormwater Infiltration	0.59	0.59	0.59				
Hydraulics	Floodplain Connectivity	Bank Height Ratio Entrenchment Ratio	6.3 1.3	0.00 0.00	0.00	0.00	Not Functioning		
Geomorphology	Large Woody Debris	Large Woody Debris Index # Pieces	0	0.00	0.00	0.10	Not Functioning		
	Lateral Migration	Erosion Rate (ft/yr) Dominant BEHI/NBS Percent Streambank Erosion (%) Percent Armoring (%)	VH/L 50	0.40 0.00	0.20				
	Riparian Vegetation	Left - Average Diameter at Breast Height (DBH; in) Right - Average DBH (in) Left - Buffer Width (feet) Right - Buffer Width (feet) Left - Tree Density (#/acre) Right - Tree Density (#/acre) Left - Native Herbaceous Cover (%) Right - Native Herbaceous Cover (%) Left - Native Shrub Cover (%) Right - Native Shrub Cover (%)	0 0 0 0 0 0 0 0 0 0	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00				
	Bed Material Characterization	Size Class Pebble Count Analyzer (p-value)							
	Bed Form Diversity	Pool Spacing Ratio Pool Depth Ratio Percent Riffle (%) Aggradation Ratio	100 1.38 50 0.7	0.00 0.27 0.00 1.00	0.32				
	Plan Form	Sinuosity	1	0.00	0.00				
Physicochemical	Bacteria	E. Coli (Cfu/100 mL)	109	0.93	0.93	0.31	Functioning At Risk		
	Organic Enrichment	Percent Nutrient Tolerant Macroinvertebrates (%)							
	Nitrogen	Nitrate-Nitrite (mg/L)	0.844	0.00	0.00				
	Phosphorus	Total Phosphorus (mg/L)	0.2	0.00	0.00				
Biology	Macroinvertebrates	Tennessee Macroinvertebrate Index Percent Clingers (%) Percent EPT - Cheumatopsyche (%) Percent Oligochaeta and Chironomidae (%)	21.76 1.18 90	0.69 0.00 0.01	0.23	0.23	Not Functioning		
	Fish	Native Fish Score Index Catch per Unit Effort Score							

TN SQT v1.0
Quantification Tool Spreadsheet Reach 4

PROPOSED CONDITION ASSESSMENT					Roll Up Scoring				
Functional Category	Function-Based Parameters	Measurement Method	Field Value	Index Value	Parameter	Category	Category	PCS	PCS
Hydrology	Catchment Hydrology	Watershed Land Use Runoff Score	0.45	0.48	0.48	0.71	Functioning	0.64	Functioning At Risk
	Reach Runoff	Stormwater Infiltration	0.94	0.94	0.94				
Hydraulics	Floodplain Connectivity	Bank Height Ratio Entrenchment Ratio	1 10	1.00 1.00	1.00	1.00	Functioning		
Geomorphology	Large Woody Debris	Large Woody Debris Index # Pieces	20	0.82	0.82	0.95	Functioning		
	Lateral Migration	Erosion Rate (ft/yr) Dominant BEHI/NBS Percent Streambank Erosion (%) Percent Armoring (%)	L/L 0	1.00 1.00	1.00				
	Riparian Vegetation	Left - Average Diameter at Breast Height (DBH; in) Right - Average DBH (in) Left - Buffer Width (feet) Right - Buffer Width (feet) Left - Tree Density (#/acre) Right - Tree Density (#/acre) Left - Native Herbaceous Cover (%) Right - Native Herbaceous Cover (%) Left - Native Shrub Cover (%) Right - Native Shrub Cover (%)	12 12 50 50 150 150 75 75 50 50	1.00 1.00 0.70 0.70 1.00 1.00 1.00 1.00 1.00 1.00	0.94				
	Bed Material Characterization	Size Class Pebble Count Analyzer (p-value)							
	Bed Form Diversity	Pool Spacing Ratio Pool Depth Ratio Percent Riffle (%) Aggradation Ratio	4 2.5 30 1	1.00 1.00 1.00 1.00	1.00				
	Plan Form	Sinuosity	1.23	1.00	1.00				
Physicochemical	Bacteria	E. Coli (Cfu/100 mL)	109	0.93	0.93	0.31	Functioning At Risk		
	Organic Enrichment	Percent Nutrient Tolerant Macroinvertebrates (%)							
	Nitrogen	Nitrate-Nitrite (mg/L)	0.844	0.00	0.00				
	Phosphorus	Total Phosphorus (mg/L)	0.2	0.00	0.00				
Biology	Macroinvertebrates	Tennessee Macroinvertebrate Index Percent Clingers (%) Percent EPT - Cheumatopsyche (%) Percent Oligochaeta and Chironomidae (%)	21.76 1.18 90	0.69 0.00 0.01	0.23	0.23	Not Functioning		
	Fish	Native Fish Score Index Catch per Unit Effort Score							

TN SQT v1.0
Quantification Tool Spreadsheet Reach 4

Reach Information and Reference Standard Stratification

Project Name:	Horse Creek Mitigation Bank
Reach ID:	UT1
Upstream Latitude:	35.373364
Upstream Longitude:	-88.639293
Downstream Latitude:	35.375098
Downstream Longitude:	-88.641567
Existing Stream Type:	G
Proposed Stream Type:	C
Ecoregion:	65abei
Drainage Area (sqmi):	0.17
Proposed Bed Material:	Silt/Clay
Existing Stream Length (feet):	931
Proposed Stream Length (feet):	1024.1
Proposed Stream Slope (%):	1.4
Proposed Flow Type:	Perennial/Intermittent
Data Collection Season:	January - June
Macro Collection Method:	SQKICK
Valley Type:	Unconfined Alluvial

Notes
1. Users input values that are highlighted based on restoration potential
2. Users select values from a pull-down menu
3. Leave values blank for field values that were not measured
4. These field values do not apply to ephemeral channels.

FUNCTIONAL LIFT SUMMARY	
Exisiting Condition Score (ECS)	0.09
Proposed Condition Score (PCS)	0.55
Change in Functional Condition (PCS - ECS)	0.46
Existing Stream Length (feet)	931
Proposed Stream Length (feet)	1024.1
Additional Stream Length (feet)	93.1
Existing Stream Functional Feet (FF)	84
Proposed Stream Functional Feet (FF)	563
Functional Lift (Proposed FF - Existing FF)	479

MITIGATION SUMMARY	
479	Credits

FUNCTION BASED PARAMETERS SUMMARY			
Functional Category	Function-Based Parameters	Existing Parameter	Proposed Parameter
Hydrology	Catchment Hydrology	0.22	0.22
	Reach Runoff	0.02	0.85
Hydraulics	Floodplain Connectivity	0.00	1.00
Geomorphology	Large Woody Debris	0.00	0.82
	Lateral Migration	0.15	1.00
	Riparian Vegetation	0.00	0.94
	Bed Material		
	Bed Form Diversity	0.34	1.00
	Sinuosity	0.00	1.00
Physicochemical	Bacteria	0.71	0.71
	Organic Enrichment		
	Nitrogen	0.00	0.00
	Phosphorus	0.00	0.00
Biology	Macroinvertebrates	0.01	0.01
	Fish		

FUNCTIONAL CATEGORY REPORT CARD			
Functional Category	ECS	PCS	Functional Lift
Hydrology	0.12	0.54	0.42
Hydraulics	0.00	1.00	1.00
Geomorphology	0.10	0.95	0.85
Physicochemical	0.24	0.24	0.00
Biology	0.01	0.01	0.00

TN SQT v1.0
Quantification Tool Spreadsheet Reach 4

EXISTING CONDITION ASSESSMENT					Roll Up Scoring				
Functional Category	Function-Based Parameters	Measurement Method	Field Value	Index Value	Parameter	Category	Category	ECS	ECS
Hydrology	Catchment Hydrology	Watershed Land Use Runoff Score	0.21	0.22	0.22	0.12	Not Functioning		
	Reach Runoff	Stormwater Infiltration	0.02	0.02	0.02				
Hydraulics	Floodplain Connectivity	Bank Height Ratio Entrenchment Ratio	4.27 1.24	0.00 0.00	0.00	0.00	Not Functioning		
Geomorphology	Large Woody Debris	Large Woody Debris Index # Pieces	0	0.00	0.00	0.10	Not Functioning	0.09	Not Functioning
	Lateral Migration	Erosion Rate (ft/yr) Dominant BEHI/NBS Percent Streambank Erosion (%) Percent Armoring (%)	H/M 50	0.30 0.00	0.15				
	Riparian Vegetation	Left - Average Diameter at Breast Height (DBH; in) Right - Average DBH (in) Left - Buffer Width (feet) Right - Buffer Width (feet) Left - Tree Density (#/acre) Right - Tree Density (#/acre) Left - Native Herbaceous Cover (%) Right - Native Herbaceous Cover (%) Left - Native Shrub Cover (%) Right - Native Shrub Cover (%)	0 0 0 0 0 0 0 0 0 0	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00				
	Bed Material Characterization	Size Class Pebble Count Analyzer (p-value)							
	Bed Form Diversity	Pool Spacing Ratio Pool Depth Ratio Percent Riffle (%) Aggradation Ratio	100 1.5 50 0.7	0.00 0.35 0.00 1.00	0.34				
	Plan Form	Sinuosity	1	0.00	0.00				
Physicochemical	Bacteria	E. Coli (Cfu/100 mL)	471	0.71	0.71	0.24	Not Functioning		
	Organic Enrichment	Percent Nutrient Tolerant Macroinvertebrates (%)							
	Nitrogen	Nitrate-Nitrite (mg/L)	1.58	0.00	0.00				
	Phosphorus	Total Phosphorus (mg/L)	0.2	0.00	0.00				
Biology	Macroinvertebrates	Tennessee Macroinvertebrate Index Percent Clingers (%) Percent EPT - Cheumatopsyche (%) Percent Oligochaeta and Chironomidae (%)	3.55 0 86.98	0.02 0.00 0.02	0.01	0.01	Not Functioning		
	Fish	Native Fish Score Index Catch per Unit Effort Score							

TN SQT v1.0
Quantification Tool Spreadsheet Reach 4

PROPOSED CONDITION ASSESSMENT					Roll Up Scoring				
Functional Category	Function-Based Parameters	Measurement Method	Field Value	Index Value	Parameter	Category	Category	PCS	PCS
Hydrology	Catchment Hydrology	Watershed Land Use Runoff Score	0.21	0.22	0.22	0.54	Functioning At Risk	0.55	Functioning At Risk
	Reach Runoff	Stormwater Infiltration	0.85	0.85	0.85				
Hydraulics	Floodplain Connectivity	Bank Height Ratio Entrenchment Ratio	1 5	1.00 1.00	1.00	1.00	Functioning		
Geomorphology	Large Woody Debris	Large Woody Debris Index # Pieces	20	0.82	0.82	0.95	Functioning		
	Lateral Migration	Erosion Rate (ft/yr) Dominant BEHI/NBS Percent Streambank Erosion (%) Percent Armoring (%)	L/L 0	1.00 1.00	1.00				
	Riparian Vegetation	Left - Average Diameter at Breast Height (DBH; in) Right - Average DBH (in) Left - Buffer Width (feet) Right - Buffer Width (feet) Left - Tree Density (#/acre) Right - Tree Density (#/acre) Left - Native Herbaceous Cover (%) Right - Native Herbaceous Cover (%) Left - Native Shrub Cover (%) Right - Native Shrub Cover (%)	12 12 50 50 150 150 75 75 50 50	1.00 1.00 0.70 0.70 1.00 1.00 1.00 1.00 1.00 1.00	0.94				
	Bed Material Characterization	Size Class Pebble Count Analyzer (p-value)							
	Bed Form Diversity	Pool Spacing Ratio Pool Depth Ratio Percent Riffle (%) Aggradation Ratio	4 2.5 30 1	1.00 1.00 1.00 1.00	1.00				
	Plan Form	Sinuosity	1.2	1.00	1.00				
Physicochemical	Bacteria	E. Coli (Cfu/100 mL)	471	0.71	0.71	0.24	Not Functioning		
	Organic Enrichment	Percent Nutrient Tolerant Macroinvertebrates (%)							
	Nitrogen	Nitrate-Nitrite (mg/L)	1.58	0.00	0.00				
	Phosphorus	Total Phosphorus (mg/L)	0.2	0.00	0.00				
Biology	Macroinvertebrates	Tennessee Macroinvertebrate Index Percent Clingers (%) Percent EPT - Cheumatopsyche (%) Percent Oligochaeta and Chironomidae (%)	3.55 0 86.98	0.02 0.00 0.02	0.01	0.01	Not Functioning		
	Fish	Native Fish Score Index Catch per Unit Effort Score							

TN SQT v1.0
Quantification Tool Spreadsheet Reach 4

Reach Information and Reference Standard Stratification	
Project Name:	Horse Creek Mitigation Bank
Reach ID:	UT2
Upstream Latitude:	35.374923
Upstream Longitude:	-88.634198
Downstream Latitude:	35.376931
Downstream Longitude:	-88.633748
Existing Stream Type:	B
Proposed Stream Type:	C
Ecoregion:	65abei
Drainage Area (sqmi):	0.8
Proposed Bed Material:	Silt/Clay
Existing Stream Length (feet):	595
Proposed Stream Length (feet):	1692.9
Proposed Stream Slope (%):	1.8
Proposed Flow Type:	Perennial/Intermittent
Data Collection Season:	January - June
Macro Collection Method:	
Valley Type:	Unconfined Alluvial

Notes
1. Users input values that are highlighted based on restoration potential
2. Users select values from a pull-down menu
3. Leave values blank for field values that were not measured
4. These field values do not apply to ephemeral channels.

FUNCTIONAL LIFT SUMMARY	
Exisiting Condition Score (ECS)	0.23
Proposed Condition Score (PCS)	0.59
Change in Functional Condition (PCS - ECS)	0.36
Existing Stream Length (feet)	595
Proposed Stream Length (feet)	1692.9
Additional Stream Length (feet)	1097.9
Existing Stream Functional Feet (FF)	137
Proposed Stream Functional Feet (FF)	999
Functional Lift (Proposed FF - Existing FF)	862

MITIGATION SUMMARY	
862	Credits

FUNCTION BASED PARAMETERS SUMMARY			
Functional Category	Function-Based Parameters	Existing Parameter	Proposed Parameter
Hydrology	Catchment Hydrology	1.00	1.00
	Reach Runoff	0.91	0.99
Hydraulics	Floodplain Connectivity	0.00	1.00
Geomorphology	Large Woody Debris	0.00	0.82
	Lateral Migration	0.20	1.00
	Riparian Vegetation	0.50	0.94
	Bed Material		
	Bed Form Diversity	0.28	1.00
	Sinuosity	0.00	1.00
Physicochemical	Bacteria		
	Organic Enrichment		
	Nitrogen		
	Phosphorus		
Biology	Macroinvertebrates		
	Fish		

FUNCTIONAL CATEGORY REPORT CARD			
Functional Category	ECS	PCS	Functional Lift
Hydrology	0.96	1.00	0.04
Hydraulics	0.00	1.00	1.00
Geomorphology	0.20	0.95	0.75
Physicochemical			
Biology			

TN SQT v1.0
Quantification Tool Spreadsheet Reach 4

EXISTING CONDITION ASSESSMENT					Roll Up Scoring				
Functional Category	Function-Based Parameters	Measurement Method	Field Value	Index Value	Parameter	Category	Category	ECS	ECS
Hydrology	Catchment Hydrology	Watershed Land Use Runoff Score	0.97	1.00	1.00	0.96	Functioning		
	Reach Runoff	Stormwater Infiltration	0.91	0.91	0.91				
Hydraulics	Floodplain Connectivity	Bank Height Ratio	3.15	0.00	0.00	0.00	Not Functioning		
		Entrenchment Ratio	1.74	0.00					
Geomorphology	Large Woody Debris	Large Woody Debris Index			0.00	0.20	Not Functioning	0.23	Not Functioning
		# Pieces	0	0.00					
	Lateral Migration	Erosion Rate (ft/yr)			0.20				
		Dominant BEHI/NBS	H/L	0.40					
		Percent Streambank Erosion (%)	50	0.00					
		Percent Armoring (%)							
	Riparian Vegetation	Left - Average Diameter at Breast Height (DBH; in)	12	1.00	0.50				
		Right - Average DBH (in)	0	0.00					
		Left - Buffer Width (feet)	200	1.00					
		Right - Buffer Width (feet)	0	0.00					
		Left - Tree Density (#/acre)	150	1.00					
		Right - Tree Density (#/acre)	0	0.00					
		Left - Native Herbaceous Cover (%)	80	1.00					
		Right - Native Herbaceous Cover (%)	0	0.00					
		Left - Native Shrub Cover (%)	40	1.00					
		Right - Native Shrub Cover (%)	0	0.00					
	Bed Material Characterization	Size Class Pebble Count Analyzer (p-value)							
	Bed Form Diversity	Pool Spacing Ratio	100	0.00	0.28				
		Pool Depth Ratio	1.19	0.13					
		Percent Riffle (%)	50	0.00					
		Aggradation Ratio	0.315384615	1.00					
	Plan Form	Sinuosity	1	0.00	0.00				
Physicochemical	Bacteria	E. Coli (Cfu/100 mL)							
	Organic Enrichment	Percent Nutrient Tolerant Macroinvertebrates (%)							
	Nitrogen	Nitrate-Nitrite (mg/L)							
	Phosphorus	Total Phosphorus (mg/L)							
Biology	Macroinvertebrates	Tennessee Macroinvertebrate Index							
		Percent Clingers (%)							
		Percent EPT - Cheumatopsyche (%)							
		Percent Oligochaeta and Chironomidae (%)							
	Fish	Native Fish Score Index							
		Catch per Unit Effort Score							

TN SQT v1.0
Quantification Tool Spreadsheet Reach 4

PROPOSED CONDITION ASSESSMENT					Roll Up Scoring				
Functional Category	Function-Based Parameters	Measurement Method	Field Value	Index Value	Parameter	Category	Category	PCS	PCS
Hydrology	Catchment Hydrology	Watershed Land Use Runoff Score	0.97	1.00	1.00	1.00	Functioning	0.59	Functioning At Risk
	Reach Runoff	Stormwater Infiltration	0.99	0.99	0.99				
Hydraulics	Floodplain Connectivity	Bank Height Ratio Entrenchment Ratio	1 5	1.00 1.00	1.00	1.00	Functioning		
Geomorphology	Large Woody Debris	Large Woody Debris Index # Pieces	20	0.82	0.82	0.95	Functioning		
	Lateral Migration	Erosion Rate (ft/yr) Dominant BEHI/NBS Percent Streambank Erosion (%) Percent Armoring (%)	L/L 0	1.00 1.00	1.00				
	Riparian Vegetation	Left - Average Diameter at Breast Height (DBH; in) Right - Average DBH (in) Left - Buffer Width (feet) Right - Buffer Width (feet) Left - Tree Density (#/acre) Right - Tree Density (#/acre) Left - Native Herbaceous Cover (%) Right - Native Herbaceous Cover (%) Left - Native Shrub Cover (%) Right - Native Shrub Cover (%)	12 12 50 50 150 150 75 75 50 50	1.00 1.00 0.70 0.70 1.00 1.00 1.00 1.00 1.00 1.00	0.94				
	Bed Material Characterization	Size Class Pebble Count Analyzer (p-value)							
	Bed Form Diversity	Pool Spacing Ratio Pool Depth Ratio Percent Riffle (%) Aggradation Ratio	4 2.5 30	1.00 1.00 1.00	1.00				
	Plan Form	Sinuosity	1.2	1.00	1.00				
Physicochemical	Bacteria	E. Coli (Cfu/100 mL)							
	Organic Enrichment	Percent Nutrient Tolerant Macroinvertebrates (%)							
	Nitrogen	Nitrate-Nitrite (mg/L)							
	Phosphorus	Total Phosphorus (mg/L)							
Biology	Macroinvertebrates	Tennessee Macroinvertebrate Index Percent Clingers (%) Percent EPT - Cheumatopsyche (%) Percent Oligochaeta and Chironomidae (%)							
	Fish	Native Fish Score Index Catch per Unit Effort Score							

TN SQT v1.0
Quantification Tool Spreadsheet Reach 4

Reach Information and Reference Standard Stratification

Project Name:	Horse Creek Mitigation Bank
Reach ID:	UT3
Upstream Latitude:	35.373252
Upstream Longitude:	-88.634778
Downstream Latitude:	35.373331
Downstream Longitude:	-88.634977
Existing Stream Type:	G
Proposed Stream Type:	C
Ecoregion:	65abei
Drainage Area (sqmi):	0.06
Proposed Bed Material:	Sand
Existing Stream Length (feet):	65
Proposed Stream Length (feet):	685
Proposed Stream Slope (%):	1.7
Proposed Flow Type:	Perennial/Intermittent
Data Collection Season:	January - June
Macro Collection Method:	
Valley Type:	Unconfined Alluvial

Notes

1. Users input values that are highlighted based on restoration potential
2. Users select values from a pull-down menu
3. Leave values blank for field values that were not measured
4. These field values do not apply to ephemeral channels.

