

**WATERS OF THE U.S. DELINEATION REPORT
935 SPA ROAD
ANNE ARUNDEL COUNTY, MARYLAND**

ECS PROJECT NO. 47:2465

**FOR
MCCRONE ENGINEERING**

AUGUST 2, 2016

1.0 INTRODUCTION

This report presents the findings of a wetland, stream, and critical area delineation conducted by ECS Mid-Atlantic, LLC (ECS) for McCrone Engineering at the 935 Spa Road study area in Anne Arundel County, Maryland. The study area is located at 935 Spa Road (Latitude: 38° 58' 20.7" N, Longitude: 76° 30' 30.1" W) and is located on Anne Arundel County Parcel No. 859. The site includes approximately 8.24-acres, as shown on the Site Location Map (Appendix I). The site is mostly developed, consisting of athletic field and parking lots, and is bound by Spa Creek to the south.

ECS conducted the wetland, stream, and critical area delineation on July 20, 2016. The purpose of this study was to identify and delineate potentially jurisdictional Waters of the U.S. (WOUS) within the proposed project study area, as well as assess the extent of critical area within the project limitations. In ECS' opinion, WOUS are present on the above referenced study area. These Waters include Spa Creek, a USGS-mapped perennial stream located in the southern and southwestern portions of the study area, as well as one estuarine forested (EFO) wetland found in the southeastern portion of the study area and one palustrine forested (PFO) wetland found in the southwestern portion of the study area.

2.0 METHODOLOGY

This wetland delineation is based on ECS' professional judgment and application of the technical criteria presented in the 1987 U.S. Army Corps of Engineers (USACE) Wetlands Delineation Manual, and on the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region*, Version 2.0 dated November 2010. Wetland boundaries were delineated using the routine onsite determination method described in the USACE Manual and Regional Supplement, in conjunction with the Atlantic and Gulf Coastal Plain 2014 Regional Wetland Plant List, and the USDA Soil Survey. Field work was completed on July 20, 2016 by Michael Kopansky, PWS, CAE.

Prior to field activities, ECS wetland scientists reviewed the U.S. Geological Survey (USGS) topographic map (Appendix II), U.S. Department of Agriculture Natural Resource Conservation Service (USDA-NRCS) Soil Survey of Anne Arundel County, Maryland (Appendix III), the U.S. Fish & Wildlife Service (USFWS) National Wetlands Inventory (NWI) maps (Appendix IV), the Federal Emergency Management Agency (FEMA) Flood Insurance Map (Appendix V), and the Maryland Department of the Environment Critical Area Map (Appendix VI). An aerial photograph of the site (Appendix VII) was also evaluated to identify potentially jurisdictional WOUS within the limits of the project area.

If wetlands were identified, flagging was placed along the boundaries and sequentially numbered to provide an onsite record of their locations. The Wetland Determination data sheets used in this evaluation are attached (Appendix VIII). A photographic log of each data point and representative wetland and non-wetland areas is included as Appendix IX. Additionally, the approximate data point locations, potentially jurisdictional wetland

boundaries, as well as approximate photo locations are illustrated on the Waters of the U.S. Delineation Map (Appendix X). Wetland and stream boundaries were survey-located by McCrone Engineering.

2.1 Methodology for Delineating the Chesapeake Bay Critical Area and Non-Tidal Wetland and Stream Buffers

The state of Maryland, particularly the Maryland Department of the Environment (MDE) and the Maryland Department of Natural Resources (DNR), requires a buffer to be established and maintained for all tidal and non-tidal wetlands and tributary streams within the state. MDE requires a minimum of a 25-foot buffer adjacent to all non-tidal wetlands, and with the City of Annapolis following MDE guidelines, a 100-foot buffer is also required on all perennial streams within the Critical Area. If a non-tidal wetland is designated one of special state concern, MDE requires a 100-foot buffer be established. To determine the non-tidal wetland and stream buffers, ECS uses the boundaries established during the field activities to delineate the required buffer extending 25-feet landward of all non-tidal wetlands and 100-feet landward of perennial streams.

Similarly, DNR also requires a minimum of a 1,000-foot Critical Area adjacent to all tidal waters and wetlands, with this area expanding beyond 1,000-feet in areas where sensitive resources are present such as steep slopes or soils limited to development. To determine the Critical Area, ECS would locate the level of mean high water or the edge of tidal wetlands and streams, and extend the boundary 1,000-feet landward of those features.

3.0 FINDINGS

3.1 Desktop Review

The NWI map for Anne Arundel County, Maryland (Appendix IV) depicted several wetlands within the project study area, including palustrine forested and estuarine emergent wetlands. The USGS map (Appendix II) shows that the project site drains to Spa Creek, located within the Severn River watershed and identified as Hydrologic Unit Code (HUC) 02060004010. Elevations within the project site range from approximately 2 feet above mean sea level (MSL) in the southeastern portion of the property to approximately 42 feet above MSL in the northwestern portion.

3.2 Site Soils

A review of the Soil Survey for Anne Arundel County, Maryland identified five mapping units within the project site (Appendix III). These soil mapping units are: AuB – Annapolis-Urban land complex, 0 to 5 percent slopes, AuD – Annapolis-Urban land complex, 5 to 15 percent

slopes, MZA – Mispillion and Transquaking soils, 0 to 1 percent slopes, tidally flooded, UxB – Udorthents, loamy, sulfidic substratum, 0 to 5 percent slopes, and WBA – Widewater and Issue soils, 0 to 2 percent slopes, frequently flooded. Units MZA and WBA are classified as hydric by the NRCS.

3.3 Waters of the U.S.

In ECS’ opinion, jurisdictional WOUS are present within the 935 Spa Road study area. These WOUS include a perennial reach of Spa Creek located in the southern and southwestern portions of the study area, as well as one EFO wetland located in the southeastern portion of the study area and one PFO wetland located in the southwestern portion of the study area. The EFO wetland extends off-site to the southeast. Their size and USFWS Cowardin classifications are summarized below (Table 1), and their locations are illustrated on the Waters of the U.S. Delineation Map (Appendix X).

**TABLE 1
 WATERS OF THE U.S. SUMMARY**

WOUS Name	Cowardin Classification	On-site Square Footage	On-site Acreage	On-site Linear Feet of Stream
Wetland	EFO*	1,261	0.03	N/A
Wetland	PFO**	3,169	0.07	N/A
Stream	R3***	8,108	0.19	624
Total		12,538	0.29	624

*EFO – Estuarine Forested Wetland
 **PFO – Palustrine Forested Wetland
 ***R3 – Riverine Perennial

3.4 Chesapeake Bay Critical Areas and Non-Tidal Wetland Buffers

A Chesapeake Bay Critical Area is believed to be present on the majority of this study area (Appendix VII). Similarly, the City of Annapolis and MDE regulations will result in a 100-foot non-tidal stream buffer adjacent to the jurisdictional non-tidal perennial portion of Spa Creek located in the southern and southwestern portions of the study area, as well as where Spa Creek flows into the tidal estuarine forested wetland in the southeastern tip of the study area. A 25-foot non-tidal wetland buffer will also exist off the PFO wetland boundary in the southwestern portion of the study area. These buffers are shown on the Waters of the U.S. Delineation Map (Appendix X).

4.0 REGULATORY DISCUSSION

Upon your request, we will contact the USACE to schedule a field meeting to conduct a Waters of the U.S. boundary confirmation and jurisdictional determination. This process takes up to six months depending on the availability of USACE personnel. After the boundaries of the wetlands and Waters have been confirmed by the USACE, we suggest that the areas be surveyed for future planning purposes and then submitted to the USACE as a final record. If any potential impacts are proposed, we can assist you with permitting options and support to complete the process. In the interim, we recommend further review of state and federal agency records pertaining to Section 7 (Federal Endangered Species Act) and Section 106 (National Historic Preservation Act). These reviews will generally be required to verify compliance for either the Nationwide Permit (NWP) or General Permit conditions.