FUNCTIONAL LIFT SUMMARY

Exisiting Condition Score (ECS)	0.20
Proposed Condition Score (PCS)	0.59
Change in Functional Condition (PCS - ECS)	0.39
Existing Stream Length (feet)	65
Proposed Stream Length (feet)	685
Additional Stream Length (feet)	620
Existing Stream Functional Feet (FF)	13
Proposed Stream Functional Feet (FF)	404
Functional Lift (Proposed FF - Existing FF)	391

MITIGATION SUMMARY

391 Credits

FUNCTION BASED PARAMETERS SUMMARY

Functional Category	Function-Based Parameters	Existing Parameter	Proposed Parameter
Hydrology	Catchment Hydrology	1.00	1.00
	Reach Runoff	0.91	0.99
Hydraulics	Floodplain Connectivity	0.00	1.00
Geomorphology	Large Woody Debris	0.00	0.82
	Lateral Migration	0.20	1.00
	Riparian Vegetation	0.00	0.94
	Bed Material		
	Bed Form Diversity	0.00	1.00
	Sinuosity	0.00	1.00
Physicochemical	Bacteria		
	Organic Enrichment		
	Nitrogen		
	Phosphorus		
Biology	Macroinvertebrates		
	Fish		

FUNCTIONAL CATEGORY REPORT CARD

Functional Category	ECS	PCS	Functional Lift
Hydrology	0.96	1.00	0.04
Hydraulics	0.00	1.00	1.00
Geomorphology	0.04	0.95	0.91
Physicochemical			
Biology			

TN SQT v1.0
Quantification Tool Spreadsheet Reach 4

EXISTING CONDITION ASSESSMENT					Roll Up Scoring				
Functional Category	Function-Based Parameters	Measurement Method	Field Value	Index Value	Parameter	Category	Category	ECS	ECS
Hydrology	Catchment Hydrology	Watershed Land Use Runoff Score	0.97	1.00	1.00	0.96	Functioning		
	Reach Runoff	Stormwater Infiltration	0.91	0.91	0.91				
Hydraulics	Floodplain Connectivity	Bank Height Ratio Entrenchment Ratio	3 1.75	0.00 0.00	0.00	0.00	Not Functioning		
Geomorphology	Large Woody Debris	Large Woody Debris Index # Pieces	0	0.00	0.00	0.04	Not Functioning	0.20	Not Functioning
	Lateral Migration	Erosion Rate (ft/yr) Dominant BEHI/NBS Percent Streambank Erosion (%) Percent Armoring (%)	H/L 50	0.40 0.00	0.20				
	Riparian Vegetation	Left - Average Diameter at Breast Height (DBH; in) Right - Average DBH (in) Left - Buffer Width (feet) Right - Buffer Width (feet) Left - Tree Density (#/acre) Right - Tree Density (#/acre) Left - Native Herbaceous Cover (%) Right - Native Herbaceous Cover (%) Left - Native Shrub Cover (%) Right - Native Shrub Cover (%)	0 0 0 0 0 0 0 0 0 0	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00				
	Bed Material Characterization	Size Class Pebble Count Analyzer (p-value)							
	Bed Form Diversity	Pool Spacing Ratio Pool Depth Ratio Percent Riffle (%) Aggradation Ratio	100 50	0.00 0.00	0.00				
	Plan Form	Sinuosity	1	0.00	0.00				
Physicochemical	Bacteria	E. Coli (Cfu/100 mL)							
	Organic Enrichment	Percent Nutrient Tolerant Macroinvertebrates (%)							
	Nitrogen	Nitrate-Nitrite (mg/L)							
	Phosphorus	Total Phosphorus (mg/L)							
Biology	Macroinvertebrates	Tennessee Macroinvertebrate Index Percent Clingers (%) Percent EPT - Cheumatopsyche (%) Percent Oligochaeta and Chironomidae (%)							
	Fish	Native Fish Score Index Catch per Unit Effort Score							

TN SQT v1.0
Quantification Tool Spreadsheet Reach 4

PROPOSED CONDITION ASSESSMENT					Roll Up Scoring				
Functional Category	Function-Based Parameters	Measurement Method	Field Value	Index Value	Parameter	Category	Category	PCS	PCS
Hydrology	Catchment Hydrology	Watershed Land Use Runoff Score	0.97	1.00	1.00	1.00	Functioning	0.59	Functioning At Risk
	Reach Runoff	Stormwater Infiltration	0.99	0.99	0.99				
Hydraulics	Floodplain Connectivity	Bank Height Ratio	1	1.00	1.00	1.00	Functioning		
		Entrenchment Ratio	5	1.00					
Geomorphology	Large Woody Debris	Large Woody Debris Index			0.82	0.95	Functioning		
		# Pieces	20	0.82					
	Lateral Migration	Erosion Rate (ft/yr)			1.00				
		Dominant BEHI/NBS	L/L	1.00					
		Percent Streambank Erosion (%)	0	1.00					
		Percent Armoring (%)							
	Riparian Vegetation	Left - Average Diameter at Breast Height (DBH; in)	12	1.00	0.94				
		Right - Average DBH (in)	12	1.00					
		Left - Buffer Width (feet)	50	0.70					
		Right - Buffer Width (feet)	50	0.70					
		Left - Tree Density (#/acre)	150	1.00					
		Right - Tree Density (#/acre)	150	1.00					
		Left - Native Herbaceous Cover (%)	75	1.00					
		Right - Native Herbaceous Cover (%)	75	1.00					
		Left - Native Shrub Cover (%)	50	1.00					
		Right - Native Shrub Cover (%)	50	1.00					
	Bed Material Characterization	Size Class Pebble Count Analyzer (p-value)	0.11	FALSE					
	Bed Form Diversity	Pool Spacing Ratio	4	1.00	1.00				
		Pool Depth Ratio	2.5	1.00					
		Percent Riffle (%)	30	1.00					
		Aggradation Ratio							
	Plan Form	Sinuosity	1.2	1.00	1.00				
Physicochemical	Bacteria	E. Coli (Cfu/100 mL)							
	Organic Enrichment	Percent Nutrient Tolerant Macroinvertebrates (%)							
	Nitrogen	Nitrate-Nitrite (mg/L)							
	Phosphorus	Total Phosphorus (mg/L)							
Biology	Macroinvertebrates	Tennessee Macroinvertebrate Index							
		Percent Clingers (%)							
		Percent EPT - Cheumatopsyche (%)							
		Percent Oligochaeta and Chironomidae (%)							
	Fish	Native Fish Score Index							
		Catch per Unit Effort Score							

Appendix F: Jurisdictional Determination

Aquatic Resources Delineation Report

Horse Creek Mitigation Bank
Finger, Chester County, TN

June 2020
Tioga Project No. 541106.00

Prepared For:

Kimley-Horn & Associates, Inc.
115 N. Liberty Street
Jackson, TN 38301

Prepared By:

Tioga
ENVIRONMENTAL CONSULTANTS
357 North Main Street
Memphis, Tennessee 38103

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1.0 INTRODUCTION

This report describes the results of a preliminary delineation of aquatic resources, including streams, wetlands, and other waters within the project area. The project area consists of approximately 93 acres located on the east side of Highway 45 approximately 3.8 miles south of Henderson, TN in Chester County. The project area is detailed in Figures 1, 2 and 3 (,aerial maps and a topographic map, respectively).

The property is owned by Mr. Tom Rice of Wetland and Stream Restoration Services. Access to the site should be arranged through the project engineer, Mr. James "Dusty" Mays with Kimley-Horn & Associates, Inc.

The purpose of the delineation was: (1) to determine the presence and approximate extent of jurisdictional wetlands and other waters of the US (streams, lakes, water bodies) under authority of the United States Army Corps of Engineers (USACE) as defined in Section 404 of the Clean Water Act; and (2) to determine the presence and approximate extent of jurisdictional waters of the State of Tennessee (streams, wet weather conveyances, water bodies) under authority of the Tennessee Department of Environment and Conservation (TDEC). Delineated features are represented on Figure 1 and summarized in Table 5-1.

Additionally, because this site has been under active agricultural cultivation since prior to 1985, onsite wetland features may qualify as either Farmed Wetlands (FW) or Prior Converted Cropland (PC) under the Food Securities Act (FSA) of 1985, as regulated by the National Resource Conservation Service (NRCS). Prior Converted Croplands are those historical wetland areas that have been altered such that they no longer meet the definition of a wetland feature under the NRCS criteria, and by agreement are not considered jurisdictional by the USACE unless they are abandoned and revert to functional wetlands. Even though continuously farmed, Farmed Wetlands maintain wetland function and remain jurisdictional under the USACE's regulatory authority.

This report is not "held out" to represent that prepared by a licensed surveyor or engineer. Boundaries and other habitat features depicted in this report are the opinions of the author and should not be misconstrued as a legal survey or engineering design.

2.0 DESKTOP EVALUATION

Prior to conducting field activities, the project area was assessed via a desktop evaluation to identify potential resources requiring field verification. Sources evaluated included:

- The current USGS topographic map (Appendix A, Figure 3);
- NRCS Web Soil Survey (Appendix C);
- National Wetland Inventory (NWI) (Appendix D); and,
- Historical aerial imagery, as available.

The following sections describe the findings from each available source.

2.1 TOPOGRAPHIC MAP

The Masseyville, TN and Henderson, TN 2019 topographic quadrangles covering the project area indicate that the site is primarily level except for some elevation on the northwest edge of the property. Horse Creek is indicated to be a first order perennial stream bisecting the property south to north. A first order intermittent stream is indicated cutting northwest across the southeastern corner of the site towards Highway 45. Another first order tributary is shown running along the western edge of the property, before turning and running west along the north edge of the property to Horse Creek. A third first order tributary sourced by an offsite pond is shown running east along a short portion of the north property line to Horse Creek. A portion of an isolated pond is indicated on the northwest elevated portion of the site.

No wetlands are indicated as present onsite.

2.2 NRCS SOIL SURVEY

Table 2-1 represents the significant soil series present and the corresponding hydric rating within the project area, as exhibited in the 2019 NRCS Web Soil Survey of Chester County, TN. The Web Soil Survey for the project area is included in Appendix C.

Table 2-1: Soil Series within Project Area

Soil Series	% of Project Area	% Hydric Rating
Bibb silt loam, frequently flooded	1.5	100
Hatchie silt loam	26	5
Iuka silt loam, occasionally flooded	31	0
Savannah clay loam	29	0
Smithdale loam	9	0
Providence silty clay loam	3.5	0

The agricultural portions of the property consist primarily of the slightly hydric Hatchie and non-hydric but occasionally flooded Iuka soils. The soil series description of the Hatchie series indicates this series forms on level stream terraces, often with a fragipan present in the lower soil series. The Iuka soils similarly form on level flood plains, and typically have a sandy alluvial layer. The statuses of these soils indicate that wetland hydrology / hydric soil indicators may be present in limited areas within these soil series.

The southeasternmost agricultural area consists of the Savannah series soils. This soil series is typically located on uplands and upland terraces and may have a fragipan present 1.5 to 3.0 feet below ground surface. This soil type would not be expected to have wetland inclusions.

The Bibb soils description indicates that these soils are commonly flooded and used for wildlife habitat and watershed protection. This corresponds to the undeveloped inclusion into the agricultural fields on the northeast portion of the property.

The Smithdale and Providence soils are typically located on slopes, with erosion and gullying common.

2.3 NATIONAL WETLAND INVENTORY

The NWI map denotes similar features to the topographic map. The easternmost tributary stream is shown to turn north away from Horse Creek instead of continuing west to intersect it.

2.4 AERIAL IMAGERY

Historical aerial imagery via the Google Earth application was available back to 1997. The site has been agricultural and undeveloped during the timeframe reviewed, with no significant changes in the apparent features present.

Horse Creek and the tributary on the southwest portion of the site are evident. A primary drainage channel from the central agricultural area leading to Horse Creek is apparent. The undeveloped area corresponding to the location of the Bibb soils is evident, with apparent dug channels (forming “fingers”) into the agricultural area present. There is no visual indication of the easternmost tributary indicated on the topographic quadrangles.

A few areas of consistent saturation are evident, primarily in the central agricultural area near the drainage channel, and in small pockets of the agricultural areas around the Bibb soils on the northeast portion of the site.

In the latest images, an apparent channel just inside the north border of the southeastern wooded area is present, leading west towards Horse Creek.

3.0 ONSITE EVALUATION METHODOLOGY

3.1 WETLANDS

Wetlands are those areas satisfying the technical criteria contained in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987) as amended, and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0))*, November 2010. The field investigation included an inspection of the entire project area to identify areas exhibiting wetland criteria. The criteria used are based on the identification of the following characteristics:

1. The presence of wetland hydrology;
2. The prevalence of hydrophytic vegetation; and,
3. The presence of hydric soils.

Where these characteristics indicated potential wetlands, a representative data plot was established during the onsite evaluation and the hydrology, vegetation, and soils in the radius plot was sampled and documented on an *Atlantic and Gulf Coastal Plain Region Data Form*. Any such data points are referenced on Figure 2 with copies of the Data Forms attached for review in Appendix E.

3.2 WATER CONVEYANCES

The presence of an "ordinary high water mark" (OHWM), as indicated by the following flow characteristics, was used as a primary guide to determine USACE jurisdiction over water conveyances: natural line impressed on the bank; the presence of litter and debris; changes in the character of soil; destruction of terrestrial vegetation; shelving; the presence of a wrack line; vegetation matted down, bent, or absent; sediment sorting; leaf litter disturbed or washed away; scour; sediment deposition; multiple observed or predicted flow events; water staining; and abrupt change in plant community. Three USACE documents were used as secondary guides to help determine jurisdictional status of potential "other waters"; the *Approved Jurisdictional Determination Form* ("JD form" / Appendix B / 30 May 2007), *Regulatory Guidance Letter (RGL) 07-01* (5 June 2007), and *RGL 05-05* (7 December 2005).

In continuation of USACE guidelines, ditches (including roadside ditches) excavated wholly in and draining only uplands that do not carry a relatively permanent flow of water, are not tributaries, and do not have a significant nexus to navigable waters would not be considered jurisdictional waters of the US. Swales and erosional features (e.g., gullies, small washes characterized by low volume, infrequent, and short duration flow) would, likewise, not be considered jurisdictional if they were not tributaries and did not have a significant nexus to a navigable water.

Water conveyances that may be considered jurisdictional waters of the State of Tennessee were evaluated in the field using the methodology described in the *Guidance for Making Hydrologic Determinations*. This guidance is intended as a supplement to the State of Tennessee standard operating procedures for making stream and wet weather conveyance determinations, as found in Rule 1200-4-03-.05(9) as provided for in Public Chapter 464 of 2009. For the purposes of classifying waters of the State of Tennessee,

a stream is defined as “a surface water that is not a wet weather conveyance.” Wet weather conveyances are defined as “man-made or natural watercourses, including natural watercourses that have been modified by channelization: that flow only in direct response to precipitation runoff in their immediate locality; whose channels are at all times above the ground water table; that are not suitable for drinking water supplies; and in which hydrological and biological analyses indicate that, under normal weather conditions, due to naturally occurring ephemeral or low flow there is not sufficient water to support fish, or multiple populations of obligate lotic aquatic organisms whose life cycle included an aquatic phase of at least two months.” Furthermore, waters of the State are “any and all water, public or private, on or beneath the surface of the ground, that are contained within, flow through, or border upon Tennessee or any portion thereof, except those bodies of water confined to and retained within the limits of private property in single ownership that do not combine or effect a junction with natural surface or underground waters.” *Hydrologic Determination Field Data Sheet(s)* were prepared to document data associated with water conveyances that may be potential waters of the State of Tennessee, and are attached for review in Appendix F.

3.3 OTHER WATERS

Manmade ponds, sediment control basins, borrow pits and other non-flowing open water areas would be considered jurisdictional waters of the US if they had a significant nexus to a jurisdictional water. These water bodies would not be considered jurisdictional if they were separated from a jurisdictional water by non-jurisdictional uplands and the use, degradation or destruction of which will not affect interstate commerce.