The USACE-Baltimore District and the Maryland Department of the Environmental (MDE) have implemented the Maryland State Programmatic General Permit-4 (MDSPGP-4) program to streamline the permit process and avoid duplication of agency review. All SPGP permit applications are reviewed by the USACE but the permit authorization comes solely from MDE. Notification of potential impacts should be filed with MDE by completing the SPGP Application, and submitting it to the MDE Watershed Management Administration. Upon receipt, the MDE distributes the SPGP to the other resource agencies (USACE, MDE Tidal/Non-tidal Wetlands Division, and others) for review and comment. Generally, the programmatic general permit applies to the discharge of dredged or fill material and/or the placement of structures, that are components of a single and complete project, including all attendant features both temporary and/or permanent, which individually and/or cumulatively result in direct or indirect impacts not to exceed 1.0 acre (43,560 square feet) of Waters of the United States, including jurisdictional wetlands, and/or 2,000 linear feet of streams, for specific categories of activities as regulated by Section 404 of the CWA and/or Section 10 of the Rivers and Harbors Act of 1899. Authorization under the MDSPGP-4 requires compliance with all of the terms and conditions of the MDSPGP-4 and that the activities authorized have only minimal individual and cumulative adverse effects on the environment. All individual impacts for an overall project will be added cumulatively to determine eligibility for authorization under the MDSPGP-4.

Compensatory mitigation for unavoidable impacts to non-tidal Waters and wetlands will generally be provided at a ratio of 2:1 for forested wetlands, 2:1 for scrub/shrub wetlands, and 1:1 for emergent wetlands. Mitigation can include: the purchase or use of mitigation bank credits; wetland preservation; preservation of upland buffers; and, in-lieu-fee contribution to the MDE Non-tidal Wetlands Compensation Fund (FUND).

5.0 CONCLUSIONS

Two potentially jurisdictional wetlands totaling 0.10 acres were identified and delineated within the 935 Spa Road study area. One potentially jurisdictional stream totaling 624 linear feet was also identified on the study area. The locations and boundaries of jurisdictional Waters are illustrated on the attached Waters of the U.S. Delineation Map (Appendix X).

The flagged WOUS boundaries are subject to change during the jurisdictional determination meeting with the USACE. ECS cannot guarantee that field conditions and/or WOUS boundaries will not change over time.

If you have any questions, please feel free to contact us at any time at 703.471.8400.

ECS MID-ATLANTIC, LLC



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Principal, Environmental Services
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APPENDICES

- Appendix I – Site Location Map
- Appendix II – U.S. Geological Survey Topographic Map
- Appendix III – NRCS Soil Survey
- Appendix IV – National Wetlands Inventory (NWI) Map
- Appendix V – FEMA Floodplain Map
- Appendix VI – Maryland Department of the Environment Critical Area Map
- Appendix VII – Color Aerial Image
- Appendix VIII – Wetland Data Sheets
- Appendix IX – Photolog
- Appendix X – Waters of the U.S. Delineation Map

APPENDIX I
SITE LOCATION MAP

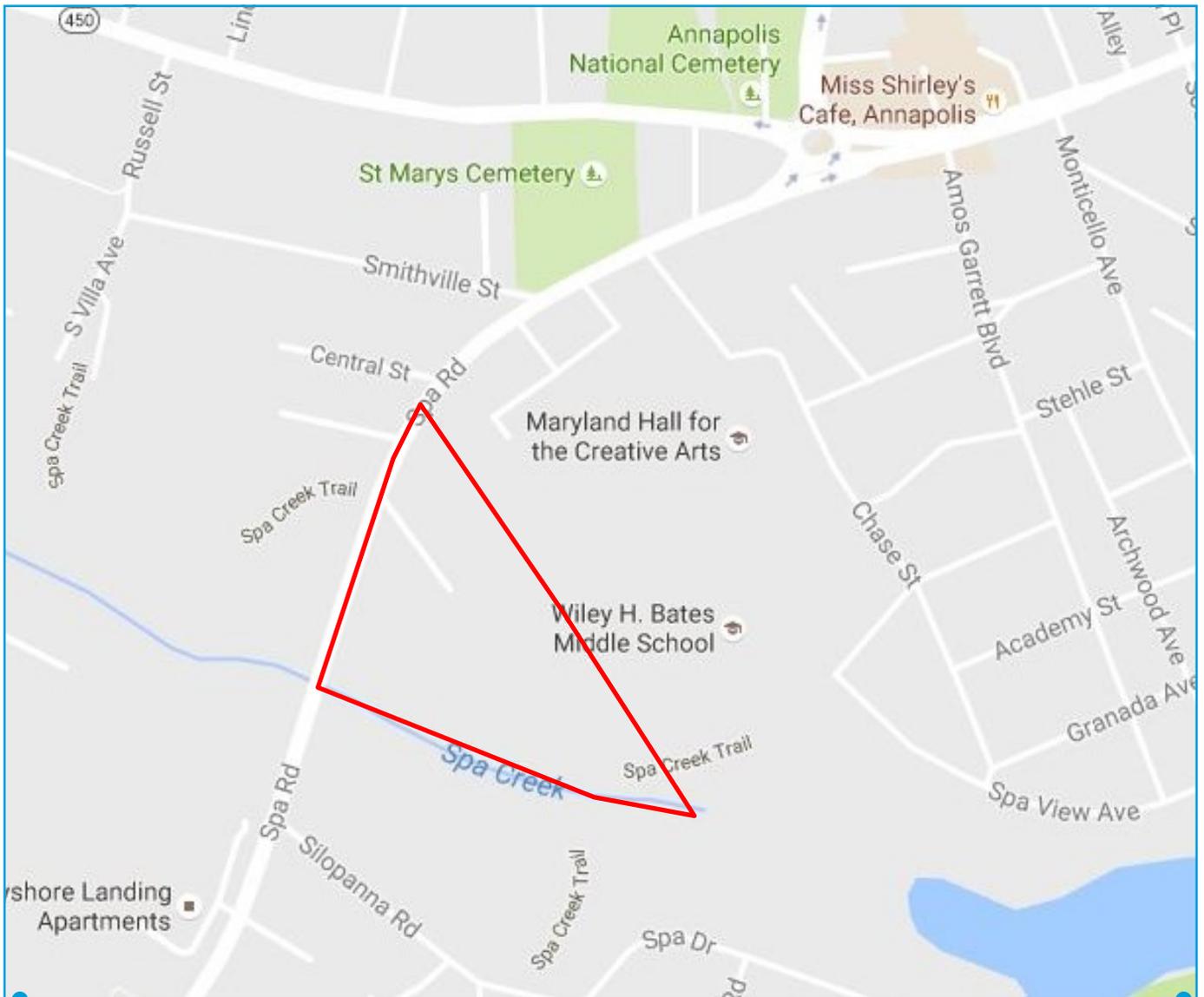
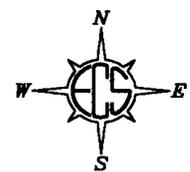


FIGURE I: SITE LOCATION MAP
PROJECT #47:2465 — 935 SPA ROAD
CITY OF ANNAPOLIS, MARYLAND



NOT TO SCALE

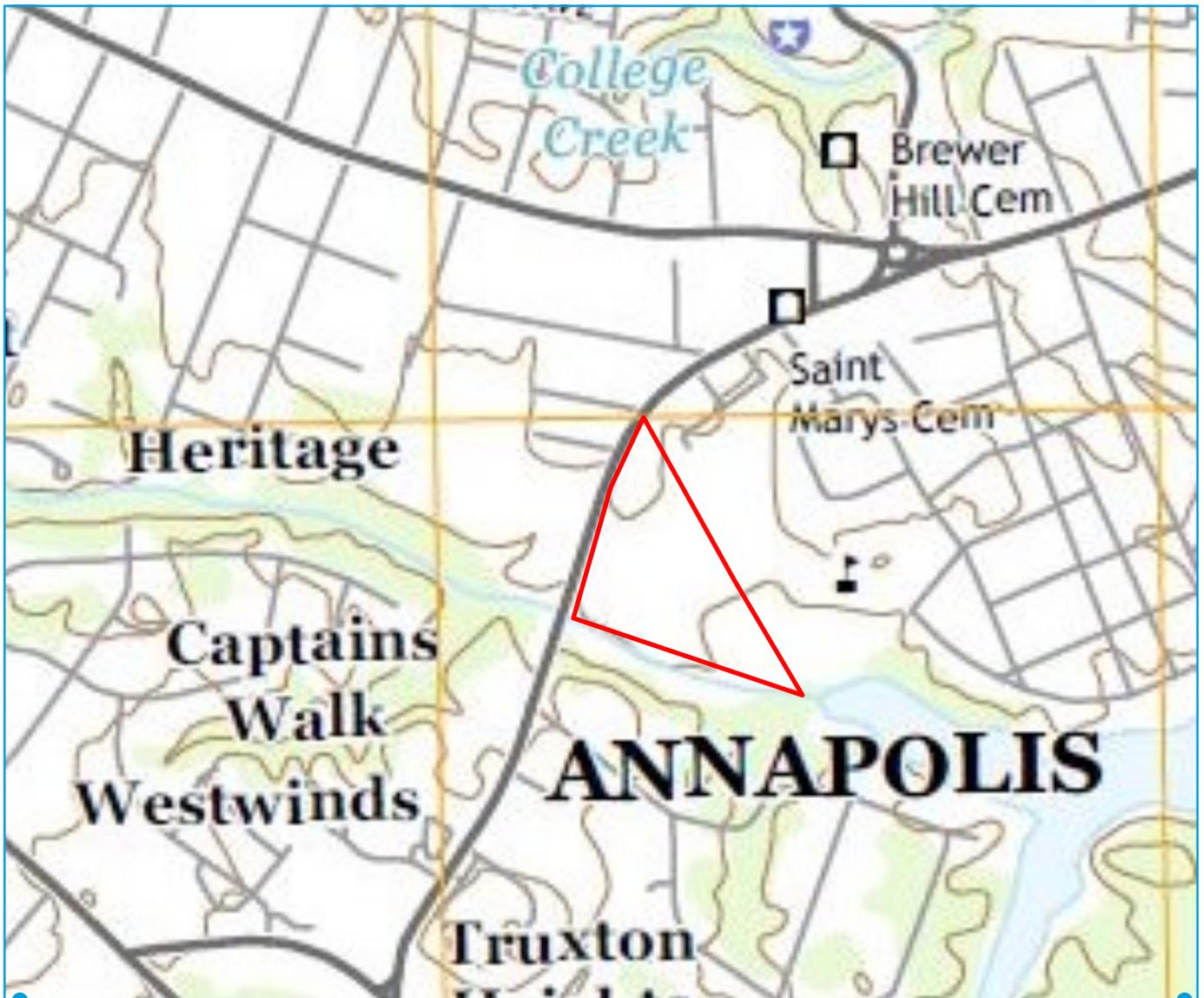
WETLAND DELINEATION REPORT
FOR: MCCRONE ENGINEERING
AUGUST 2016
SOURCE: GOOGLE MAPS

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CHANTILLY, VA 20151
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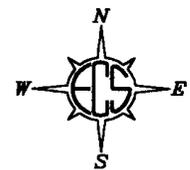


APPENDIX II

U.S. GEOLOGICAL SURVEY TOPOGRAPHIC MAP



**FIGURE II: USGS TOPOGRAPHIC MAP
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CITY OF ANNAPOLIS, MARYLAND**



NOT TO SCALE

WETLAND DELINEATION REPORT
FOR: MCCRONE ENGINEERING
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SOURCE: THE USGS STORE

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APPENDIX III
NRCS SOIL SURVEY

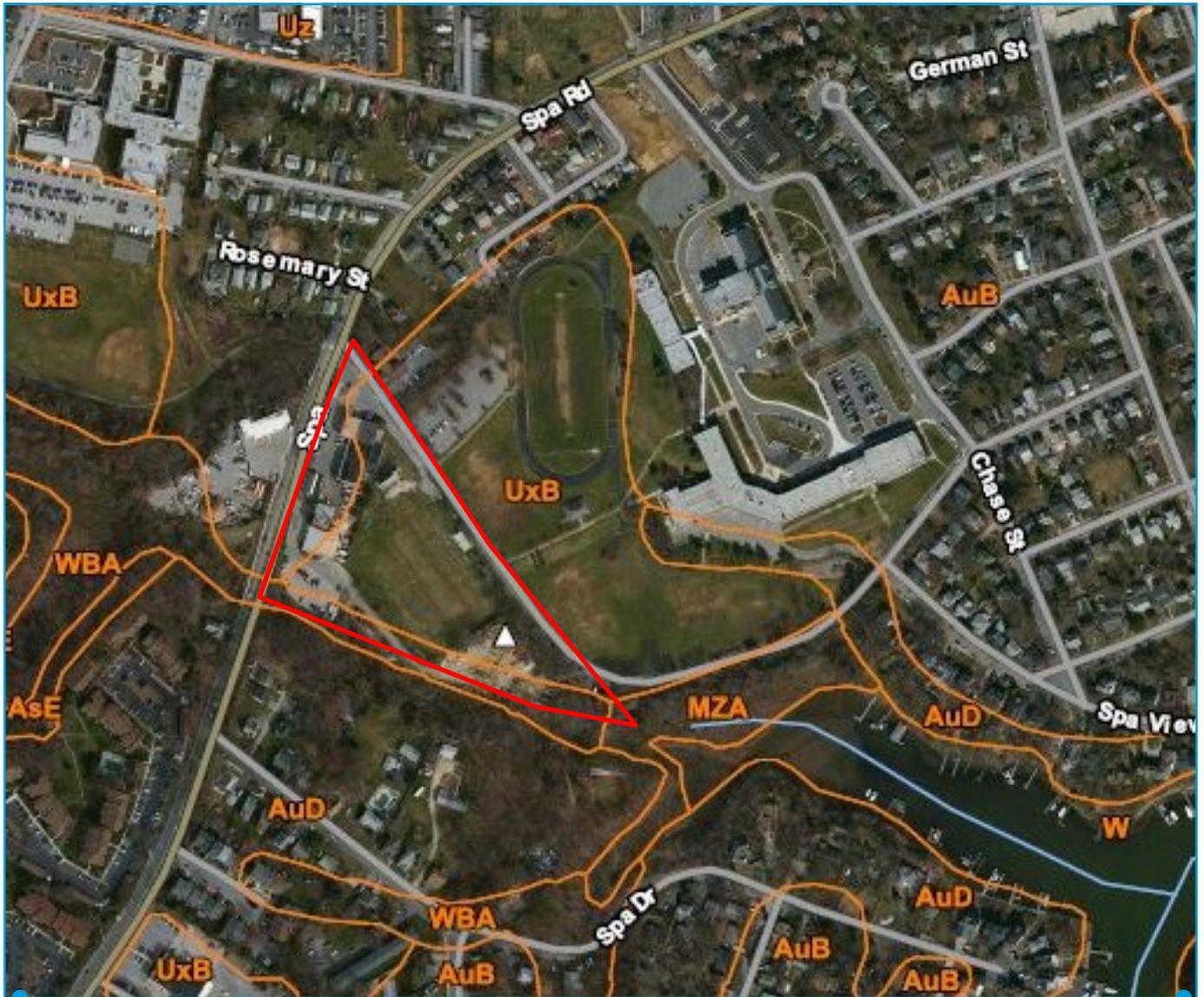
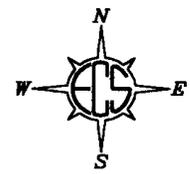