3.4 MARKING OF FEATURES

A ‘WAAS’ enabled Global Positioning System (GPS) is used to determine the latitude and longitude of the plots where data is collected and where site photographs are taken. GPS data collected in the field is used to generate track lines representing any present wetland boundaries and the path of water features. Accuracy of the track lines and / or positions shown is to within 1-3 meters. Large, obvious water bodies, such as major named rivers, borrow pits or lakes, are not commonly flagged in the field. The point of jurisdiction for unflagged, obvious water bodies would be assumed to be the crest of top-bank. In situations where access to a wetland or water boundary is not accessible, for instance where only one side of a linear feature can be reached, available points would be recorded and desktop interpretation made to determine the additional boundary lines. In other instances, for example when a delineated feature is less than approximately one meter in width, the centerline of the feature would be recorded with later desktop interpretation

3.5 PHOTOGRAPHIC DOCUMENTATION

Photographs are taken at representative sites within the project area (see Appendix B). The photographs are included to provide a visual representation of the typical habitat, soil characteristics and landmarks found therein.

4.0 JURISDICTIONAL EVALUATION

An onsite delineation was conducted on May 25th, 2020 by Ben Day and William Gray of Tioga Environmental Consultants. The project area was thoroughly inspected to determine if any jurisdictional wetlands, streams, drains or water bodies occur within the area.

The jurisdictional criteria have been significantly disturbed as a result of historical agricultural activities.

4.1 HYDROLOGY

The primary sources of water onto the project area are from direct precipitation, inflow from the neighboring southern properties, and direct groundwater connections. The hydrology of the majority of the project area has been significantly disturbed as a result of site historical activities, including extensive agricultural practices, grading, ditching and channelization.

4.1.1 Streams and Conveyances

Horse Creek was determined to be a perennial stream, based on a distinct OHWM and strong geomorphological features with significant flow. The stream is channelized and severely incised and disconnected from its floodplain. Spoil material from the channelization is evident, forming an artificial levee along the stream's west bank in particular.

The channel (Tributary 1 on the southwest corner of the site was determined to be a perennial stream, but only after the channel passes through a culvert near the southern property boundary and receives additional input from apparent drain tiles. The tributary bed is poorly defined, still eroding through the soil profile, but had strong flow, a distinct OHWM, and other stream indicators including the presence of fish.

An apparent intermittent stream (Tributary 2) was present just inside the north border of the southeastern wooded area. This channel was inundated throughout the reach, but had weak to no flow, with most of the reach ponded with wetland fringe. The channel itself was apparently dug, ranging from 3 - 8 feet deep, with the deepest portions strangely being in the upper headwater reach, with a likely groundwater connection.

A third tributary (Tributary 3) has a short reach onsite, flowing in from the south adjoining property and almost immediately into Horse Creek. This tributary appears to be perennial, with a well-defined bed and bank with a distinct OHWM, and strong flow and geomorphology. According to a representative of the adjoining property owner who was coincidentally present during evaluation of this reach, this tributary is spring fed and flows year-round.

Two ephemeral streams (EPH2 and EPH3) within the south and east wooded areas were identified, one (EPH3) being the easternmost channel indicated as an intermittent stream on the USGS topographic maps. These channels had defined bed and banks, but no water was present in either channel. There were no obvious indicators of consistent flow, such as sorting, alluvial deposition, etc., present in

either channel. These channels were shallower than the previously listed tributaries, which may be limiting their connection to groundwater and flow.

Within the agricultural fields, multiple drainage channels were identified. EPH1 is the primary drainage channel located centrally onsite and flowing northeast to Horse Creek. This channel is a shallow excavation but was wet throughout, although there were very minimal geomorphological or flow indicators. EPH4 is the paired channel to EPH1, flowing southwest towards Tributary 1, but is less distinct and only channelizes near its western terminus. The final ephemeral channel (EPH5) is the upper reach of Tributary 1 beforeit has visible flow, with the "bright-line" between the two being the onsite culvert. None of these ephemeral channels are likely to be considered jurisdictional features by the USACE.

4.1.2 Wetlands

Based on the hydric designation of the Bibbs soils, the area of these soils was evaluated for the presence of hydrologic indicators. This area is primarily undeveloped / nonagricultural and was found to be inundated or saturated throughout, having the primary indicators of Surface Water, Saturation, and Hydrogen Sulfide Odor. Due to the persistent inundation and obvious vegetation, no specific sample point was installed directly in this area, although points within the adjacent agricultural fields were sampled, discussed below.

Based on apparent saturation present on historical aerial imagery, and apparent saturation noted during the site visit, multiple areas within the agricultural fields were evaluated. These were present in two sub areas, one being areas on the northeast portion of the site adjacent to the inundated Bibb soils, and the other being slightly low-lying areas in the central agricultural portion of the site that collect and hold surface water flow. Hydrology in both these areas appears to be sourced from overland flow that pools in these slightly lower areas and slowly drains or percolates.

Regarding the former, hydrology indicators present included some areas of minimal Surface Water, Algal Mat or Crust, and the secondary indicators Crayfish Burrows (very few), Saturation Visible on Aerial Imagery, and Shallow Aquitard, and maintained a visible vegetative shift (discussed below). Care was taken to place points in wetland / upland pairs as available, and within each applicable soil series. Although these agricultural portions are present in the Savannah, Iuka and Hatchie soil series, because these areas generally abut and join the inundated Bibb soils, this area was mapped as two wetland features (Wetlands 5 and 6).

Regarding the central agricultural areas, several areas with apparent consistent saturation were identified. These areas were noted to have similar primary and secondary hydrology indicators to the northeast areas previously discussed. Based on the other criteria, discussed below, five small wetland areas (< 0.25 acres each) were delineated.

One wetland feature was identified south of the onsite pond located on the northwest portion of the site. This wetland area's hydrology is sourced from leaching of the pond water through the earthen berm. This wetland is isolated from the remainder of the site and is not considered to be a USACE jurisdictional feature.

4.1.3 Other Waters

A portion of one upland excavated and bermed farm pond is located on the north property boundary on the northwest portion of the site. The pond is sourced from overland flow. Being an upland excavated farm pond, this feature is not considered to be USACE jurisdictional.

4.2 VEGETATION

The agricultural portions of the site were fallow, most recently planted in feed corn. Tufted lovegrass (*Eragrostis pectinacean*), a common first stage successional species in agricultural fields, was present in all upland areas of the fields.

The noted low-lying "wet" areas were generally sparsely vegetated, with a visible vegetative shift compared to the upland areas. Emergent species included Virginia buttonweed (*Diodia virginiana*), last season's small flower buttercup (*Ranunculus abortivus*), and a very few small common rush (*Juncus effusus*).

Within the inundated Bibbs soils, button bush (*Cephalanthus occidentalis*), common rush, red maple (*Acer rubrum*) and black willow (*Salix nigra*) saplings, and various sedges (*Carex spp*.) were abundant.

Vegetation within the isolated wetland adjacent to the pond included common rush, buttonbush saplings, goldenrod (*Solidago spp*.), and Frank's sedge (*Carex frankii*), with the adjacent upland primarily dominated by broomsedge (*Andropogon virginicus*) and lespedeza (*Lespedeza cuneate*).

4.3 SOILS

Although the project area consists of multiple soil types, the hydric indicators, where present, were consistent throughout the site, with each hydric point demonstrating a Depleted Matrix in the upper soils, typically above a restrictive layer (fragipan). This indicates that in the low-lying areas, surface waters tend to pool and are held in the upper soil profile by the impermeable restrictive layer, creating hydric conditions. The presence of this fragipan is expected in the Hatchie and Savannah soils, as per their soils series descriptions. For the Iuka series, a sand layer was encountered, consistent with the soil's series description. Hydric soils above this soil layer are likely due to an introduced restrictive layer resulting from intensive farming.

The areas exhibiting hydric soil indicators corresponded with the noted vegetative shifts noted on the surface, and the presence of hydrology.

5.0 SUMMARY OF FEATURES

The site delineation identified jurisdictional features within the project area. Tabular summary of the identified features is provided, with supporting location and extent diagrams attached (see Figure 1 in Appendix A). The GPS coordinates of each feature are provided. For large features such as open waters and wetlands the coordinates listed provide a generalized central location of the feature. The coordinates provided for linear features are for the "start point" and "end point" of the feature within the project area.

Cowardin and USACE classification are used by the USACE to categorize various wetland and other waters of the US types. The State of Tennessee classification is likewise provided for categorization purposes. The Tennessee classification for the water conveyances are also described in parentheses by the type of field indicators present: Primary = feature is classified based on primary indicators; Numerical score = feature is classified based on secondary indicator scoring, where 19 or above is classified as a stream and below 19 is classified as a wet weather conveyance.

Table 5-1: Delineated Features

Feature ID	Length / Area	Start Point Latitude, °N Longitude, °W	End Point Latitude, °N Longitude, °W	Cowardin Class	USACE Class	TN Class
Wetlands						
Wetland 1	0.07 acres	35.37655 88.63960	N/A	PEM1B	Wetland	Wetland
Wetland 2	0.22 acres	35.37428 88.63744	N/A	PEM1Ef	Wetland	Wetland
Wetland 3	0.21 acres	35.37459 88.63724	N/A	PEM1Ef	Wetland	Wetland
Wetland 4	0.24 acres	35.37413 88.63563	N/A	PEM1Ef	Wetland	Wetland
Wetland 5	2.68 acres	35.37651 88.63290	N/A	PSS1F / PEM1Ef	Wetland	Wetland
Wetland 6	0.47 acres	35.37637 88.63411	N/A	PEM1Ef	Wetland	Wetland
Wetland 7	0.85 acres	35.37582 88.63551	N/A	PEM1Ef	Wetland	Wetland
Wetland 8	0.14 acres	35.37502 88.64108	N/A	PEM1Ef	Wetland	Wetland
Streams						
Horse Creek	1,300 feet	35.37326 88.63495	35.37681 88.63449	R3UB2	Perennial Stream	Stream (Primary, 30.25)
Tributary 1	830 feet	35.37360 88.63945	35.37508 88.64150	R3UB3	Perennial Stream	Stream (24.25)
Tributary 2	1,061 feet	35.37381 88.63178	35.37393 88.63502	R4SB5/7	Intermittent Stream	Stream (19.0)
Tributary 3	87 feet	35.37325 88.63471	35.37334 88.63497	R3UB2	Perennial Stream	Stream (23.0)

Feature ID	Length / Area	Start Point Latitude, °N Longitude, °W	End Point Latitude, °N Longitude, °W	Cowardin Class	USACE Class	TN Class
Ephemeral Channels / Wet Weather Conveyances						
EPH1	1,132 feet	35.37467 88.63760	35.37673 88.63484	N/A	Ephemeral Stream (non-jurisdictional)	WWC (12.25)
EPH2	400 feet	35.37323 88.63396	35.37390 88.63496	N/A	Ephemeral Stream (non-jurisdictional)	WWC (9.5)
EPH3	1,894 feet	35.37463 88.63102	35.37694 88.63396	N/A	Ephemeral Stream (non-jurisdictional)	WWC (14.75)
EPH4	151 feet	35.37428 88.63956	35.37418 88.64003	N/A	Ephemeral Stream (non-jurisdictional)	WWC (Primary)
EPH5	103 feet	35.37336 88.63927	35.37360 88.63945	N/A	Ephemeral Stream (non-jurisdictional)	WWC (11.5)
Other Waters						
Pond 1	0.79 acres	35.37666 88.63952	N/A	PUB3Hfhx	Other Water (non-jurisdictional)	Pond

If the “wetland” areas of the property have not been classified by the NRCS as Prior Converted Cropland, the features would be subject to regulation under Section 404 of the Clean Water Act, as administered by the USACE. An NRCS designation of PC for these features would remove the USACE jurisdiction unless the features are abandoned (no longer actively farmed) and wetland functions are considered restored.

6.0 ADDITIONAL CONSIDERATIONS

This report is intended as a preliminary delineation and should not be interpreted as a final jurisdictional delineation nor an authorization to perform any soil disturbance on the site evaluated. The USACE and TDEC are the only agencies authorized to make the final jurisdictional classification of the wetland and waters identified in this report.

7.0 REFERENCES

The wetland delineation method used followed the procedures outlined in the following:

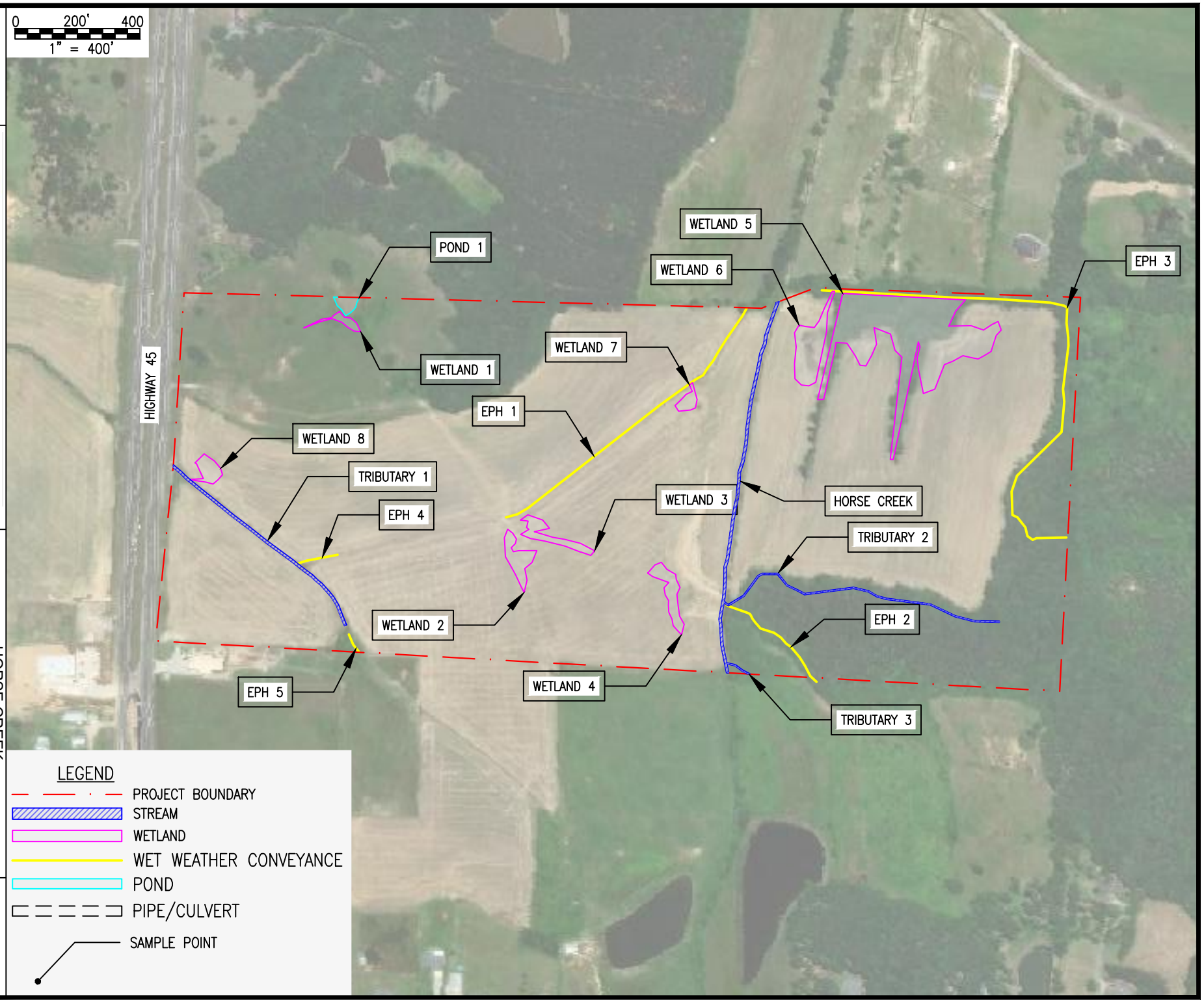
- Corps of Engineers Wetland Delineation Manual, Technical Report Y-87-1. 1987;
- *USACE Regulatory Guidance Letter No. 05-05 dated December 2005;*
- *USACE Regulatory Guidance Letter No. 07-01 dated June 2007;*
- *USACE Regulatory Guidance Letter No. 16-01 dated October 2016*; and,
- *ERDC/EL TR-10-20 (Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0))*, November 2010.

Other sources of information utilized in this delineation include the following:

- Google Earth. Available [online] Aerial Photograph. http://googleearth.com/;
- *Guidance for Making Hydrologic Determinations, Version 1.4*. Tennessee Department of Environment and Conservation, Division of Water Pollution Control. May 2011.
- *Redoximorphic Features for Identifying Aquic Conditions*, North Carolina Agricultural Research Service, Technical Bulletin 301;
- U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) 2019. Chester County, Tennessee WEB Soil Survey;
- U.S. Fish and Wildlife Service, National Wetlands Inventory. NWI Mapper. 2020; and,
- U.S. Geological Survey, Henderson, TN and Masseyville, TN 2019 topographic quadrangles.