FIGURE III: USDA SOILS MAP
PROJECT #47:2465 — 935 SPA ROAD
CITY OF ANNAPOLIS, MARYLAND



NOT TO SCALE

WETLAND DELINEATION REPORT
 FOR: MCCRONE ENGINEERING
 AUGUST 2016
 SOURCE: NRCS WEB SOIL SURVEY

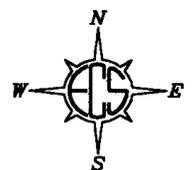
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 703-471-8400



APPENDIX IV
NATIONAL WETLANDS INVENTORY (NWI) MAP



**FIGURE IV: NATIONAL WETLANDS INVENTORY MAP
PROJECT #47:2465 — 935 SPA ROAD
CITY OF ANNAPOLIS, MARYLAND**



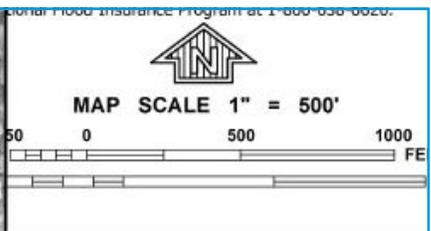
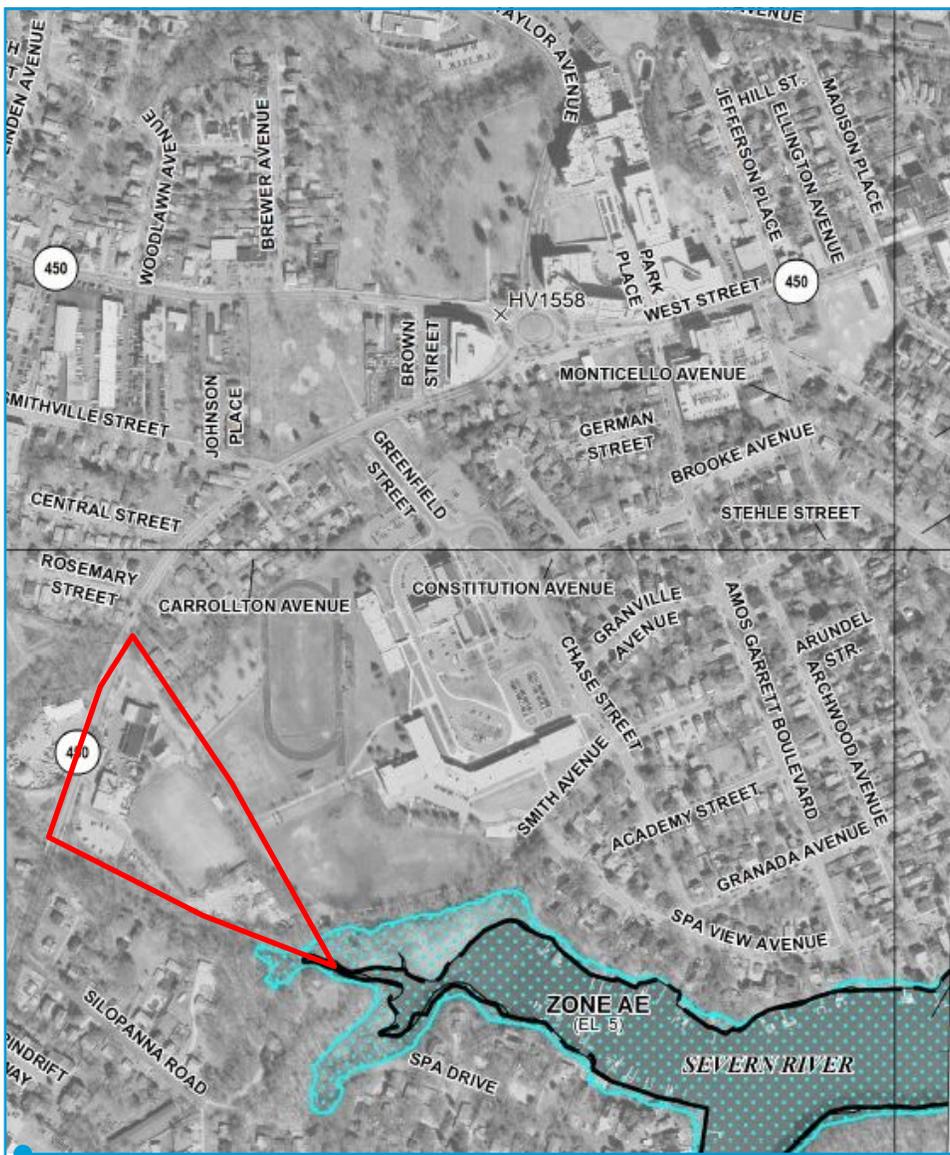
NOT TO SCALE

WETLAND DELINEATION REPORT
FOR: MCCRONE ENGINEERING
AUGUST 2016
SOURCE: USFWS WETLANDS MAPPER

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APPENDIX V
FEMA FLOODPLAIN MAP



NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0232F

FIRM
 FLOOD INSURANCE RATE MA

ANNE ARUNDEL COUNTY,
 MARYLAND
 AND INCORPORATED AREAS

PANEL 232 OF 385

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ANNAPOLIS, CITY OF	240009	0232	F
ANNE ARUNDEL COUNTY	240008	0232	F

Notice to User: The Map Number shown below should be used when placing map orders; the Community Name shown above should be used on insurance applications for subject community.

MAP NUMBER
 24003C0232

MAP REVISED
 FEBRUARY 18, 2011

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. This map does not reflect changes or amendments which may have been made subsequent to the date of this title block. For the latest product information about National Flood Program flood maps check the FEMA Flood Map Store at www.fema.gov

**FIGURE V: FEMA FLOODPLAIN MAP
 PROJECT #47:2465 — 935 SPA ROAD
 CITY OF ANNAPOLIS, MARYLAND**



WETLAND DELINEATION REPORT
 FOR: MCCRONE ENGINEERING
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 SOURCE: FEMA

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APPENDIX VI

MARYLAND DEPARTMENT OF THE ENVIRONMENT CRITICAL AREA MAP

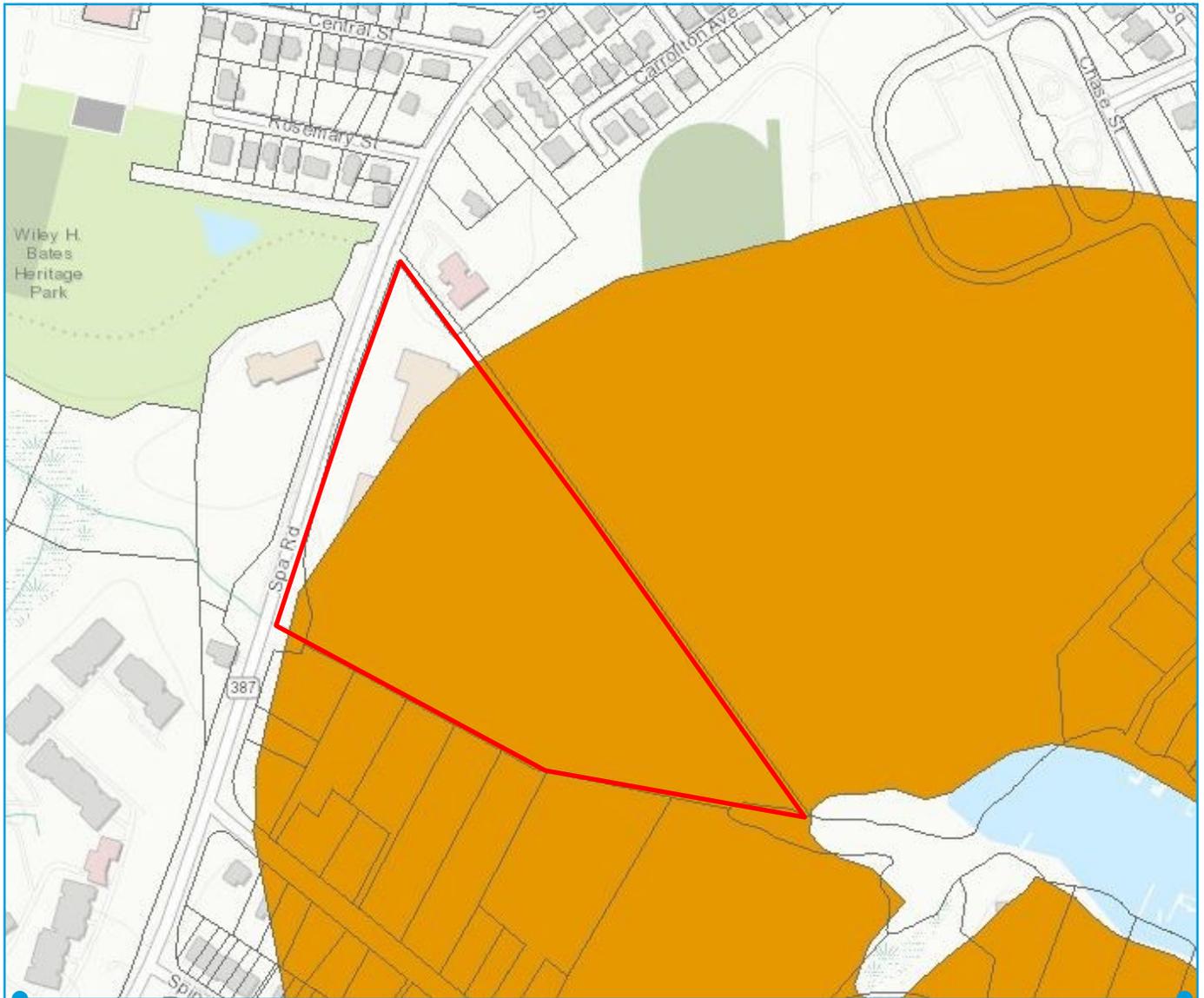
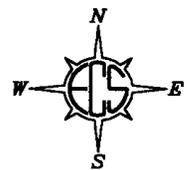


FIGURE VI: CRITICAL AREA MAP
PROJECT #47:2465 — 935 SPA ROAD
CITY OF ANNAPOLIS, MARYLAND



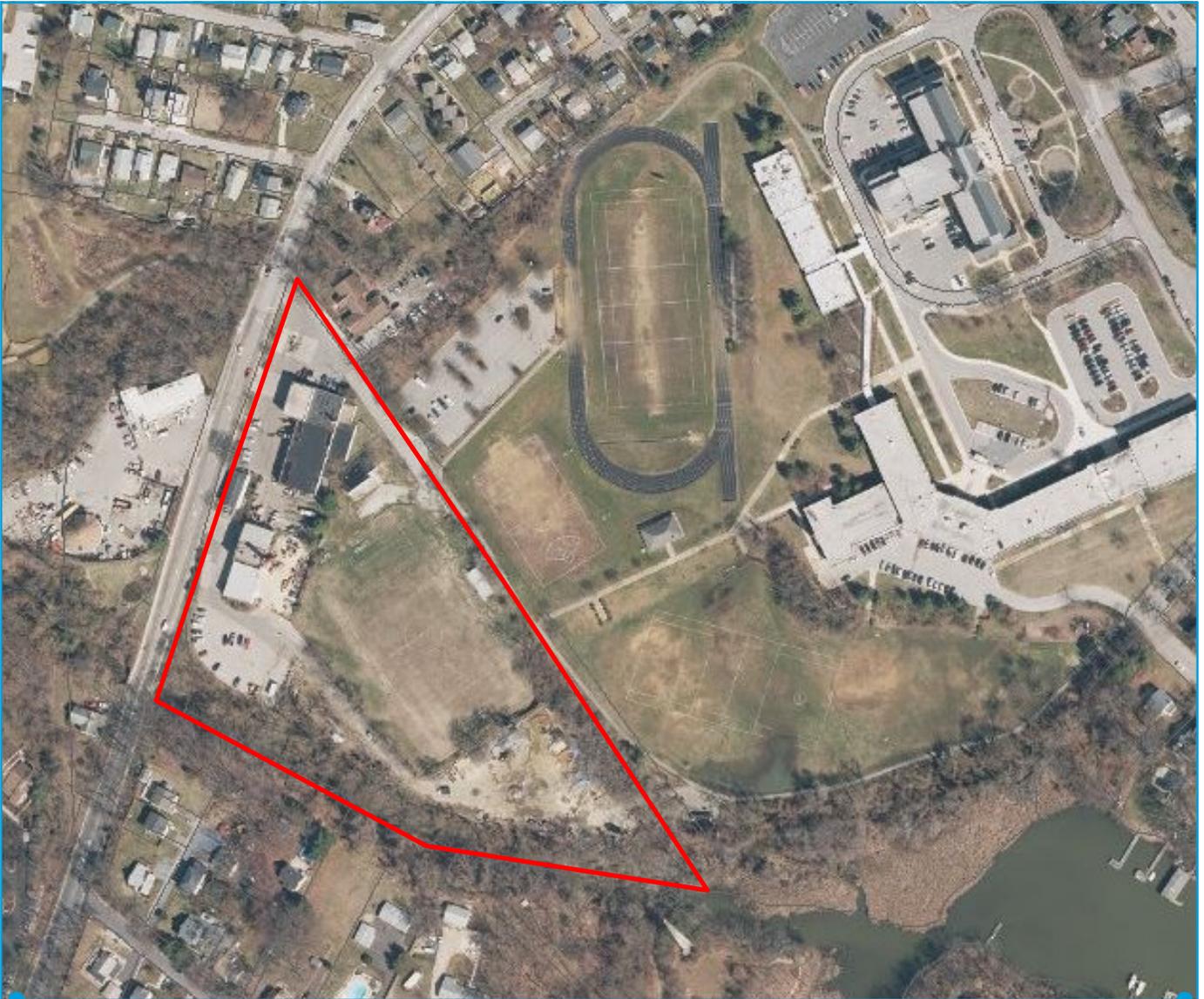
NOT TO SCALE

WETLAND DELINEATION REPORT
FOR: MCCRONE ENGINEERING
AUGUST 2016
SOURCE: MERLIN ONLINE

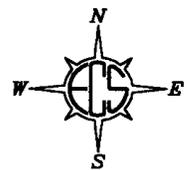
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APPENDIX VII
COLOR AERIAL IMAGE



**FIGURE VII: COLOR AERIAL IMAGE
PROJECT #47:2465 — 935 SPA ROAD
CITY OF ANNAPOLIS, MARYLAND**



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WETLAND DELINEATION REPORT
FOR: MCCRONE ENGINEERING
AUGUST 2016
SOURCE: MERLIN ONLINE