APPENDIX A

FIGURES



Tioga
ENVIRONMENTAL CONSULTANTS

HORSE CREEK
JURISDICTIONAL WATERS DELINEATION

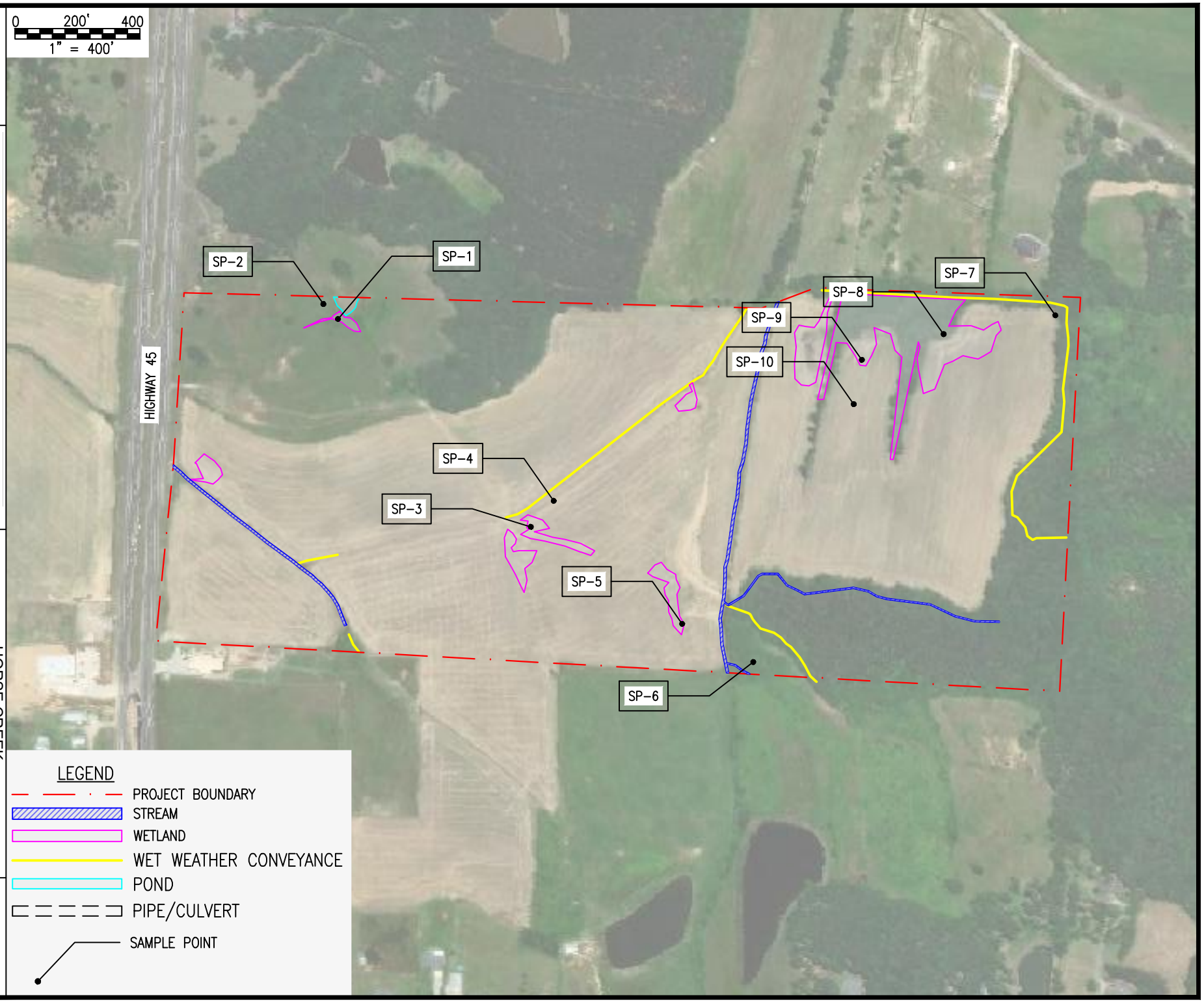
LOCATION: HIGHWAY 45 FINGER, TN

DESCRIPTION: SITE FEATURES MAP

DATE: JUNE 2020

PROJECT #: 541106.00

1



Tioga
ENVIRONMENTAL CONSULTANTS

HORSE CREEK
JURISDICTIONAL WATERS DELINEATION

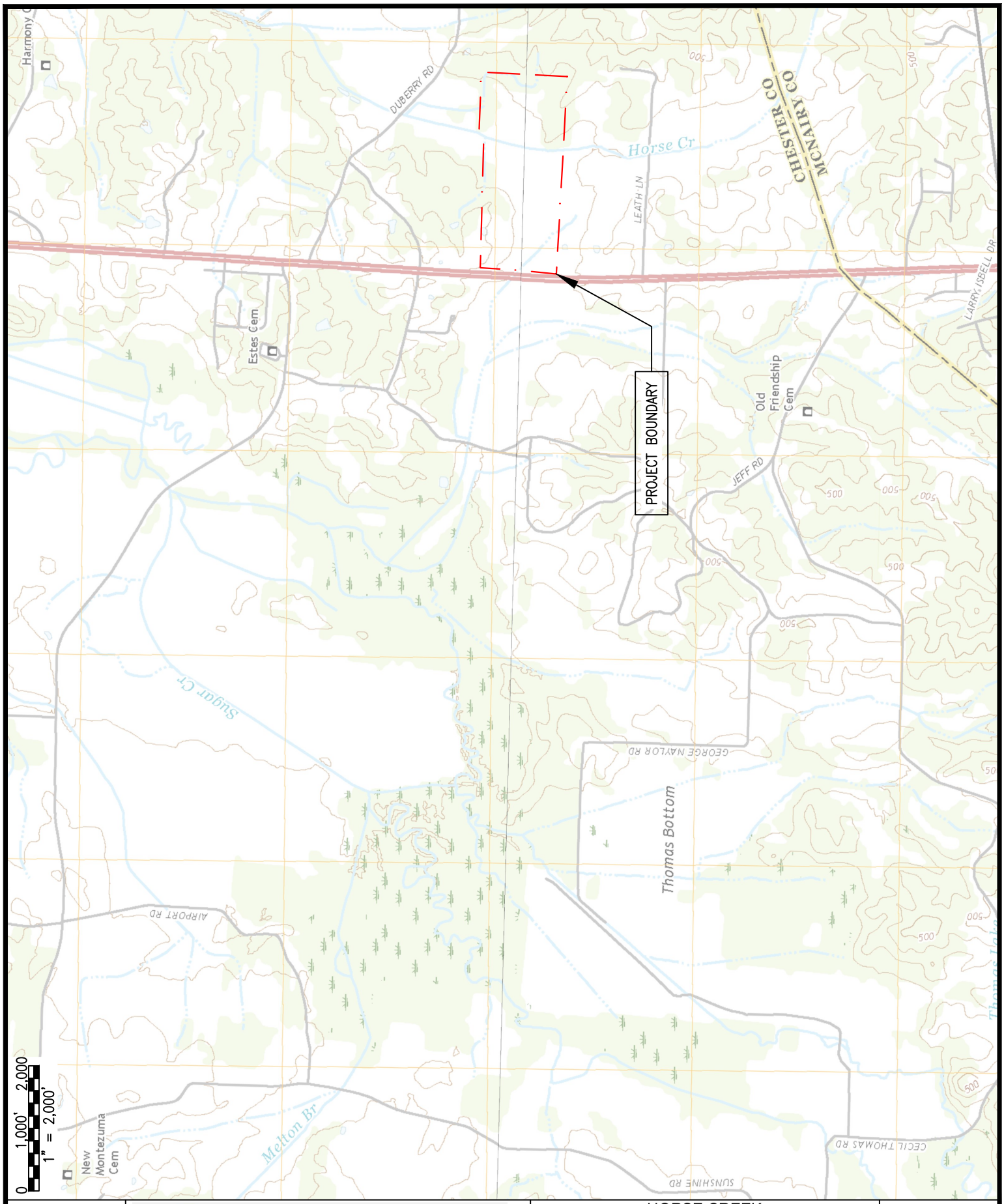
LOCATION: HIGHWAY 45 FINGER, TN

DESCRIPTION: SAMPLE POINT MAP

DATE: JUNE 2020

PROJECT #: 541106.00

2



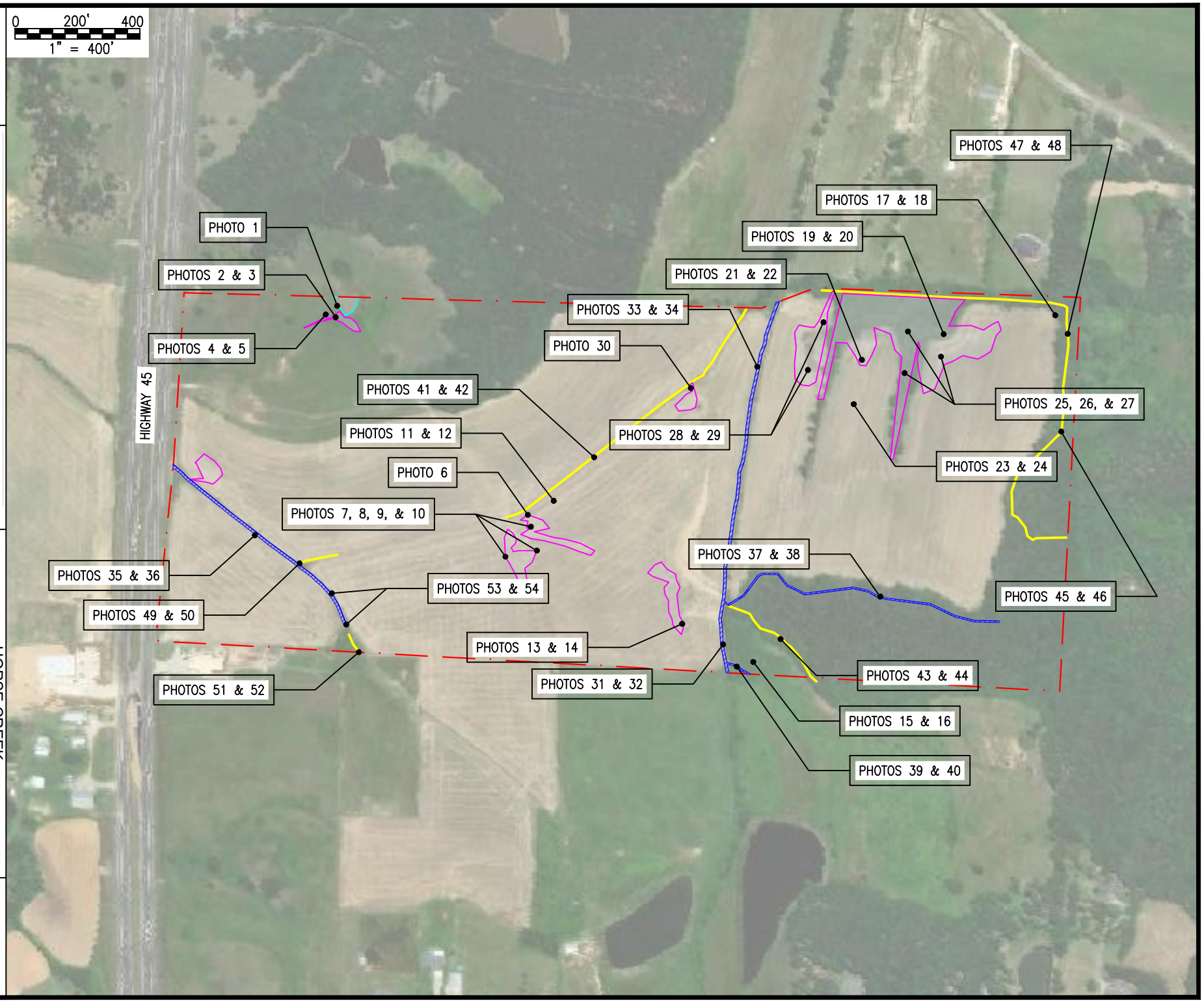
Tioga
ENVIRONMENTAL CONSULTANTS

HORSE CREEK
JURISDICTIONAL WATERS DELINEATION

LOCATION:	DATE:
HIGHWAY 45 FINGER, TN	JUNE 2020
DESCRIPTION:	PROJECT #:
TOPOGRAPHIC MAP HENDERSON & MASSEYVILLE, TN	541106.00

APPENDIX B

PHOTOGRAPHIC LOG



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ENVIRONMENTAL CONSULTANTS

HORSE CREEK
JURISDICTIONAL WATERS DELINEATION

LOCATION: HIGHWAY 45 FINGER, TN

DATE: JUNE 2020

DESCRIPTION: PHOTO LOCATIONS

PROJECT #: 541106.00

KEY

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PHOTOGRAPHIC LOG

Client Name: Kimley-Horn & Associates, Inc.	**Site Location:** Horse Creek Mitigation Project - Finger, TN	**Project No.** 541106.00

Photo No. 1	**Date:** 05/25/2020

Direction Photo Taken:

East

Description:

Overview of Pond 1

Photo No. 2	**Date:** 05/25/2020

Direction Photo Taken:

North

Description:

Overview of SP-1 (Wetland 1)

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PHOTOGRAPHIC LOG

Client Name: Kimley-Horn & Associates, Inc.	**Site Location:** Horse Creek Mitigation Project - Finger, TN	**Project No.** 541106.00

Photo No. 3	**Date:** 05/25/2020

Direction Photo Taken:

N/A

Description:

Hydric soils from SP-1 (Wetland 1)

Photo No. 4	**Date:** 05/25/2020

Direction Photo Taken:

South

Description:

Overview of SP-2

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ENVIRONMENTAL CONSULTANTS

PHOTOGRAPHIC LOG

Client Name: Kimley-Horn & Associates, Inc.	**Site Location:** Horse Creek Mitigation Project - Finger, TN	**Project No.** 541106.00

Photo No. 5	**Date:** 05/25/2020

Direction Photo Taken:

N/A

Description:

Soils from SP-2

Photo No. 6	**Date:** 05/25/2020

Direction Photo Taken:

South

Description:

Typical view of wetlands on the agricultural fields at the site

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PHOTOGRAPHIC LOG

Client Name: Kimley-Horn & Associates, Inc.	**Site Location:** Horse Creek Mitigation Project - Finger, TN	**Project No.** 541106.00

Photo No. 7	**Date:** 05/25/2020

Direction Photo Taken:

Southwest

Description:

Typical view of wetlands on the agricultural fields at the site, Wetland 2 in this instance

Photo No. 8	**Date:** 05/25/2020

Direction Photo Taken:

N/A

Description:

Typical hydrology indicators within the wetland areas of the agricultural fields, including Crayfish burrows, algal growth, and vegetative shift

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PHOTOGRAPHIC LOG

Client Name: Kimley-Horn & Associates, Inc.	**Site Location:** Horse Creek Mitigation Project - Finger, TN	**Project No.** 541106.00

Photo No. 9	**Date:** 05/25/2020

Direction Photo Taken:

N/A

Description:

Typical hydrology indicators within the wetland areas of the agricultural fields, including algal mat, and some limited soil cracks

Photo No. 10	**Date:** 05/25/2020

Direction Photo Taken:

N/A

Description:

Hydric soils from SP-3

Note the sand layer at the bottom of the profile, typical for Iuka soils

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PHOTOGRAPHIC LOG

Client Name: Kimley-Horn & Associates, Inc.	**Site Location:** Horse Creek Mitigation Project - Finger, TN	**Project No.** 541106.00

Photo No. 11	**Date:** 05/25/2020

Direction Photo Taken:

East

Description:

Overview of SP-4, upland point above SP-3

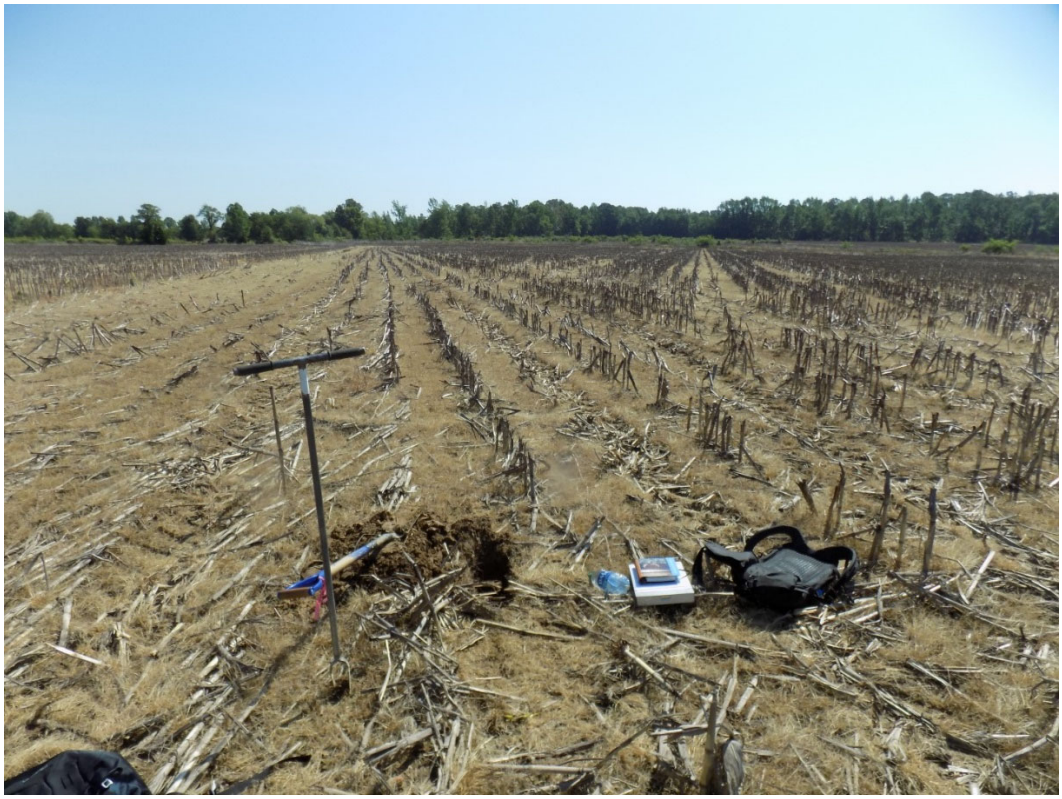

Photo No. 12	**Date:** 05/25/2020

Direction Photo Taken:

N/A

Description:

Non-hydric soils from SP-4, upland point

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ENVIRONMENTAL CONSULTANTS

PHOTOGRAPHIC LOG

Client Name: Kimley-Horn & Associates, Inc.	**Site Location:** Horse Creek Mitigation Project - Finger, TN	**Project No.** 541106.00

Photo No. 13	**Date:** 05/25/2020

Direction Photo Taken:

East

Description:

Overview of SP-5 (Wetland 5)

Photo No. 14	**Date:** 05/25/2020

Direction Photo Taken:

N/A

Description:

Hydric soils from SP-5

Soils are hydric in the upper profile above a restrictive layer

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PHOTOGRAPHIC LOG

Client Name: Kimley-Horn & Associates, Inc.	**Site Location:** Horse Creek Mitigation Project - Finger, TN	**Project No.** 541106.00

Photo No. 15	**Date:** 05/25/2020

Direction Photo Taken:

South

Description:

Overview of SP-6, upland

Photo No. 16	**Date:** 05/25/2020

Direction Photo Taken:

N/A

Description:

Non-hydric soils from SP-6

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ENVIRONMENTAL CONSULTANTS

PHOTOGRAPHIC LOG

Client Name: Kimley-Horn & Associates, Inc.	**Site Location:** Horse Creek Mitigation Project - Finger, TN	**Project No.** 541106.00

Photo No. 17	**Date:** 05/25/2020

Direction Photo Taken:

West

Description:

Overview of SP-7, upland

Photo No. 18	**Date:** 05/25/2020

Direction Photo Taken:

N/A

Description:

Non-hydric soils from SP-7

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ENVIRONMENTAL CONSULTANTS

PHOTOGRAPHIC LOG

Client Name: Kimley-Horn & Associates, Inc.	**Site Location:** Horse Creek Mitigation Project - Finger, TN	**Project No.** 541106.00

Photo No. 19	**Date:** 05/25/2020

Direction Photo Taken:

Northwest

Description:

Overview of SP-8 (Wetland 5, Hatchie soils adjacent to Bibb soils)

Photo No. 20	**Date:** 05/25/2020

Direction Photo Taken:

N/A

Description:

Hydric soils from SP-8

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ENVIRONMENTAL CONSULTANTS

PHOTOGRAPHIC LOG

Client Name: Kimley-Horn & Associates, Inc.	**Site Location:** Horse Creek Mitigation Project - Finger, TN	**Project No.** 541106.00

Photo No. 21	**Date:** 05/25/2020

Direction Photo Taken:

North

Description:

Overview of SP-9 (Wetland 5, Savanah soils adjacent to Bibb soils)

Photo No. 22	**Date:** 05/25/2020

Direction Photo Taken:

West

Description:

Hydric soils from SP-9

Tioga
ENVIRONMENTAL CONSULTANTS

PHOTOGRAPHIC LOG

Client Name: Kimley-Horn & Associates, Inc.	**Site Location:** Horse Creek Mitigation Project - Finger, TN	**Project No.** 541106.00

Photo No. 23	**Date:** 05/25/2020

Direction Photo Taken:

North

Description:

Overview of SP-10, upland

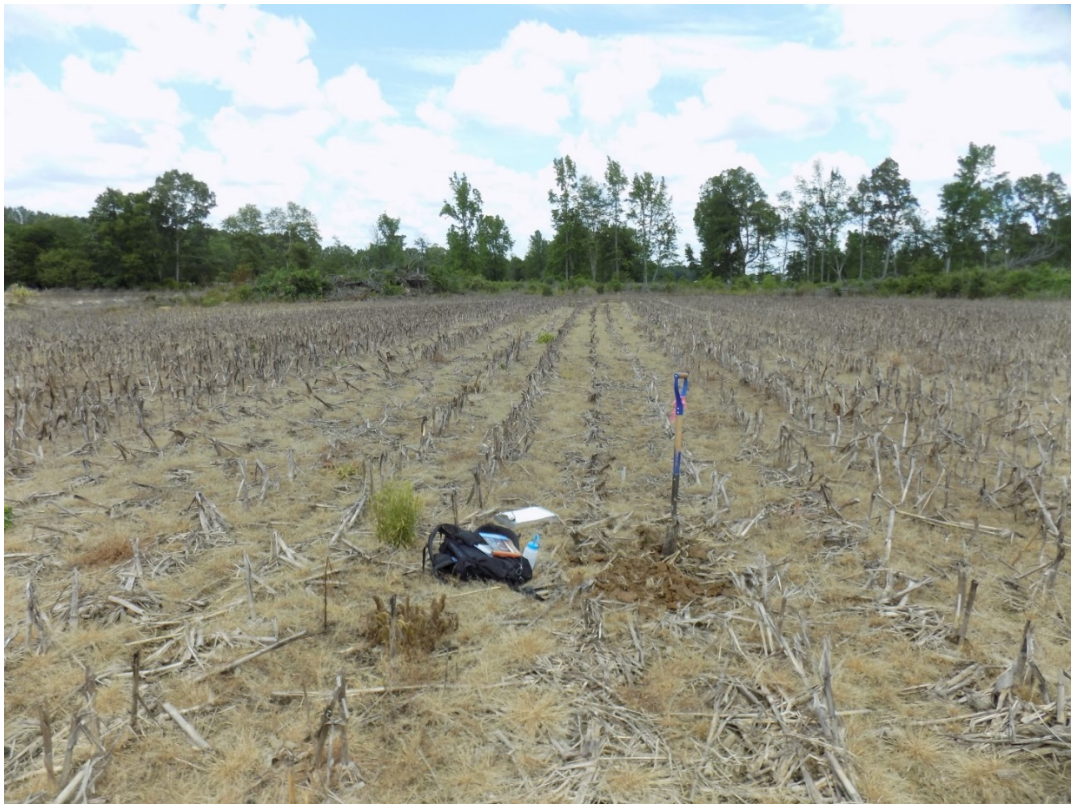

Photo No. 24	**Date:** 05/25/2020

Direction Photo Taken:

N/A

Description:

Non-hydric soils from SP-10

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ENVIRONMENTAL CONSULTANTS

PHOTOGRAPHIC LOG

Client Name: Kimley-Horn & Associates, Inc.	**Site Location:** Horse Creek Mitigation Project - Finger, TN	**Project No.** 541106.00

Photo No. 25	**Date:** 05/25/2020

Direction Photo Taken:

West

Description:

Typical scrub/shrub interior of Wetland 5 within the Bibb soils

Photo No. 26	**Date:** 05/25/2020

Direction Photo Taken:

Northwest

Description:

Drainage from the agricultural portions of Wetland 5 into the non-agricultural portion containing the Bibb soils

Tioga
ENVIRONMENTAL CONSULTANTS

PHOTOGRAPHIC LOG

Client Name: Kimley-Horn & Associates, Inc.	**Site Location:** Horse Creek Mitigation Project - Finger, TN	**Project No.** 541106.00

Photo No. 27	**Date:** 05/25/2020

Direction Photo Taken:

South

Description:

Typical view of one of the "fingers" on Wetland 5, a dug channel

Photo No. 28	**Date:** 05/25/2020

Direction Photo Taken:

Northeast

Description:

Overview of Wetland 6

Tioga
ENVIRONMENTAL CONSULTANTS

PHOTOGRAPHIC LOG

Client Name: Kimley-Horn & Associates, Inc.	**Site Location:** Horse Creek Mitigation Project - Finger, TN	**Project No.** 541106.00

Photo No. 29	**Date:** 05/25/2020

Direction Photo Taken:

North

Description:

Drainage from Wetland 6 back towards the channel running along the north property line

Photo No. 30	**Date:** 05/25/2020

Direction Photo Taken:

North

Description:

Overview of Wetland 7, draining into EPH 1, not quite visible in mid-ground

Tioga
ENVIRONMENTAL CONSULTANTS

PHOTOGRAPHIC LOG

Client Name: Kimley-Horn & Associates, Inc.	**Site Location:** Horse Creek Mitigation Project - Finger, TN	**Project No.** 541106.00

Photo No. 31	**Date:** 05/25/2020

Direction Photo Taken:

South

Description:

Upstream view of Horse Creek (south side)

Photo No. 32	**Date:** 05/25/2020

Direction Photo Taken:

North

Description:

Downstream view of Horse Creek (south side)

Tioga
ENVIRONMENTAL CONSULTANTS

PHOTOGRAPHIC LOG

Client Name: Kimley-Horn & Associates, Inc.	**Site Location:** Horse Creek Mitigation Project - Finger, TN	**Project No.** 541106.00

Photo No. 33	**Date:** 05/25/2020

Direction Photo Taken:

South

Description:

Upstream view of Horse Creek (north side)

Photo No. 34	**Date:** 05/25/2020

Direction Photo Taken:

North

Description:

Downstream view of Horse Creek (north side)

Tioga
ENVIRONMENTAL CONSULTANTS

PHOTOGRAPHIC LOG

Client Name: Kimley-Horn & Associates, Inc.	**Site Location:** Horse Creek Mitigation Project - Finger, TN	**Project No.** 541106.00

Photo No. 35	**Date:** 05/25/2020

Direction Photo Taken:

Southeast

Description:

Upstream view of Tributary 1

Photo No. 36	**Date:** 05/25/2020

Direction Photo Taken:

Northwest

Description:

Downstream view of Tributary 1

Tioga
ENVIRONMENTAL CONSULTANTS

PHOTOGRAPHIC LOG

Client Name: Kimley-Horn & Associates, Inc.	**Site Location:** Horse Creek Mitigation Project - Finger, TN	**Project No.** 541106.00

Photo No. 37	**Date:** 05/25/2020

Direction Photo Taken:

East

Description:

Upstream view of Tributary 2

Photo No. 38	**Date:** 05/25/2020

Direction Photo Taken:

West

Description:

Downstream view of Tributary 2

Tioga
ENVIRONMENTAL CONSULTANTS

PHOTOGRAPHIC LOG

Client Name: Kimley-Horn & Associates, Inc.	**Site Location:** Horse Creek Mitigation Project - Finger, TN	**Project No.** 541106.00

Photo No. 39	**Date:** 05/25/2020

Direction Photo Taken:

East

Description:

Upstream view of Tributary 3

Photo No. 40	**Date:** 05/25/2020

Direction Photo Taken:

West

Description:

Downstream view of Tributary 3

Tioga
ENVIRONMENTAL CONSULTANTS

PHOTOGRAPHIC LOG

Client Name: Kimley-Horn & Associates, Inc.	**Site Location:** Horse Creek Mitigation Project - Finger, TN	**Project No.** 541106.00

Photo No. 41	**Date:** 05/25/2020

Direction Photo Taken:

West

Description:

Upstream view of EPH 1

Photo No. 42	**Date:** 05/25/2020

Direction Photo Taken:

East

Description:

Downstream view of EPH 1

Tioga
ENVIRONMENTAL CONSULTANTS

PHOTOGRAPHIC LOG

Client Name: Kimley-Horn & Associates, Inc.	**Site Location:** Horse Creek Mitigation Project - Finger, TN	**Project No.** 541106.00

Photo No. 43	**Date:** 05/25/2020

Direction Photo Taken:

Southeast

Description:

Upstream view of EPH 2

Photo No. 44	**Date:** 05/25/2020

Direction Photo Taken:

Northwest

Description:

Downstream view of EPH 2

Tioga
ENVIRONMENTAL CONSULTANTS

PHOTOGRAPHIC LOG

Client Name: Kimley-Horn & Associates, Inc.	**Site Location:** Horse Creek Mitigation Project - Finger, TN	**Project No.** 541106.00

Photo No. 45	**Date:** 05/25/2020

Direction Photo Taken:

South

Description:

Upstream view of EPH 3

Photo No. 46	**Date:** 05/25/2020

Direction Photo Taken:

North

Description:

Downstream view of EPH 3

Tioga
ENVIRONMENTAL CONSULTANTS

PHOTOGRAPHIC LOG

Client Name: Kimley-Horn & Associates, Inc.	**Site Location:** Horse Creek Mitigation Project - Finger, TN	**Project No.** 541106.00

Photo No. 47	**Date:** 05/25/2020

Direction Photo Taken:

South

Description:

Single large head cut on EPH 3 (the only pool with water on the reach)

Photo No. 48	**Date:** 05/25/2020

Direction Photo Taken:

North

Description:

Downstream of the head cut on EPH 3

Tioga
ENVIRONMENTAL CONSULTANTS

PHOTOGRAPHIC LOG

Client Name: Kimley-Horn & Associates, Inc.	**Site Location:** Horse Creek Mitigation Project - Finger, TN	**Project No.** 541106.00

Photo No. 49	**Date:** 05/25/2020

Direction Photo Taken:

East

Description:

Upstream view of EPH 4

Photo No. 50	**Date:** 05/25/2020

Direction Photo Taken:

West

Description:

EPH 4 (right) entering into Tributary 1

Tioga
ENVIRONMENTAL CONSULTANTS

PHOTOGRAPHIC LOG

Client Name: Kimley-Horn & Associates, Inc.	**Site Location:** Horse Creek Mitigation Project - Finger, TN	**Project No.** 541106.00

Photo No. 51	**Date:** 05/25/2020

Direction Photo Taken:

South

Description:

EPH 5, entering the project area (foreground) from the south adjoining property

Photo No. 52	**Date:** 05/25/2020

Direction Photo Taken:

Southwest

Description:

Up channel view of EPH 5 at project area boundary

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ENVIRONMENTAL CONSULTANTS

PHOTOGRAPHIC LOG

Client Name: Kimley-Horn & Associates, Inc.	**Site Location:** Horse Creek Mitigation Project - Finger, TN	**Project No.** 541106.00

Photo No. 53	**Date:** 05/25/2020

Direction Photo Taken:

North

Description:

EPH 5 entering a culvert near the south project area boundary

Photo No. 54	**Date:** 05/25/2020

Direction Photo Taken:

Northwest

Description:

An example of inground drainage feeding into Tributary 1 at the bright line between EPH 5 and the tributary, just below the culvert in the previous photograph

APPENDIX C

NRCS SOIL MAP

Hydric Rating by Map Unit—Chester County, Tennessee
(Horse Creek)

Map Scale: 1:5,360 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Lines
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Soil Rating Points
- Hydric (100%)
- Hydric (66 to 99%)
- Hydric (33 to 65%)
- Hydric (1 to 32%)
- Not Hydric (0%)
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Chester County, Tennessee
Survey Area Data: Version 16, Sep 16, 2019

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 12, 2015—Aug 24, 2017

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydric Rating by Map Unit

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
BB	Bibb silt loam, frequently flooded	100	1.4	1.5%
Ha	Hatchie silt loam, 0 to 2 percent slopes	5	24.2	26.1%
Iu	Iuka silt loam, occasionally flooded	0	29.0	31.3%
PrC3	Providence silty clay loam, 5 to 8 percent slopes, severely eroded	0	3.1	3.4%
SaB2	Savannah fine sandy loam, 2 to 5 percent slopes, eroded	0	3.4	3.6%
SaB3	Savannah clay loam, 2 to 5 percent slopes, severely eroded	0	14.0	15.1%
SaC3	Savannah clay loam, 5 to 8 percent slopes, severely eroded	0	0.1	0.1%
SaD3	Savannah clay loam, 8 to 12 percent slopes, severely eroded	0	9.1	9.8%
SmD3	Smithdale loam, 8 to 12 percent slopes, severely eroded	0	8.4	9.1%
Totals for Area of Interest			**92.7**	**100.0%**

Description

This rating indicates the percentage of map units that meets the criteria for hydric soils. Map units are composed of one or more map unit components or soil types, each of which is rated as hydric soil or not hydric. Map units that are made up dominantly of hydric soils may have small areas of minor nonhydric components in the higher positions on the landform, and map units that are made up dominantly of nonhydric soils may have small areas of minor hydric components in the lower positions on the landform. Each map unit is rated based on its respective components and the percentage of each component within the map unit.

The thematic map is color coded based on the composition of hydric components. The five color classes are separated as 100 percent hydric components, 66 to 99 percent hydric components, 33 to 65 percent hydric components, 1 to 32 percent hydric components, and less than one percent hydric components.

In Web Soil Survey, the Summary by Map Unit table that is displayed below the map pane contains a column named 'Rating'. In this column the percentage of each map unit that is classified as hydric is displayed.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2006) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and Vasilas, 2006).

References:

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.

Soil Survey Staff. 2006. Keys to soil taxonomy. 10th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.

Rating Options

Aggregation Method: Percent Present

Component Percent Cutoff: None Specified

Tie-break Rule: Lower

APPENDIX D

NATIONAL WETLANDS INVENTORY MAP

U.S. Fish and Wildlife Service
National Wetlands Inventory

Horse Creek

June 1, 2020

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

APPENDIX E

WETLANDS DATA FORMS

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Horse Creek City/County: Finger / Chester Sampling Date: 5/25/2020

Applicant/Owner: Kimley-Horn & Associates, Inc. State: TN Sampling Point: SP-1

Investigator(s): Ben Day, William Gray / Tioga Environmental Section, Township, Range:

Landform (hillside, terrace, etc.): hillside Local relief (concave, convex, none): concave Slope (%): 0-2

Subregion (LRR or MLRA): LRR P, MLRA 133A Lat: 35.37655 Long: 88.63962 Datum: NAD83

Soil Map Unit Name: Providence silty clay loam NWI classification: None

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

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Below berm of farm pond, isolated wetland

HYDROLOGY

Wetland Hydrology Indicators:

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

- ____ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15) **(LRR U)**
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- ____ Saturation Visible on Aerial Imagery (C9)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ____ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes X	No ____	Depth (inches): 16
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** ____

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

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: SP-1

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Shrub Stratum (Plot size: 15)			
1. *Cephalanthus occidentalis*	10	Yes	OBL
2.			
3.			
4.			
5.			
6.			
	10 =Total Cover		
50% of total cover: 5	20% of total cover: 2		
Herb Stratum (Plot size: 15)			
1. *Juncus effusus*	70	Yes	OBL
2. *Carex frankii*	40	Yes	OBL
3. *Solidago spp.*	25	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	135 =Total Cover		
50% of total cover: 68	20% of total cover: 27		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	120	x 1 =	120
FACW species	0	x 2 =	0
FAC species	25	x 3 =	75
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	145 (A)		195 (B)
Prevalence Index = B/A =			1.34

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody Plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody Vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL Sampling Point: SP-1

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2								Recentrly deposited silt & organic material
2 - 6	10YR 5/1	85	10YR 5/8	15	C	PL	Loamy/Clayey	Prominent redox concentrations
6 - 18	10YR 5/1	60	10YR 5/6	40	C	M	Loamy/Clayey	Prominent redox concentrations

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** ___

Remarks:
Water table @ 16 inches.
Saturation to surface.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Horse Creek City/County: Finger / Chester Sampling Date: 5/25/2020

Applicant/Owner: Kimley-Horn & Associates, Inc. State: TN Sampling Point: SP-2

Investigator(s): Ben Day, William Gray / Tioga Environmental Section, Township, Range:

Landform (hillside, terrace, etc.): hillside Local relief (concave, convex, none): none Slope (%): 5

Subregion (LRR or MLRA): LRR P, MLRA 133A Lat: 35.37669 Long: 88.63980 Datum: NAD83

Soil Map Unit Name: Providence silty clay loam NWI classification: None

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

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Upland fallow field from SP-1

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

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

Remarks:
None present

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: SP-2

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Shrub Stratum (Plot size: 30)			
1. *Andropogon virginicus*	90	Yes	FAC
2.			
3.			
4.			
5.			
6.			
	90 =Total Cover		
50% of total cover: 45	20% of total cover:	18	
Herb Stratum (Plot size: 30)			
1. *Lespedeza cuneata*	40	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	40 =Total Cover		
50% of total cover: 20	20% of total cover:	8	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	90	x 3 =	270
FACU species	40	x 4 =	160
UPL species	0	x 5 =	0
Column Totals:	130 (A)		430 (B)
Prevalence Index = B/A =			3.31

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody Plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody Vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (If observed, list morphological adaptations below.)