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APPENDIX VIII
WETLAND DATA SHEETS

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: 935 Spa Road City/County: City of Annapolis Sampling Date: Jul 26, 2016
 Applicant/Owner: McCrone Engineering State: Maryland Sampling Point: 1
 Investigator(s): MSK Section, Township, Range: N/A
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): concave Slope (%): 0-1
 Subregion (LRR or MLRA): LRR S (MLRA 149A) Lat: 38°58'20.7" N Long: 76°30'30.1" W Datum: N/A
 Soil Map Unit Name: MZA - Mispillion and Transquaking soils NWI Classification: N/A
 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 <u> X </u> No <u> </u> Hydric Soil Present? Yes <u> X </u> No <u> </u> Wetland Hydrology Present? Yes <u> X </u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u> X </u> No <u> </u>
Remarks: All three wetland parameters have been met at this Data Point location, which characterizes the estuarine forested wetland southeast of the study area.	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input checked="" type="checkbox"/> Saturation (A3) <input checked="" type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Water Marks (B1) <input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input checked="" type="checkbox"/> Sediment Deposits (B2) <input checked="" type="checkbox"/> Presence of Reduced Iron (C4) <input checked="" type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input checked="" type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input checked="" type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6) <input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input checked="" type="checkbox"/> Drainage Patterns (B10) <input checked="" type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input checked="" type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
Field Observations: Surface Water Present? Yes <u> X </u> No <u> </u> Depth (inches): <u> 1" </u> Water Table Present? Yes <u> X </u> No <u> </u> Depth (inches): <u> 3" </u> Saturation Present? Yes <u> X </u> No <u> </u> Depth (inches): <u> 3" </u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u> X </u> No <u> </u>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

VEGETATION (Four Strata) - Use scientific names of plants.

Sampling Point 1

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30</u>)				
1. <u>Acer rubrum (Red maple)</u>	<u>40</u>	<u>Y</u>	<u>FAC</u>	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>7</u> (A) Total Number of Dominant Species Across All Strata: <u>7</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
2. <u>Liquidambar styraciflua (Sweet-gum)</u>	<u>40</u>	<u>Y</u>	<u>FACW</u>	
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
80 = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: _____ OBL species _____ x 1 = _____ FACW species _____ X 2 = _____ FAC species _____ X 3 = _____ FACU species _____ X 4 = _____ UPL species _____ X 5 = _____ Column Totals: _____ (A) _____ (B)
50 % of total cover: <u>40</u>	20 % of total cover: <u>16</u>			
Sapling/Shrub Stratum (Plot size: <u>30</u>)				
1. <u>Acer rubrum (Red maple)</u>	<u>30</u>	<u>Y</u>	<u>FAC</u>	Hydrophytic Vegetation Indicators: ___ 1 – Rapid Test for Hydrophytic Vegetation <u>X</u> 2 – Dominance Test is > 50% ___ 3 – Prevalence Test is ≤ 3.0 ¹ ___ Problematic Hydrophytic Vegetation ¹ (Explain)
2. <u>Ulmus americana (American elm)</u>	<u>25</u>	<u>Y</u>	<u>FACW</u>	
3. <u>Viburnum nudum (Possumhaw)</u>	<u>20</u>	<u>Y</u>	<u>FACW</u>	
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
75 = Total Cover				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. Definitions of 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. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height. Woody vine – All woody vines, regardless of height.
5 <u>37.5</u>	20 % of total cover: <u>15</u>			
Herb Stratum (Plot size: <u>30</u>)				
1. <u>Phragmites australis (Common reed)</u>	<u>20</u>	<u>Y</u>	<u>FACW</u>	Hydrophytic Vegetation Present? Yes <u>X</u> No _____
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
12. _____				
20 = Total Cover				
50 % of total cover: <u>10</u>	20 % of total cover: <u>4</u>			
Woody Vine Stratum (Plot size: <u>30</u>)				
1. <u>Vitis rotundifolia (Muscadine)</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>	
2. _____				
3. _____				
4. _____				
5. _____				
10 = Total Cover				
50 % of total cover: <u>5</u>	20 % of total cover: <u>2</u>			

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

SOIL

Sampling Point: 1

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-8	2.5Y2.5/1	70	2.5YR4/4	30	C	PL/M	Sandy Clay	Oxidized rhizospheres
8-18	2.5y3/2	80	5yr4/4	20	C	M	Sandy Clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- 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)
- Loamy Gleyed Matrix (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 Loamy Soils (F20) (MLRA 149A, 153C, 153D)

Indicators for Problematic Hydric Soils³:

- 1 cm Muck (A9) (LRR O)
- 2 cm Muck (A10) (LRR S)
- Reduced Vertic (F18) (outside MLRA 150A,B)
- Piedmont Floodplain Soils (F19) (LRR P, S, T)
- Anomalous Bright Loamy Soils (F20) (MLRA 153B)
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: 935 Spa Road City/County: City of Annapolis Sampling Date: Jul 20, 2016

Applicant/Owner: McCrone Engineering State: Maryland Sampling Point: 2

Investigator(s): MSK Section, Township, Range: N/A

Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): none Slope (%): 0-1

Subregion (LRR or MLRA): LRR S (MLRA 149A) Lat: 38°58'20.7" N Long: 76°30'30.1" W Datum: N/A

Soil Map Unit Name: MZA - Mispillion and Transquaking soils NWI Classification: N/A

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 <u> X </u> No <u> </u> Hydric Soil Present? Yes <u> X </u> No <u> </u> Wetland Hydrology Present? Yes <u> </u> No <u> X </u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u> X </u>
Remarks: Only two of the three wetland parameters have been met at this Data Point location, which characterizes the non-wetland forested area southeast of the study area.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)	<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
--	--

Field Observations: Surface Water Present? Yes <u> </u> No <u> X </u> Depth (inches): <u> </u> Water Table Present? Yes <u> </u> No <u> X </u> Depth (inches): <u> </u> Saturation Present? Yes <u> </u> No <u> X </u> Depth (inches): <u> </u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u> </u> No <u> X </u>
--	---

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

Remarks:

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: <u>30</u>)			
1. <u>Acer rubrum (Red maple)</u>	<u>30</u>	<u>Y</u>	<u>FAC</u>
2. <u>Ulmus americana (American elm)</u>	<u>15</u>	<u>Y</u>	<u>FACW</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
	<u>45</u> = Total Cover		
50 % of total cover: <u>22.5</u>		20 % of total cover: <u>9</u>	
Sapling/Shrub Stratum (Plot size: <u>30</u>)			
1. <u>Ulmus americana (American elm)</u>	<u>10</u>	<u>Y</u>	<u>FACW</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
	<u>10</u> = Total Cover		
30		5	20 % of total cover: <u>2</u>
Herb Stratum (Plot size: _____)			
1. <u>Hedera helix (English ivy)</u>	<u>80</u>	<u>Y</u>	<u>UPL</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
	<u>80</u> = Total Cover		
50 % of total cover: <u>40</u>		20 % of total cover: <u>16</u>	
Woody Vine Stratum (Plot size: <u>30</u>)			
1. <u>Lonicera japonica (Japanese honeysuckle)</u>	<u>30</u>	<u>Y</u>	<u>FACU</u>
2. <u>Toxicodendron radicans (Eastern poison ivy)</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>
3. <u>Celastrus orbiculatus (Asian bittersweet)</u>	<u>15</u>	<u>Y</u>	<u>UPL</u>
4. <u>Vitis rotundifolia (Muscadine)</u>	<u>10</u>	_____	<u>FAC</u>
5. _____	_____	_____	_____
	<u>75</u> = Total Cover		
50 % of total cover: <u>37.5</u>		20 % of total cover: <u>15</u>	

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 57.1 (A/B)

Prevalence Index worksheet:

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

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

 1 – Rapid Test for Hydrophytic Vegetation

X 2 – Dominance Test is > 50%

 3 – Prevalence Test is ≤ 3.0¹

 Problematic Hydrophytic Vegetation¹ (Explain)

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

Definitions of 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. Includes 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: (Include photo numbers here or on a separate sheet.)

WETLAND DETERMINATION DATA FORM – Atlantic and Gulf Coastal Plain Region

Project/Site: 935 Spa Road City/County: City of Annapolis Sampling Date: Jul 20, 2016
 Applicant/Owner: McCrone Engineering State: Maryland Sampling Point: 3
 Investigator(s): MSK Section, Township, Range: N/A
 Landform (hillslope, terrace, etc.) Depression Local relief (concave, convex, none): concave Slope (%): 0-5
 Subregion (LRR or MLRA): LRR S (MLRA 149A) Lat: 38°58'20.7" N Long: 76°30'30.1" W Datum: N/A
 Soil Map Unit Name: UxB - Udorthents NWI Classification: N/A
 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 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 <u> X </u> No <u> </u> Hydric Soil Present? Yes <u> </u> No <u> X </u> Wetland Hydrology Present? Yes <u> X </u> No <u> </u>	Is the Sampled Area within a Wetland? Yes <u> </u> No <u> X </u>
Remarks: Only two of the three wetland parameters have been met at this Data Point location, characterizing the upland field east of the study area. Although this area exhibits some wetland characteristics, it appears to be highly disturbed. The land appears to have been graded to make an athletic field, as well as for the paved trail around the field. This trail appears to be inhibiting overland drainage, causing water to pool around the outer extents of the vegetated area where the field abuts the paved trail. As a result of the athletic field, the vegetation is mowed and maintained.	

HYDROLOGY

Wetland Hydrology Indicators: <u> X </u> Primary Indicators (minimum of one is required; check all that apply)	Secondary Indicators (minimum of two required)
<input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> Aquatic Fauna (B13) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Marl Deposits (B15) (LRR U) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> FAC-Neutral Test (D5) <input type="checkbox"/> Sphagnum moss (D8) (LRR T, U)
Field Observations: Surface Water Present? Yes <u> X </u> No <u> </u> Depth (inches): <u> 2 "</u> Water Table Present? Yes <u> </u> No <u> X </u> Depth (inches): <u> </u> Saturation Present? Yes <u> </u> No <u> X </u> Depth (inches): <u> </u> (includes capillary fringe)	Wetland Hydrology Present? Yes <u> X </u> No <u> </u>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: _____)				Dominance Test worksheet:
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>1</u> (B)
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
	<u>0</u> = Total Cover			Prevalence Index worksheet:
50 % of total cover: <u>0</u>	20 % of total cover: <u>0</u>			Total % Cover of: _____ Multiply by: _____
				OBL species _____ x 1 = _____
				FACW species _____ X 2 = _____
				FAC species _____ X 3 = _____
				FACU species _____ X 4 = _____
				UPL species _____ X 5 = _____
				Column Totals: _____ (A) _____ (B)
				Prevalence Index = B/A = _____
Sapling/Shrub Stratum (Plot size: _____)				Hydrophytic Vegetation Indicators:
1. _____	_____	_____	_____	<u> </u> 1 – Rapid Test for Hydrophytic Vegetation
2. _____	_____	_____	_____	<u>X</u> 2 – Dominance Test is > 50%
3. _____	_____	_____	_____	<u> </u> 3 – Prevalence Test is ≤ 3.0 ¹
4. _____	_____	_____	_____	<u> </u> Problematic Hydrophytic Vegetation ¹ (Explain)
5. _____	_____	_____	_____	¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
6. _____	_____	_____	_____	Definitions of Vegetation Strata:
7. _____	_____	_____	_____	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).
8. _____	_____	_____	_____	Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.
9. _____	_____	_____	_____	Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.
10. _____	_____	_____	_____	Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3 ft (1 m) in height.
11. _____	_____	_____	_____	Woody vine – All woody vines, regardless of height.
12. _____	_____	_____	_____	
	<u>0</u> = Total Cover			Hydrophytic Vegetation Present?
30 % of total cover: <u>0</u>	20 % of total cover: <u>0</u>			Yes <u>X</u> No _____
Herb Stratum (Plot size: _____)				
1. <u>Juncus tenuis</u> (Lesser poverty rush)	100	Y	FAC	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
12. _____	_____	_____	_____	
	<u>100</u> = Total Cover			
50 % of total cover: <u>50</u>	20 % of total cover: <u>20</u>			
Woody Vine Stratum (Plot size: _____)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
	<u>0</u> = Total Cover			
50 % of total cover: <u>0</u>	20 % of total cover: <u>0</u>			

Remarks: (Include photo numbers here or on a separate sheet.)
 No tree, sapling/shrub, or vine stratum present at this Data Point location.

SOIL

Sampling Point: 3

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2	10YR4/4	100			N/A	N/A	Sandy Clay	
2-14	10YR3/4	100			N/A	N/A	Silty Clay	
14-18	10YR3/4	90	7.5YR4/6	10	C	M	Silty Clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- 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)**
- Loamy Gleyed Matrix (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 Loamy Soils (F20) **(MLRA 149A, 153C, 153D)**

Indicators for Problematic Hydric Soils³:

- 1 cm Muck (A9) **(LRR O)**
- 2 cm Muck (A10) **(LRR S)**
- Reduced Vertic (F18) **(outside MLRA 150A,B)**
- Piedmont Floodplain Soils (F19) **(LRR P, S, T)**
- Anomalous Bright Loamy Soils (F20) **(MLRA 153B)**
- Red Parent Material (TF2)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

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

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

APPENDIX IX

PHOTOLOG



Photograph 1: Looking southeast at the estuarine forested (EFO) wetland, southeast of the study area.



Photograph 2: Looking northeast along the boundary of the EFO wetland, southeast of the study area.



Photograph 3: Looking southeast at Data Point 1, which characterizes the EFO wetland southeast of the study area.



Photograph 4: Looking north at a culvert outlet southeast of the study area. This culvert appears to be the drainage outfall for the athletic fields present on the study area.



Photograph 5: Looking north at Data Point 2, which characterizes the non-wetland forest southeast of the study area.



Photograph 6: Looking southeast (downstream) at Spa Creek, located on the southern portion of the study area.



Photograph 7: Looking northwest (upstream) at Spa Creek.



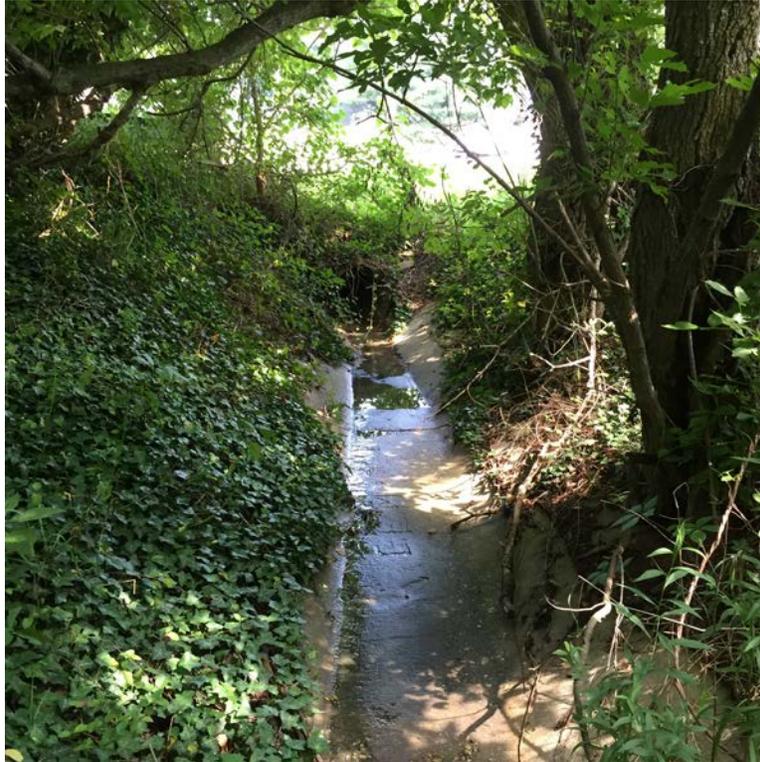
Photograph 8: Looking southeast (downstream) at Spa Creek, located on the southwestern portion of the study area.