SOIL Sampling Point: SP-2

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/4	100						
3-18	7.5YR 4/4	100						

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Horse Creek City/County: Finger / Chester Sampling Date: 5/25/2020

Applicant/Owner: Kimley-Horn & Associates, Inc. State: TN Sampling Point: SP-3

Investigator(s): Ben Day, William Gray / Tioga Environmental Section, Township, Range:

Landform (hillside, terrace, etc.): open field Local relief (concave, convex, none): slight concave Slope (%): 0-2

Subregion (LRR or MLRA): LRR P, MLRA 133A Lat: 35.37460 Long: -88.63730 Datum: NAD83

Soil Map Unit Name: Iuka NWI classification: None

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

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X No ____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- X Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15) **(LRR U)**
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- X Sparsely Vegetated Concave Surface (B8)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- X Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ____ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches): 2
Water Table Present?	Yes ____	No ____	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ____	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

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

Remarks:
Surface water present in some areas, secondary indicators on margins

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: SP-3

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Shrub Stratum (Plot size: 15)			
1. *Zea mays*	20	Yes	UPL
2.			
3.			
4.			
5.			
6.			
	20 =Total Cover		
50% of total cover: 10	20% of total cover: 4		
Herb Stratum (Plot size: 15)			
1. *Eragrostis pectinacea*	25	Yes	FAC
2. *Juncus effusus*	10	No	OBL
3. *Ranunculus abortivus*	20	Yes	FACW
4. *Diodia virginiana*	40	Yes	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	95 =Total Cover		
50% of total cover: 48	20% of total cover: 19		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	60	x 2 =	120
FAC species	25	x 3 =	75
FACU species	0	x 4 =	0
UPL species	20	x 5 =	100
Column Totals:	115 (A)		305 (B)
Prevalence Index = B/A =			2.65

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody Plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody Vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)
Eragrostis only on egde margins

SOIL Sampling Point: SP-3

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 5/1	90	10YR 5/6	10	C	PL	Loamy/Clayey	Prominent redox concentrations
4-10	10YR 5/2	80	10YR 5/6	20	C	M	Loamy/Clayey	Prominent redox concentrations
10-18	10YR 7/1	100					Sandy	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ? Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ? Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ? Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ? Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Horse Creek City/County: Finger / Chester Sampling Date: 5/25/2020

Applicant/Owner: Kimley-Horn & Associates, Inc. State: TN Sampling Point: SP-4

Investigator(s): Ben Day, William Gray / Tioga Environmental Section, Township, Range:

Landform (hillside, terrace, etc.): open field Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR or MLRA): LRR P, MLRA 133A Lat: 35.37486 Long: -88.63704 Datum: NAD83

Soil Map Unit Name: Iuka NWI classification: None

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

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Upland point just north of SP-3 wetland point

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

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

Remarks:
None present

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: SP-4

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Shrub Stratum (Plot size: 30)			
1. *Zea mays*	25	Yes	UPL
2.			
3.			
4.			
5.			
6.			
	25 =Total Cover		
50% of total cover: 13	20% of total cover: 5		
Herb Stratum (Plot size: 30)			
1. *Eragrostis pectinacea*	90	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	90 =Total Cover		
50% of total cover: 45	20% of total cover: 18		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	90	x 3 =	270
FACU species	0	x 4 =	0
UPL species	25	x 5 =	125
Column Totals:	115 (A)		395 (B)
Prevalence Index = B/A =			3.43

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody Plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody Vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (If observed, list morphological adaptations below.)

SOIL Sampling Point: SP-4

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
1-17	10YR 4/2	100					Loamy/Clayey	
17-18	10YR 5/1	80	10YR 5/4	20	C	M	Loamy/Clayey	Distinct redox concentrations

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Relic hydric features observed deep in the soil profile.

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Horse Creek City/County: Finger / Chester Sampling Date: 5/25/2020

Applicant/Owner: Kimley-Horn & Associates, Inc. State: TN Sampling Point: SP-5

Investigator(s): Ben Day, William Gray / Tioga Environmental Section, Township, Range:

Landform (hillside, terrace, etc.): open field, floodplain Local relief (concave, convex, none): slight concave Slope (%): 2

Subregion (LRR or MLRA): LRR P, MLRA 133A Lat: 35.37370 Long: -88.63551 Datum: NAD83

Soil Map Unit Name: Hatchie NWI classification: None

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

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- X Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** X **No** ____

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

Remarks:
Upper (north) areas have shallow surface water.

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: SP-5

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Shrub Stratum (Plot size: 15)			
1. *Zea mays*	20	Yes	UPL
2.			
3.			
4.			
5.			
6.			
	20 =Total Cover		
50% of total cover: 10	20% of total cover: 4		
Herb Stratum (Plot size:)			
1. *Eragrostis pectinacea*	10	No	FAC
2. *Ranunculus abortivus*	20	Yes	FACW
3. *Diodia virginiana*	40	Yes	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	70 =Total Cover		
50% of total cover: 35	20% of total cover: 14		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	60	x 2 =	120
FAC species	10	x 3 =	30
FACU species	0	x 4 =	0
UPL species	20	x 5 =	100
Column Totals:	90 (A)		250 (B)

Prevalence Index = B/A = 2.78

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody Plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody Vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL Sampling Point: SP-5

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-2	10YR 4/2	100					Loamy/Clayey	
2-6	10YR 5/1	92	10YR 5/4	8	C	M	Loamy/Clayey	Distinct redox concentrations
6-18	10YR 5/2	100					Loamy/Clayey	Fragipan

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: Fragipan

Depth (inches): 6

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Horse Creek City/County: Finger / Chester Sampling Date: 5/25/2020

Applicant/Owner: Kimley-Horn & Associates, Inc. State: TN Sampling Point: SP-6

Investigator(s): Ben Day, William Gray / Tioga Environmental Section, Township, Range:

Landform (hillside, terrace, etc.): wooded floodplain terrace Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR or MLRA): LRR P, MLRA 133A Lat: 35.37336 Long: -88.63465 Datum: NAD83

Soil Map Unit Name: Smithdale NWI classification: None

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

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
South wooded area near Horse Creek, Smithdale soils

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

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

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: SP-6

Tree Stratum (Plot size: 30)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Platanus occidentalis*	20	Yes	FACW
2. *Liquidambar styraciflua*	70	Yes	FAC
3.			
4.			
5.			
6.			
	90	=Total Cover	
50% of total cover: 45		20% of total cover: 18	
Sapling Stratum (Plot size: 30)			
1. *Liquidambar styraciflua*	60	Yes	FAC
2. *Acer rubrum*	20	Yes	FAC
3.			
4.			
5.			
6.			
	80	=Total Cover	
50% of total cover: 40		20% of total cover: 16	
Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
		=Total Cover	
50% of total cover:		20% of total cover:	
Herb Stratum (Plot size: 30)			
1. *Microstegium vimineum*	50	Yes	FAC
2. *Ampelopsis arborea*	20	Yes	FAC
3. *Smilax rotundifolia*	5	No	FAC
4. *Liquidambar styraciflua*	5	No	FAC
5. *Acer rubrum*	5	No	FAC
6.			
7.			
8.			
9.			
10.			
11.			
	85	=Total Cover	
50% of total cover: 43		20% of total cover: 17	
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
50% of total cover:		20% of total cover:	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	20	x 2 =	40
FAC species	235	x 3 =	705
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	255 (A)		745 (B)

Prevalence Index = B/A = 2.92

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody Plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody Vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL Sampling Point: SP-6

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-4	10YR 4/3	100					Loamy/Clayey	
4-18	10YR 4/4	100					Loamy/Clayey	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Horse Creek City/County: Finger / Chester Sampling Date: 5/25/2020

Applicant/Owner: Kimley-Horn & Associates, Inc. State: TN Sampling Point: SP-7

Investigator(s): Ben Day, William Gray / Tioga Environmental Section, Township, Range:

Landform (hillside, terrace, etc.): edge of field Local relief (concave, convex, none): slight convex Slope (%): 0-2

Subregion (LRR or MLRA): LRR P, MLRA 133A Lat: 35.37677 Long: -88.63122 Datum: NAD83

Soil Map Unit Name: Htchoe / Smithdale interface NWI classification: None

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

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes ____	No X	**within a Wetland?** **Yes** ____ **No** X
Wetland Hydrology Present?	Yes ____	No X	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

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

Remarks:
No hydrology indicators

VEGETATION (Five Strata) – Use scientific names of plants. Sampling Point: SP-7

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Shrub Stratum (Plot size: 20)			
1. *Zea mays*	10	Yes	UPL
2.			
3.			
4.			
5.			
6.			
	10 =Total Cover		
50% of total cover: 5	20% of total cover: 2		
Herb Stratum (Plot size: 20)			
1. *Andropogon virginicus*	30	Yes	FAC
2. *Eragrostis pectinacea*	60	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	90 =Total Cover		
50% of total cover: 45	20% of total cover: 18		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	90	x 3 =	270
FACU species	0	x 4 =	0
UPL species	10	x 5 =	50
Column Totals:	100 (A)		320 (B)
Prevalence Index = B/A =			3.20

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody Plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody Vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL Sampling Point: SP-7

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/2	100					Loamy/Clayey	
4-18	10YR 5/2	100					Loamy/Clayey	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Horse Creek City/County: Finger / Chester Sampling Date: 5/25/2020

Applicant/Owner: Kimley-Horn & Associates, Inc. State: TN Sampling Point: SP-8

Investigator(s): Ben Day, William Gray / Tioga Environmental Section, Township, Range:

Landform (hillside, terrace, etc.): open field, floodplain Local relief (concave, convex, none): none Slope (%): 0-2

Subregion (LRR or MLRA): LRR P, MLRA 133A Lat: 35.37655 Long: -88.63253 Datum: NAD83

Soil Map Unit Name: Hatche . Bibb interface NWI classification: None

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

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Wet area in field immediately adjacent to the scrub/shrub inundated Bibb soils, at inbterface between Hatchie and Bibb soils.

HYDROLOGY

Wetland Hydrology Indicators:

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

- X Surface Water (A1)
- ____ High Water Table (A2)
- ____ Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15) **(LRR U)**
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- ____ Sparsely Vegetated Concave Surface (B8)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- ____ Geomorphic Position (D2)
- ____ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ____ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches): 3
Water Table Present?	Yes ____	No ____	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 2

Wetland Hydrology Present? **Yes** X **No** ____

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

Remarks:
Some areas with surface water, some saturated to near surface

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: SP-8

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Shrub Stratum (Plot size: 30)			
1. *Zea mays*	10	Yes	UPL
2.			
3.			
4.			
5.			
6.			
	10 =Total Cover		
50% of total cover: 5	20% of total cover: 2		
Herb Stratum (Plot size: 30)			
1. *Ranunculus abortivus*	25	Yes	FACW
2. *Eragrostis pectinacea*	25	Yes	FAC
3. *Diodia virginiana*	15	Yes	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	65 =Total Cover		
50% of total cover: 33	20% of total cover: 13		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	40	x 2 =	80
FAC species	25	x 3 =	75
FACU species	0	x 4 =	0
UPL species	10	x 5 =	50
Column Totals:	75 (A)		205 (B)
Prevalence Index = B/A =			2.73

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody Plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody Vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL Sampling Point: SP-8

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/2	94	10YR 5/6	6	C	M	Loamy/Clayey	Prominent redox concentrations
4-8	10YR 4/2	80	10YR 5/6	20	C	M	Loamy/Clayey	Prominent redox concentrations
8-18	10YR 4/3	90	10YR 5/4	10	C	M	Sandy	Faint redox concentrations

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Horse Creek City/County: Finger / Chester Sampling Date: 5/25/2020

Applicant/Owner: Kimley-Horn & Associates, Inc. State: TN Sampling Point: SP-9

Investigator(s): Ben Day, William Gray / Tioga Environmental Section, Township, Range:

Landform (hillside, terrace, etc.): open field, floodplain Local relief (concave, convex, none): convex Slope (%): 0-2

Subregion (LRR or MLRA): LRR P, MLRA 133A Lat: 35.37628 Long: -88.63347 Datum: NAD83

Soil Map Unit Name: Savannah NWI classification: None

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

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area**
Hydric Soil Present?	Yes X No ____	**within a Wetland?** **Yes** X **No** ____
Wetland Hydrology Present?	Yes X No ____	

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- X Surface Water (A1)
- ____ High Water Table (A2)
- X Saturation (A3)
- ____ Water Marks (B1)
- ____ Sediment Deposits (B2)
- ____ Drift Deposits (B3)
- ____ Algal Mat or Crust (B4)
- ____ Iron Deposits (B5)
- ____ Inundation Visible on Aerial Imagery (B7)
- ____ Water-Stained Leaves (B9)
- ____ Aquatic Fauna (B13)
- ____ Marl Deposits (B15) **(LRR U)**
- ____ Hydrogen Sulfide Odor (C1)
- ____ Oxidized Rhizospheres on Living Roots (C3)
- ____ Presence of Reduced Iron (C4)
- ____ Recent Iron Reduction in Tilled Soils (C6)
- ____ Thin Muck Surface (C7)
- ____ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ____ Surface Soil Cracks (B6)
- X Sparsely Vegetated Concave Surface (B8)
- ____ Drainage Patterns (B10)
- ____ Moss Trim Lines (B16)
- ____ Dry-Season Water Table (C2)
- ____ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- ____ Geomorphic Position (D2)
- X Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ____ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes X	No ____	Depth (inches): 2
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes X	No ____	Depth (inches): 4

Wetland Hydrology Present? **Yes** X **No** ____

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

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: SP-9

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Herb Stratum (Plot size: 30)			
1. *Juncus effusus*	5	Yes	OBL
2. *Eragrostis pectinacea*	5	Yes	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	10 =Total Cover		
50% of total cover: 5	20% of total cover: 2		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	0	x 2 =	0
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	10 (A)		20 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody Plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody Vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (If observed, list morphological adaptations below.)

SOIL Sampling Point: SP-9

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 5/1	98	10YR 4/4	2	C	M	Loamy/Clayey	Distinct redox concentrations
2-8	10YR 5/2	80	10YR 4/6	20	C	M	Loamy/Clayey	Prominent redox concentrations
8-18	10YR 6/1	92	10YR 6/6	8	C	M	Loamy/Clayey	Prominent redox concentrations

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: Fragipan

Depth (inches): 8

Hydric Soil Present? **Yes** X **No** ___

Remarks:

U.S. Army Corps of Engineers
WETLAND DETERMINATION DATA SHEET – Atlantic and Gulf Coastal Plain Region
See ERDC/EL TR-07-24; the proponent agency is CECW-CO-R

OMB Control #: 0710-xxxx, Exp: Pending
Requirement Control Symbol EXEMPT:
(Authority: AR 335-15, paragraph 5-2a)

Project/Site: Horse Creek City/County: Finger / Chester Sampling Date: 5/25/2020

Applicant/Owner: Kimley-Horn & Associates, Inc. State: TN Sampling Point: SP-10

Investigator(s): Ben Day, William Gray / Tioga Environmental Section, Township, Range:

Landform (hillside, terrace, etc.): open field Local relief (concave, convex, none): none Slope (%): 2

Subregion (LRR or MLRA): LRR P, MLRA 133A Lat: 35.37587 Long: -88.63356 Datum: NAD83

Soil Map Unit Name: Savannah NWI classification: None

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

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Upland point south of SP-9

HYDROLOGY

Wetland Hydrology Indicators:

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

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15) **(LRR U)**
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Sphagnum Moss (D8) **(LRR T, U)**

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? **Yes** ____ **No** X

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

Remarks:
None present

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: SP-10

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Sapling Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
	=Total Cover		
50% of total cover:	20% of total cover:		
Shrub Stratum (Plot size: 30)			
1. *Zea mays*	10	Yes	UPL
2.			
3.			
4.			
5.			
6.			
	10 =Total Cover		
50% of total cover: 5	20% of total cover: 2		
Herb Stratum (Plot size: 30)			
1. *Eragrostis pectinacea*	70	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	70 =Total Cover		
50% of total cover: 35	20% of total cover: 14		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
50% of total cover:	20% of total cover:		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	70	x 3 =	210
FACU species	0	x 4 =	0
UPL species	10	x 5 =	50
Column Totals:	80 (A)		260 (B)
Prevalence Index = B/A =			3.25

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub - Woody Plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody Vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (If observed, list morphological adaptations below.)

SOIL Sampling Point: SP-10

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 4/3	100					Loamy/Clayey	
6-18	10YR 4/4	100					Loamy/Clayey	

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

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Organic Bodies (A6) **(LRR P, T, U)**
- ___ 5 cm Mucky Mineral (A7) **(LRR P, T, U)**
- ___ Muck Presence (A8) **(LRR U)**
- ___ 1 cm Muck (A9) **(LRR P, T)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Coast Prairie Redox (A16) (**MLRA 150A)**
- ___ Sandy Mucky Mineral (S1) **(LRR O, S)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) **(LRR P, S, T, U)**
- ___ Polyvalue Below Surface (S8) **(LRR S, T, U)**
- ___ Thin Dark Surface (S9) **(LRR S, T, U)**
- ___ Barrier Islands 1 cm Muck (S12) **(MLRA 153B, 153D)**
- ___ Loamy Mucky Mineral (F1) **(LRR O)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) **(LRR U)**
- ___ Depleted Ochric (F11) **(MLRA 151)**
- ___ Iron-Manganese Masses (F12) **(LRR O, P, T)**
- ___ Umbric Surface (F13) **(LRR P, T, U)**
- ___ Delta Ochric (F17) **(MLRA 151)**
- ___ Reduced Vertic (F18) **(MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(MLRA 149A)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 149A, 153C, 153D)**
- ___ Very Shallow Dark Surface (F22) **(MLRA 138, 152A in FL, 154)**

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR O)**
- ___ 2 cm Muck (A10) **(LRR S)**
- ___ Coast Prairie Redox (A16) **(outside MLRA 150A)**
- ___ Reduced Vertic (F18) **(outside MLRA 150A, 150B)**
- ___ Piedmont Floodplain Soils (F19) **(LRR P, T)**
- ___ Anomalous Bright Floodplain Soils (F20) **(MLRA 153B)**
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22) **(outside MLRA 138, 152A in FL, 154)**
- ___ Barrier Islands Low Chroma Matrix (TS7) **(MLRA 153B, 153D)**
- ___ Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

APPENDIX F

HYDROLOGIC DETERMINATION DATA FORMS

Weather Conditions Calulation

		Long Term Rainfall Records							
	Month	Minus One Std. Dev. (DRY)	NORMAL (Mean inches)	Plus One Std. Dev (WET)	Actual Rainfall	Condition (DRY, WET, NORMAL)	Condition Value	Month Weight value	Product of Previous Two Columns
1st Prior Month	April	2.92	4.95	6.98	5.99	NORMAL	1	x3	3
2nd Prior Month	March	3.24	6.10	8.95	10.36	WET	3	x2	6
3rd Prior Month	February	2.74	4.87	6.99	7.1	WET	3	x1	3
								Sum =	12
								Condition =	Normal

If Sum Is:	
6-9	then prior period has been dryer than normal
10-14	then prior period has been normal
15-18	then prior period has been wetter than normal

Dry=	1
Normal=	2
Wet=	3

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Horse Creek	Date/Time: 5/25/22
Assessors/Affiliation: Ben Day, William Gray / Tioga Env.	Project ID: 541106.00
Site Name/Description: Horse Creek Mitigation Area	
Site Location: Hwy 45, Finger, TN	
HUC (12 digit): 080102050105	Lat/Long: 35.37365
Previous Rainfall (7-days): 1.7" (0.62 last 72 hrs)	-88.63505
Precipitation this Season vs. Normal: abnormally wet elevated (average) low abnormally dry unknown Source of recent & seasonal precip data: NOAA 12	
Watershed Size: 0.69 mi^2	County: Chester
Soil Type(s) / Geology: Iuka	Source: NRCS
Surrounding Land Use: Fallow Agricultural, undeveloped	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes): Severe (Moderate) Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	?	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	?	Stream
6. Presence of fish (except *Gambusia*)		Stream
7. Presence of naturally occurring ground water table connection	?	~~Stream~~ X BSTJ
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	NA	Stream
9. Evidence watercourse has been used as a supply of drinking water	?	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

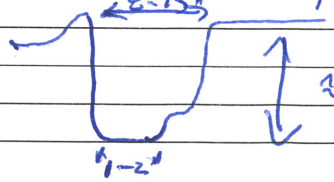
In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream (primary, fish)

Secondary Indicator Score (if applicable) = 30,25

Justification / Notes: Stream very incised. Obviously dug / trenched, with spoil material forming a 'levee' on west side. Has formed good bed and bank full benches on much of reach. Sandy bottom w/ much vegetation on banks / benches.



Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal = 14.5)	Absent	Weak	Moderate	Strong	
1. Continuous bed and bank	0	1	2	(3)	3
2. Sinuous channel	(0)	1	2	3	
3. In-channel structure: riffle-pool sequences	0	1	(2)	3	2
4. Sorting of soil textures or other substrate	0	1	(2)	3	2
5. Active/relic floodplain incised channel, beaches	0	0.5	(1)	1.5	0.75
6. Depositional bars or benches	0	1	(2)	3	2
7. Braided channel	(0)	1	2	3	
8. Recent alluvial deposits	0	(0.5)	1	1.5	0.5
9. Natural levees	(0)	1	2	3	
10. Headcuts	(0)	1	2	3	
11. Grade controls artificial, road debris	0	(0.5)	1	1.5	0.25
12. Natural valley or drainageway	0	0.5	(1)	1.5	1
13. At least second order channel on existing USGS or NRCS map - stream stats, visual confirmation	No = 0		Yes = 3		3

B. **Hydrology** (Subtotal = 7.5)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel ?	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	(3)
16. Leaf litter in channel (January – September)	(1.5)	1	0.5	0
17. Sediment on plants or on debris @ bank full	0	0.5	(1)	1.5
18. Organic debris lines or piles (wrack lines)	0	(0.5)	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. **Biology** (Subtotal = 8.25)	Absent	Weak	Moderate	Strong	
20. Fibrous roots in channel bed [1] margins some	3	(2)	1	0	2.75
21. Rooted plants in the thalweg [1]	(3)	2	1	0	3
22. Crayfish in stream (exclude in floodplain) ?	0	1	2	3	
23. Bivalves/mussels	(0)	1	2	3	
24. Amphibians some tadpoles	0	(0.5)	1	1.5	0.5
25. Macrobenthos (record type & abundance) not scared	0	1	2	3	very minimal substrate (sand mostly)
26. Filamentous algae; periphyton	0	(1)	2	3	1
27. Iron oxidizing bacteria/fungus	(0)	0.5	1	1.5	
28. Wetland plants in channel bed [2]	0	0.5	(1)	1.5	1

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 30.25

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Tributary 1

Named Waterbody: Horse Creek	Date/Time: 5/25/20
Assessors/Affiliation: Ben Day, William Gray / Tioga Env.	Project ID :
Site Name/Description: Horse Creek Mitigation Area	
Site Location: Hwy 45, Finger, TN	
HUC (12 digit): 080102050102	Lat/Long:
Previous Rainfall (7-days) : 1.7" (0.62 last 72 hrs)	
Precipitation this Season vs. Normal : abnormally wet elevated (average) low abnormally dry unknown Source of recent & seasonal precip data : NOAA 12	
Watershed Size : 0.11 mi^2	County: Chester
Soil Type(s) / Geology : Hatchie / Iuka	Source: NRCS
Surrounding Land Use : Agricultural	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : (Severe) Moderate Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	—	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*) some fish, litel, Gambusia		Stream
7. Presence of naturally occurring ground water table connection	?	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	NA	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

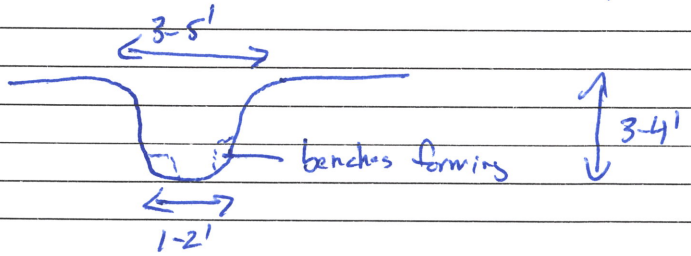
In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream

Secondary Indicator Score (if applicable) = 24.25

Justification / Notes : Dry channel forms from offsite and field drainage



Tributary 1

Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal = 9.0)	Absent	Weak	Moderate	Strong	
1. Continuous bed and bank bed ill defined in a few incised areas	0	1	2	3	2.5
2. Sinuous channel ditched	0	1	2	3	
3. In-channel structure: riffle-pool sequences forming	0	1	2	3	2
4. Sorting of soil textures or other substrate on benches esp.	0	1	2	3	2
5. Active/relic floodplain	0	0.5	1	1.5	
6. Depositional bars or benches	0	1	2	3	1.5
7. Braided channel	0	1	2	3	
8. Recent alluvial deposits	0	0.5	1	1.5	
9. Natural levees	0	1	2	3	
10. Headcuts	0	1	2	3	
11. Grade controls culvert	0	0.5	1	1.5	0.5
12. Natural valley or drainageway	0	0.5	1	1.5	0.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3		

B. **Hydrology** (Subtotal = 8.25)	Absent	Weak	Moderate	Strong	
14. Subsurface flow/discharge into channel	0	1	2	3	1.5 drain tiles
15. Water in channel and >48 hours since sig. rain	0	1	2	3	3 upper reach
16. Leaf litter in channel (January – September)	1.5	1	0.5	0	1.5
17. Sediment on plants or on debris	0	0.5	1	1.5	0.5
18. Organic debris lines or piles (wrack lines) a few	0	0.5	1	1.5	0.25
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5		1.5

C. **Biology** (Subtotal = 7)	Absent	Weak	Moderate	Strong	
20. Fibrous roots in channel bed[1] profile below	3	2	1	0	2
21. Rooted plants in the thalweg[1] margins not thalweg	3	2	1	0	3
22. Crayfish in stream (exclude in floodplain) muddy ?	0	1	2	3	
23. Bivalves/mussels	0	1	2	3	
24. Amphibians tadpoles multiple	0	0.5	1	1.5	0.5
25. Macrobenthos (record type & abundance) no substrate muddy	0	1	2	3	
26. Filamentous algae; periphyton	0	1	2	3	2
27. Iron oxidizing bacteria/fungus few pools	0	0.5	1	1.5	0.5
28. Wetland plants in channel bed[2]	0	0.5	1	1.5	1

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 24.25

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

Tributary 2

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Horse Creek	Date/Time: 5/25/20
Assessors/Affiliation: Ben Day, William Gray / Tioga Env.	Project ID :
Site Name/Description: Horse Creek Mitigation Area	
Site Location: Hwy 45, Finger, TN	
HUC (12 digit): 080102050105	Lat/Long: 35.37409
Previous Rainfall (7-days) : 1.7' (0.62 last 72 hrs)	-88.63354
Precipitation this Season vs. Normal : abnormally wet elevated (average) low abnormally dry unknown Source of recent & seasonal precip data : NOAA 12	
Watershed Size : 0.04 mi² (Streamstats)	County: Chester
Soil Type(s) / Geology : Smithdale / Savannah interface	Source: NRCS
Surrounding Land Use : wooded, agricultural	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe (Moderate) Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	—	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	?	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	✓	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream

Secondary Indicator Score (if applicable) = 19.0 *

Justification / Notes : * see back for justification of "stream" call.

Tributary 2

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 8)	Absent	Weak	Moderate	Strong	
1. Continuous bed and bank (a few interruptions, esp on south bank)	0	1	2	3	2.5
2. Sinuous channel	0	1	2	3	1
3. In-channel structure: riffle-pool sequences (many large pools)	0	1	2	3	1
4. Sorting of soil textures or other substrate	0	1	2	3	1
5. Active/relic floodplain	0	0.5	1	1.5	0.5
6. Depositional bars or benches (very little evi. of flow)	0	1	2	3	1
7. Braided channel	0	1	2	3	
8. Recent alluvial deposits	0	0.5	1	1.5	
9. Natural levees	0	1	2	3	
10. Headcuts	0	1	2	3	
11. Grade controls (large roots ; many smaller roots)	0	0.5	1	1.5	1
12. Natural valley or drainageway	0	0.5	1	1.5	0.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3		

B. Hydrology (Subtotal = 5)	Absent	Weak	Moderate	Strong	
14. Subsurface flow/discharge into channel	0	1	2	3	
15. Water in channel and >48 hours since sig. rain	0	1	2	3	many pools
16. Leaf litter in channel (January – September)	1.5	1	0.5	0	
17. Sediment on plants or on debris (around pools)	0	0.5	1	1.5	
18. Organic debris lines or piles (wrack lines) (some large)	0	0.5	1	1.5	
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5		

C. Biology (Subtotal = 5.5)	Absent	Weak	Moderate	Strong	
20. Fibrous roots in channel bed [1]	3	2	1	0	1.5
21. Rooted plants in the thalweg [1] (varies along reach)	3	2	1	0	2
22. Crayfish in stream (exclude in floodplain)	0	1	2	3	
23. Bivalves/mussels	0	1	2	3	
24. Amphibians	0	0.5	1	1.5	1
25. Macrobenthos (record type & abundance)	0	1	2	3	
26. Filamentous algae; periphyton	0	1	2	3	
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5	1
28. Wetland plants in channel bed [2]	0	0.5	1	1.5	1

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = ~~16.5~~ 19.0

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : Channel was very difficult to access, behind and among very heavy deadfall and growth. Difficult to fully assess the full reach, likely reducing scoring.

Deadfall pushed into the channel is creating blockages to flow. Where less disturbed, channel had stronger stream geomorphology.

Professional judgement is this is an intermittent stream.

Trib stream (3)

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Horse Creek	Date/Time: 5/25/20
Assessors/Affiliation: Ben Day, William Gray / Tioga Env.	Project ID :
Site Name/Description: Horse Creek Mitigation Area	
Site Location: Hwy 45, Finger, TN	
HUC (12 digit): 080102050105	Lat/Long: 35.37331
Previous Rainfall (7-days) : 1.7" (0.02 last 72 hrs)	-88.63485
Precipitation this Season vs. Normal : abnormally wet elevated (average) low abnormally dry unknown Source of recent & seasonal precip data : NOAA	
Watershed Size : 0.06 mi² (Streamstats)	County: Chester
Soil Type(s) / Geology : Smithdale	Source: NRCS
Surrounding Land Use : wooded	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate (Slight) Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	?	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection		(Stream) per adjoining owner (spring)
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	NA	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

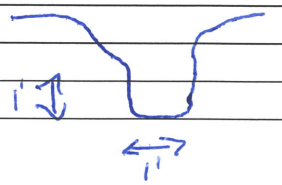
In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = Stream

Secondary Indicator Score (if applicable) = 23

Justification / Notes : verified by adjoining property owner (in-laws) Robert Slam sourced by spring head, always flows
Naturalized channel w/ strong flow, wooded area



Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal = 10)	Absent	Weak	Moderate	Strong	
1. Continuous bed and bank	0	1	2	3	3
2. Sinuous channel	0	1	2	3	
3. In-channel structure: riffle-pool sequences	0	1	2	3	2
4. Sorting of soil textures or other substrate	0	1	2	3	2.5
5. Active/relic floodplain small benching w/in incised	0	0.5	1	1.5	0.25
6. Depositional bars or benches	0	1	2	3	1
7. Braided channel	0	1	2	3	
8. Recent alluvial deposits	0	0.5	1	1.5	
9. Natural levees	0	1	2	3	
10. Headcuts	0	1	2	3	
11. Grade controls roots	0	0.5	1	1.5	0.5
12. Natural valley or drainageway	0	0.5	1	1.5	0.75
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3		

B. **Hydrology** (Subtotal = 7.5) not observed ?	Absent	Weak	Moderate	Strong	
14. Subsurface flow/discharge into channel	0	1	2	3	
15. Water in channel and >48 hours since sig. rain	0	1	2	3	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0	1.25
17. Sediment on plants or on debris	0	0.5	1	1.5	0.75
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5	1
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5		1.5

C. **Biology** (Subtotal = 5.5)	Absent	Weak	Moderate	Strong	
20. Fibrous roots in channel bed [1]	3	2	1	0	1.5
21. Rooted plants in the thalweg [1]	3	2	1	0	3
22. Crayfish in stream (exclude in floodplain) none seen	0	1	2	3	
23. Bivalves/mussels	0	1	2	3	
24. Amphibians adult frogs	0	0.5	1	1.5	0.5
25. Macrobenthos (record type & abundance)	0	1	2	3	
26. Filamentous algae; periphyton	0	1	2	3	
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5	0.5
28. Wetland plants in channel bed [2]	0	0.5	1	1.5	

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 23

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

EPH-1
WWC 1

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Horse Creek	Date/Time: 5/25/20
Assessors/Affiliation: Ben Day, William Gray / Tioga Env	Project ID :
Site Name/Description: Horse Creek Mitigation Area	
Site Location: Hwy 45, Finger, TN	
HUC (12 digit): 080102050105	Lat/Long: 35.37502
Previous Rainfall (7-days) : ~~1.62~~ 1.7" (0.62 last 72 hrs)	-88.63700
Precipitation this Season vs. Normal : abnormally wet elevated (average) low abnormally dry unknown	
Source of recent & seasonal precip data : NOAA	
Watershed Size : <0.1 mi²	County: Chester
Soil Type(s) / Geology : Iuka	Source: NRCS
Surrounding Land Use : agricultural	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : (Severe) Moderate Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	NA	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 12.25 Cover scored b/c channel is maintained, artificially inflating a few parameters)

Justification / Notes :

Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal = 2)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank (dug)	0	1	(2)	3
2. Sinuous channel	(0)	1	2	3
3. In-channel structure: riffle-pool sequences	(0)	1	2	3
4. Sorting of soil textures or other substrate	(0)	1	2	3
5. Active/relic floodplain	(0)	0.5	1	1.5
6. Depositional bars or benches	(0)	1	2	3
7. Braided channel	(0)	1	2	3
8. Recent alluvial deposits	(0)	0.5	1	1.5
9. Natural levees	(0)	1	2	3
10. Headcuts	(0)	1	2	3
11. Grade controls	(0)	0.5	1	1.5
12. Natural valley or drainageway	(0)	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	(No = 0)		Yes = 3	

2

B. **Hydrology** (Subtotal = ~~4.25~~ 5.75)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	(0)	1	2	3
15. Water in channel and >48 hours since sig. rain ?	0	(1)	2	3
16. Leaf litter in channel (January – September) overscored	(1.5)	1	0.5	0
17. Sediment on plants or on debris	0	0.5	(1)	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	(1)	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		(Yes = 1.5)	

1 overscore
1 no veg.
.75

C. **Biology** (Subtotal = 4.5)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel bed [1]	3	2	(1)	0
21. Rooted plants in the thalweg [1] (dug - maintained)	(3)	2	1	0
22. Crayfish in stream (exclude in floodplain)	(0)	1	2	3
23. Bivalves/mussels	(0)	1	2	3
24. Amphibians	(0)	0.5	1	1.5
25. Macrobenthos (record type & abundance)	(0)	1	2	3
26. Filamentous algae; periphyton	(0)	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	(1.5)
28. Wetland plants in channel bed [2]	(0)	0.5	1	1.5

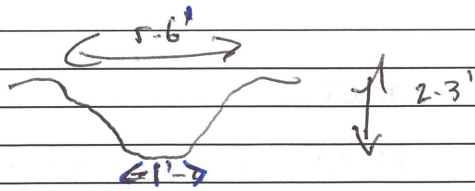
1
3 (overscored)
1.5

[1] Focus is on the presence of terrestrial plants. [2] Focus is on the presence of aquatic or wetland plants.

Total Points = 12.25 (overscored)

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : dug channel



Drainage channel in gg field

EPH 2
WWC 2

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Horse Creek	Date/Time: 5/25/20
Assessors/Affiliation: Ben Day, Willian Gray / Tioga Env.	Project ID :
Site Name/Description: Horse Creek Mitigation Area	
Site Location: Hwy 45, Finger, TN	
HUC (12 digit): 080102050105	Lat/Long: 35,37359 37360
Previous Rainfall (7-days) : 1.7" (0.62" last 72 hrs)	-88,63434
Precipitation this Season vs. Normal : abnormally wet elevated average low abnormally dry unknown Source of recent & seasonal precip data : NOAA	12
Watershed Size : 60.1 mi²	County: Chester
Soil Type(s) / Geology : Smithdale	Source: NRCS
Surrounding Land Use : wooded	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe Moderate Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	NA	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 9.5

Justification / Notes : See back

EPH 2
WWC 2

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 5)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank a few interuptions	0	1	2	(3)
2. Sinuous channel	(0)	1	2	3
3. In-channel structure: riffle-pool sequences flat bed	(0)	1	2	3
4. Sorting of soil textures or other substrate	(0)	1	2	3
5. Active/relic floodplain	0	(0.5)	1	1.5
6. Depositional bars or benches	(0)	1	2	3
7. Braided channel	(0)	1	2	3
8. Recent alluvial deposits	(0)	0.5	1	1.5
9. Natural levees	(0)	1	2	3
10. Headcuts 1 small	0	(1)	2	3
11. Grade controls small roots	0	(0.5)	1	1.5
12. Natural valley or drainageway	0	(0.5)	1	1.5
13. At least second order channel on existing USGS or NRCS map	(No = 0)		Yes = 3	

B. Hydrology (Subtotal = 2.5)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	(0)	1	2	3
15. Water in channel and >48 hours since sig. rain	(0)	1	2	3
16. Leaf litter in channel (January – September)	1.5	(1)	0.5	0
17. Sediment on plants or on debris	0	(0.5)	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	(1)	1.5
19. Hydric soils in channel bed or sides of channel	(No = 0)		Yes = 1.5	

C. Biology (Subtotal = 2)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel bed [1]	3	2	1	(0)
21. Rooted plants in the thalweg [1] Varies	3	(2)	1	0
22. Crayfish in stream (exclude in floodplain)	(0)	1	2	3
23. Bivalves/mussels	(0)	1	2	3
24. Amphibians	(0)	0.5	1	1.5
25. Macrobenthos (record type & abundance)	(0)	1	2	3
26. Filamentous algae; periphyton	(0)	1	2	3
27. Iron oxidizing bacteria/fungus	(0)	0.5	1	1.5
28. Wetland plants in channel bed [2]	(0)	0.5	1	1.5

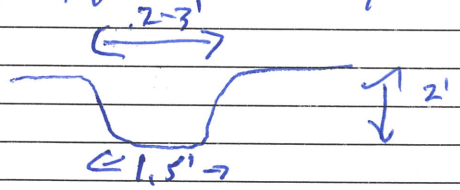
[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 9.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : Geomorphology varies but generally "square" w/ flat bed.