Photograph 9: Looking northwest (upstream) at Spa Creek.



Photograph 10: Looking southeast (downslope) at the non-jurisdictional stormwater drainage located in the southwestern portion of the study area (subject to USACE concurrence).



Photograph 11: Looking northwest (upslope) at the non-jurisdictional stormwater drainage located in the southwestern portion of the study area (subject to USACE concurrence).



Photograph 12: Looking northwest at the non-jurisdictional drainage swale located in the southeastern portion of the study area. This drainage swale appears to outlet at the culvert pictured in Photograph 4.



Photograph 13: Looking northwest at Data Point 3, which characterizes the upland field just east of the study area. Although this area exhibits some wetland characteristics, it appears to be highly disturbed. The land appears to have been graded to make an athletic field, as well as for the paved trail around the field. This trail appears to be inhibiting overland drainage, causing water to pool around the outer extents of the vegetated area where the field abuts the paved trail. As a result of the athletic field, the vegetation is mowed and maintained.



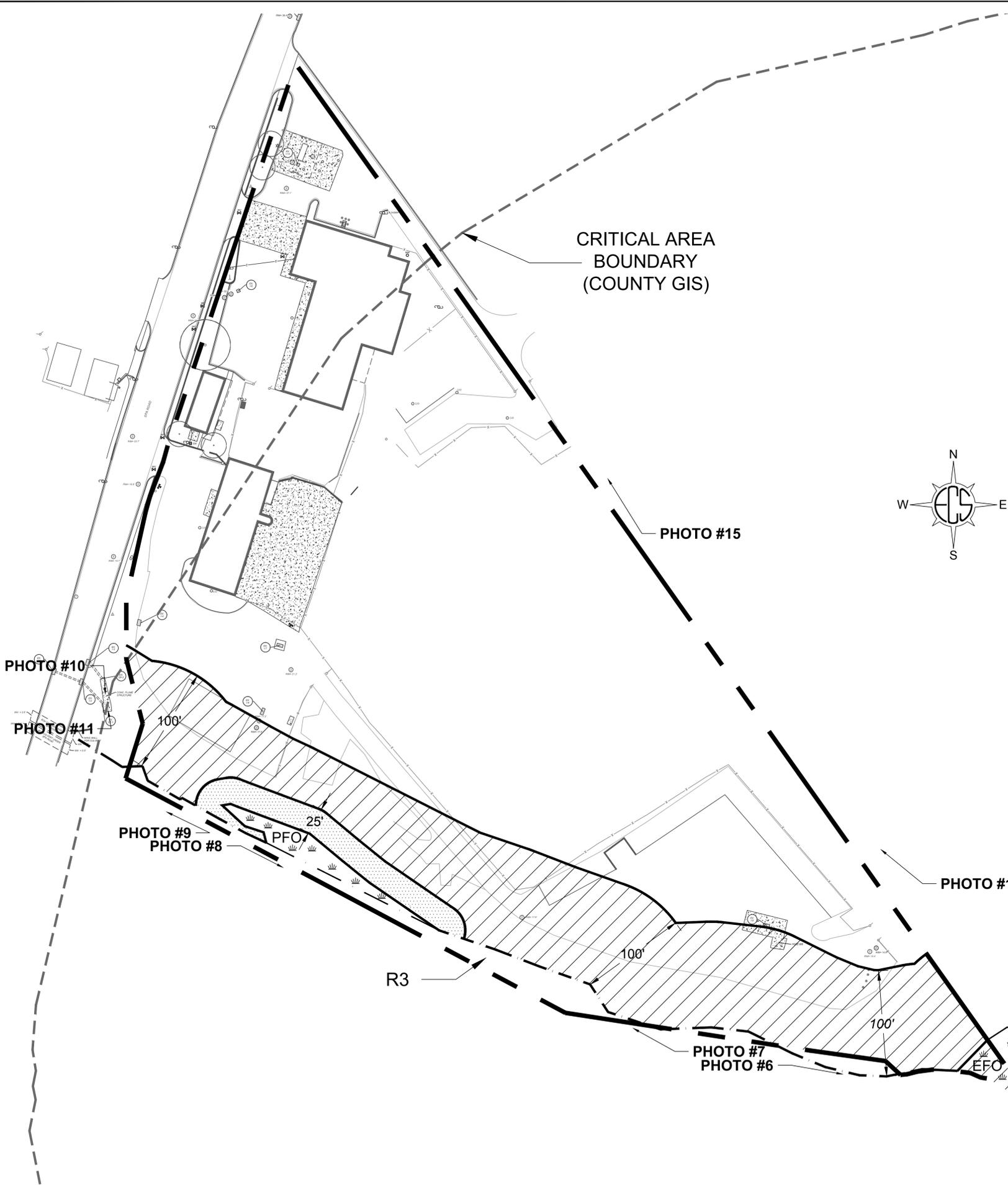
Photograph 14: Looking north at the maintained athletic field located along the eastern boundary of the study area.



Photograph 15: Looking northwest at the maintained athletic field located along the northeastern boundary of the study area. The majority of the study area is composed of maintained, athletic facilities, paved parking area, and buildings.

APPENDIX X

WATERS OF THE U.S. DELINEATION MAP



LEGEND

- PROJECT STUDY AREA
- PERENNIAL STREAM CHANNEL
- JURISDICTIONAL WETLAND
- APPROXIMATE JURISDICTIONAL WETLAND
- APPROXIMATE DATAPPOINT LOCATION
- APPROXIMATE 25' WETLAND BUFFER
- APPROXIMATE 100' STREAM BUFFER
- CRITICAL AREA BOUNDARY (ANNE ARUNDEL COUNTY GIS)

**TABLE 1
WATERS OF THE U.S. SUMMARY**

WOUS Name	Cowardin Classification	On-site Square Footage	On-site Acreage	On-site Linear Feet of Stream
Wetland	EFO*	1,261	0.03	N/A
Wetland	PFO**	3,169	0.07	N/A
Stream	R3***	8,108	0.19	624
Total		12,538	0.29	624

*EFO - Estuarine Forested Wetland
 **PFO - Palustrine Forested Wetland
 ***R3 - Riverine Perennial

CELEBRATING
 OVER 25 YEARS
 OF EXCELLENCE



**935 SPA ROAD
 ANNAPOLIS DPW
 CITY OF ANNAPOLIS, MARYLAND**

**WATERS OF THE U.S.
 DELINEATION MAP
 MCCRONE ENGINEERING**

ECS REVISIONS
 08-08-2016

ENGINEER AMM	DRAFTING MSK
SCALE 1" = 50'	

PROJECT NO.
47:2465

SHEET
1 OF 1

DATE
08-02-2016

*SETTING THE STANDARD FOR SERVICE™

8/8/2016

C:\projects\472465\Annapolis DPW - Spa Road Waters of the U.S. Delineation Map.dwg