Probably a relic drainage channel or old relocated stream bed.

East Conveyance
EPH 3
WWC 3

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Horse Creek	Date/Time: 5/25/20
Assessors/Affiliation: Ben Day, William Gray / Tioga Env.	Project ID :
Site Name/Description: Horse Creek Mitigation Area	
Site Location: Hwy 45, Finger, TN	
HUC (12 digit): 080102050105	Lat/Long: 35.37607
Previous Rainfall (7-days) : 1.7" (0.62 last 72 hrs)	-88.63110
Precipitation this Season vs. Normal : abnormally wet elevated (average) low abnormally dry unknown Source of recent & seasonal precip data : NOAA T2	
Watershed Size : 20.1 mi^2	County: Chester
Soil Type(s) / Geology : Smithdale	Source: NRCS
Surrounding Land Use : wooded	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : Severe (Moderate) Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	✓	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	NA	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 14.75

Justification / Notes : See back

EPH 3

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 9.25)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	(3)
2. Sinuous channel	(0)	(1)	2	3
3. In-channel structure: riffle-pool sequences	0	1	(2)	3
4. Sorting of soil textures or other substrate	0	(1)	2	3
5. Active/relic floodplain	(0)	0.5	1	1.5
6. Depositional bars or benches	(0)	1	2	3
7. Braided channel	(0)	1	2	3
8. Recent alluvial deposits	(0)	0.5	1	1.5
9. Natural levees	(0)	1	2	3
10. Headcuts (1 large)	0	1	(2)	3
11. Grade controls (a few larger roots in 1 area)	0	0.5	(1)	1.5
12. Natural valley or drainageway	0	(0.5)	1	1.5
13. At least second order channel on existing USGS or NRCS map	(No = 0)		Yes = 3	

3 ,5 1.5 1 — 9.25 — 2 .75 .5

B. Hydrology (Subtotal = 3.5)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	(0)	1	2	3
15. Water in channel and >48 hours since sig. rain	(0)	1	2	3
16. Leaf litter in channel (January – September)	(1.5)	1	0.5	0
17. Sediment on plants or on debris	(0)	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	(0.5)	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		(Yes = 1.5)	

3.5

C. Biology (Subtotal = 2.0)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel bed [1]	3	2	1	(0)
21. Rooted plants in the thalweg [1]	3	(2)	1	0
22. Crayfish in stream (exclude in floodplain)	(0)	1	2	3
23. Bivalves/mussels	(0)	1	2	3
24. Amphibians	(0)	0.5	1	1.5
25. Macrobenthos (record type & abundance)	(0)	1	2	3
26. Filamentous algae; periphyton	(0)	1	2	3
27. Iron oxidizing bacteria/fungus	(0)	0.5	1	1.5
28. Wetland plants in channel bed [2]	(0)	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

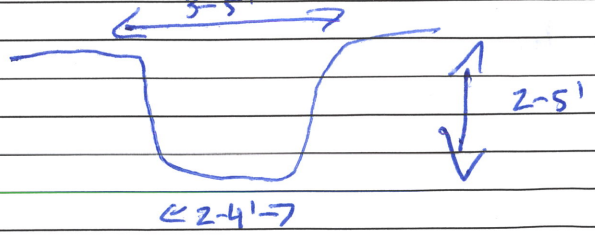
2

Total Points = 14.75

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : Very defined channel, but no evidence of flow. No water present except below single large headcut. V in pool

Bed very uniform in shape, flat. Sand or clay bottom.



EPH 4
WWC 4

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Horse Creek	Date/Time: 5/25/20
Assessors/Affiliation: Ben Day, William Gray / Tioga Env.	Project ID :
Site Name/Description: Horse Creek Mitigation Area	
Site Location: Hwy 45, Finger, TN	
HUC (12 digit): 080102050102	Lat/Long: 35.37422
Previous Rainfall (7-days) : 1.7" (0.12" last 72 hrs)	-88.63988
Precipitation this Season vs. Normal : abnormally wet elevated **average** low abnormally dry unknown Source of recent & seasonal precip data : NOAA 12	
Watershed Size : <0.1 mi²	County: Chester
Soil Type(s) / Geology : Iuka / Hatchie	Source: NRCS
Surrounding Land Use : agricultural	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : **Severe** Moderate Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species		**WWC**
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	✓	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	NA	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

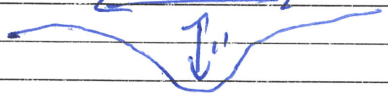
Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC (primary)

Secondary Indicator Score (if applicable) =

Justification / Notes :

Drainage west along a slight depression forms a very ill-defined channel just before discharging to a tributary.



channel erodes near trib.

EPH 4

Secondary Field Indicator Evaluation

A. **Geomorphology** (Subtotal =)	Absent	Weak	Moderate	Strong
1. Continuous bed and bank	0	1	2	3
2. Sinuous channel	0	1	2	3
3. In-channel structure: riffle-pool sequences	0	1	2	3
4. Sorting of soil textures or other substrate	0	1	2	3
5. Active/relic floodplain	0	0.5	1	1.5
6. Depositional bars or benches	0	1	2	3
7. Braided channel	0	1	2	3
8. Recent alluvial deposits	0	0.5	1	1.5
9. Natural levees	0	1	2	3
10. Headcuts	0	1	2	3
11. Grade controls	0	0.5	1	1.5
12. Natural valley or drainageway	0	0.5	1	1.5
13. At least second order channel on existing USGS or NRCS map	No = 0		Yes = 3	

B. **Hydrology** (Subtotal =)	Absent	Weak	Moderate	Strong
14. Subsurface flow/discharge into channel	0	1	2	3
15. Water in channel and >48 hours since sig. rain	0	1	2	3
16. Leaf litter in channel (January – September)	1.5	1	0.5	0
17. Sediment on plants or on debris	0	0.5	1	1.5
18. Organic debris lines or piles (wrack lines)	0	0.5	1	1.5
19. Hydric soils in channel bed or sides of channel	No = 0		Yes = 1.5	

C. **Biology** (Subtotal =)	Absent	Weak	Moderate	Strong
20. Fibrous roots in channel bed [1]	3	2	1	0
21. Rooted plants in the thalweg [1]	3	2	1	0
22. Crayfish in stream (exclude in floodplain)	0	1	2	3
23. Bivalves/mussels	0	1	2	3
24. Amphibians	0	0.5	1	1.5
25. Macrobenthos (record type & abundance)	0	1	2	3
26. Filamentous algae; periphyton	0	1	2	3
27. Iron oxidizing bacteria/fungus	0	0.5	1	1.5
28.Wetland plants in channel bed [2]	0	0.5	1	1.5

[1] Focus is on the presence of terrestrial plants.

[2] Focus is on the presence of aquatic or wetland plants.

Total Points = _____

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes :

EPH 5
WWC 5

Hydrologic Determination Field Data Sheet

Tennessee Division of Water Pollution Control, Version 1.5

Named Waterbody: Horse Creek	Date/Time: 5/25/20
Assessors/Affiliation: Ben Day, William Gray / Tioga Env	Project ID :
Site Name/Description: Horse Creek Mitigation Area	
Site Location: Hwy 45, Finger, TN	
HUC (12 digit): 080102050102	Lat/Long: 35.37340
Previous Rainfall (7-days) : 1.7" (0.62" last 72 hrs)	-88.63932
Precipitation this Season vs. Normal : abnormally wet elevated (average) low abnormally dry unknown	
Source of recent & seasonal precip data : NOAA	
Watershed Size : <0.1 mi^2	County: Chester
Soil Type(s) / Geology : Hatchie	Source: NRCS
Surrounding Land Use : Agricultural / Horse	
Degree of historical alteration to natural channel morphology & hydrology (circle one & describe fully in Notes) : (Severe) Moderate Slight Absent	

Primary Field Indicators Observed

Primary Indicators	NO	YES
1. Hydrologic feature exists solely due to a process discharge	✓	WWC
2. Defined bed and bank absent, vegetation composed of upland and FACU species	upstream yes	WWC
3. Watercourse dry anytime during February through April 15th, under normal precipitation / groundwater conditions	NA	WWC
4. Daily flow and precipitation records showing feature only flows in direct response to rainfall	✓	WWC
5. Presence of multiple populations of obligate lotic organisms with ≥ 2 month aquatic phase	✓	Stream
6. Presence of fish (except *Gambusia*)	✓	Stream
7. Presence of naturally occurring ground water table connection	–	Stream
8. Flowing water in channel and 7 days since last precip >0.1" in local watershed	NA	Stream
9. Evidence watercourse has been used as a supply of drinking water	✓	Stream

NOTE: If any Primary Indicators 1-9 = "Yes", then no further investigation is necessary. However, assessors may choose to score secondary indicators as supporting evidence.

In the absence of a primary indicator, or other definitive evidence, complete the secondary indicator table on page 2 of this sheet, and provide score below.

Guidance for the interpretation and scoring of both the primary & secondary indicators is provided in *TDEC-WPC Guidance For Making Hydrologic Determinations, Version 1.5*

Overall Hydrologic Determination = WWC

Secondary Indicator Score (if applicable) = 11.5

Justification / Notes : Primary WWCs combine at project / property line to form this slightly deeper channel. Flow NW into a culvert beyond which it bright lines to a stream.

EPH 5
WWC 5

Secondary Field Indicator Evaluation

A. Geomorphology (Subtotal = 5.5)	Absent	Weak	Moderate	Strong	
1. Continuous bed and bank	0	1	2	(3)	3
2. Sinuous channel	(0)	1	2	3	
3. In-channel structure: riffle-pool sequences	(0)	1	2	3	
4. Sorting of soil textures or other substrate	0	(1)	2	3	1
5. Active/relic floodplain	(0)	0.5	1	1.5	
6. Depositional bars or benches	(0)	1	2	3	
7. Braided channel	(0)	1	2	3	
8. Recent alluvial deposits	(0)	0.5	1	1.5	
9. Natural levees	(0)	1	2	3	
10. Headcuts offsite WWC, continue and drop in	0	(1)	2	3	1
11. Grade controls	(0)	0.5	1	1.5	
12. Natural valley or drainageway	0	(0.5)	1	1.5	0.5
13. At least second order channel on existing USGS or NRCS map	(No = 0)		Yes = 3		

B. Hydrology (Subtotal = 4.5)	Absent	Weak	Moderate	Strong	
14. Subsurface flow/discharge into channel	(0)	1	2	3	
15. Water in channel and >48 hours since sig. rain "wet"	0	(1)	2	3	1 no obvious flow
16. Leaf litter in channel (January – September)	(1.5)	1	0.5	0	1.5
17. Sediment on plants or on debris	0	(0.5)	1	1.5	0.5
18. Organic debris lines or piles (wrack lines)	(0)	0.5	1	1.5	
19. Hydric soils in channel bed or sides of channel	No = 0		(Yes = 1.5)		1.5

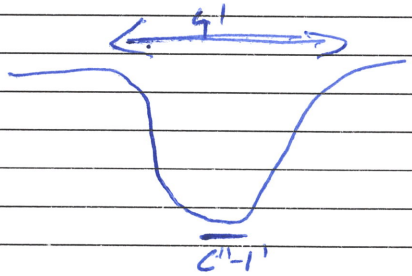
C. Biology (Subtotal = 1.5)	Absent	Weak	Moderate	Strong	
20. Fibrous roots in channel bed [1]	3	2	(1)	0	1
21. Rooted plants in the thalweg [1]	(3)	2	1	0	
22. Crayfish in stream (exclude in floodplain)	(0)	1	2	3	
23. Bivalves/mussels	(0)	1	2	3	
24. Amphibians	(0)	0.5	1	1.5	
25. Macrobenthos (record type & abundance)	(0)	1	2	3	
26. Filamentous algae; periphyton	(0)	1	2	3	
27. Iron oxidizing bacteria/fungus	0	(0.5)	1	1.5	0.5
28. Wetland plants in channel bed [2]	(0)	0.5	1	1.5	

[1] Focus is on the presence of terrestrial plants.
[2] Focus is on the presence of aquatic or wetland plants.

Total Points = 11.5

Under Normal Conditions, Watercourse is a Wet Weather Conveyance if Secondary Indicator Score < 19 points

Notes : Short segment, drops in from offsite WWCs. Weak geomorphology until after culvert where Tributary 1 begins



Some water present but little / no flow

Appendix G: Biological and Physiochemical Sample Results

Benthic Macroinvertebrates Collected from Horse Creek and an Unnamed Tributary to Webb Branch, April 28, 2020.						
GENERA[a]					Horse Creek	UT-1
ORDER	TAXA	T.V.[b]	F.F.G.[c]	CL[d]		
Veneroida	*Pisidium sp.*	**6.6**	**FC**			10
Basommatophora	*Physella sp.*	**8.8**	**CG**		1	3
Basommatophora	*Menetus sp.*	**7.6**	**SC**			3
Tubificida	*Haemonais sp.*	**4**	**CG**			5
Tubificida	*Nais sp.*	**8.7**	**CG**		1	46
Tubificida	*Slavina sp.*	**8.4**	**CG**		2	9
Tubificida	Tubificinae w.h.c.	**10**	**CG**			9
Tubificida	Tubificinae w.o.h.c.	**10**	**CG**		3	18
Lumbriculida	*Lumbriculus sp.*	**7**	**CG**			5
Branchiobdellida		**6**			4	
Amphipoda	*Crangonyx sp.*	**7.2**	**CG**			5
Amphipoda	*Procambarus sp.*	**9.3**	**SH**		2	
Odonata	*Calopteryx sp.*	**7.5**	**P**		2	
Odonata	*Progomphus sp.*	**8.2**	**P**		1	
Trichoptera	Hydropsychidae	**4.1**	**FC**	**CL**	2	
Coleoptera	*Stenelmis sp.*	**5.6**	**SC**	**CL**	1	
Diptera	Ceratopogonidae	**6.8**	**P**			1
Diptera	*Chaetocladius sp.*	**4**	**CG**		1	
Diptera	*Chironomus sp.*	**9.3**	**CG**		1	17
Diptera	*Conchapelopia sp.*	**8.4**	**P**		4	
Diptera	*Corynoneura sp.*	**5.7**	**CG**		30	
Diptera	*Cricotopus sp.*	**7.4**	**CG**	**CL**	26	5
Diptera	*Dicrotendipes sp.*	**7.2**	**CG**			3
Diptera	*Glyptotendipes sp.*	**8.6**	**FC**			3
Diptera	*Kiefferulus dux*	**8**			4	
Diptera	*Nanocladius sp.*	**7.4**	**CG**		23	
Diptera	*Polypedilum sp.*	**6.1**	**SH**		3	1
Diptera	*Pseudorthocladius sp.*	**1.5**	**CG**		1	
Diptera	*Rheotanytarsus sp.*	**6.5**	**FC**	**CL**	4	1
Diptera	*Stictochironomus sp.*	**5.4**	**CG**		2	4
Diptera	*Tanytarsus sp.*	**6.6**	**FC**		12	19
Diptera	*Thienemanniella sp.*	**6.4**	**CG**		28	
Diptera	*Zavrelimyia sp.*	**8.6**	**P**		8	2
Diptera	*Simulium sp.*	**4.9**	**FC**	**CL**	4	
TOTAL NO. OF ORGANISMS					**170**	**169**
TOTAL NO. OF TAXA					**25**	**20**
EPT					**1**	**0**
%EPT-CHEUMATOPSYCHE					**1.18%**	**0.00%**
%OC					**90.00%**	**86.98%**
NCBI					**6.83**	**8.16**
% CLINGERS-CHEUMATOPSYCHE					**21.76%**	**3.55%**
%TNUTOL					**24.12%**	**61.54%**

[a] Organisms identified to family and subfamily are not included in total taxa or EPT counts if an organism is identified to genera under that family or subfamily unless it exhibits characteristics indicating it is not one of the genera listed.

[b] Tolerance Values range from 0 for species of benthic macroinvertebrates very intolerant of organic enrichment to 10 for species very tolerant to enriched conditions.

[c] F.F.G.-Functional Feeding Groups: SH=Shredder, CG=Collector/Gatherer, FC=Filtering Collector, SC=Scraper, P=Predator and PI=Piercer

[d] CL= Clinger Species

Summary of Tennessee Bioassessment Metrics, Protocol K, Horse Creek and Unnamed Tributary to Webb Branch, April 28, 2020.				
METRIC	**Horse Creek**		**UT 1**	
	Value	**Score**	**Value**	**Score**
1. Taxa Richness (Genera-TR)	25	4	20	2
2. EPT Richness (Genera-EPT)	1	0	0	0
3. % EPT-Cheumatopsyche	1.18	0	0	0
4. % Oligochaetes and Chironomids (%OC)	90	0	86.98	0
5. NCBI	6.83	4	8.16	2
6. % Clingers - Clingers	21.76	6	3.55	0
7. %TNUTOL	24.12	6	61.54	2
TOTAL VALUE	**20**		**6**	
BIOCRITERIA GUIDELINES	**NOT PASSING**		**NOT PASSING**	

Target Index Score for bioregion 65e from January – June = 32.

Summary of Water Quality Characteristics Horse Creek and Unnamed Tributary to Webb Branch		
METRIC	**Horse Creek**	**UT 1**
E. Coli (MPN/100ml)	109	471
Nitrate+Nitrite-N (mg/l)	0.844	1.58
Total Kjeldahl Nitrogen (mg/l)	< 1.0	< 0.20
Total Nitrogen (mg/l)	0.844	1.58
Phosphorous (mg/l)	< 0.20	< 0.20