



ISO 9001:2008 CERTIFIED

ENGINEERS • PLANNERS • SCIENTISTS • CONSTRUCTION MANAGERS

936 Ridgebrook Road • Sparks, MD 21152 • Phone 410-316-7800 • Fax 410-316-7885

August 23, 2018

Mr. Michael Rothenheber, PE, AICP
Johnson, Mirmiran & Thompson, Inc.
40 Wight Avenue
Hunt Valley, MD 21030

RE: Raphel Road Bridge Replacement
Kingsville, Baltimore County, Maryland

SUB: Wetland Assessment & Delineation Letter Report

Dear Mr. Rothenheber:

The Maryland Transportation Authority (MDTA) is proposing the replacement of the Raphel Road Overpass in Kingsville, Baltimore County, Maryland. As part of this effort, KCI Technologies, Inc. (KCI) conducted a wetland investigation to determine the presence of wetlands and other “waters of the United States” (WUS) systems within the study area. Resources throughout the study area were identified and delineated in accordance with the methodologies outlined in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987), the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0)* (Environmental Laboratory, 2012), and other relevant guidance documents.

This report documents wetland and waterways conditions as field delineated on May 21, 2018, in the vicinity of the Raphel Road overpass. Prior to the commencement of field activities, KCI reviewed readily available primary source materials to determine the presence or absence of natural resources within the study area. Relevant information found during this search is described in detail below and references utilized during the literature review are included as Appendix A to this report.

Study Area and Description

The project study area consists of an approximately one-half acre site in Kingsville, Baltimore County, Maryland. The study area extends along Raphel Road northwest and southeast of Interstate 95 for a total length of approximately 1,000 feet. A Site Location Map depicting the study area is enclosed as Attachment 1 to this report.

Watershed and Land Use

The study area is located within the Lower Gunpowder Falls watershed (02130802). Big Gunpowder Falls is the nearest named waterway to the study area. The Maryland Surface Water Use Designation for Lower Gunpowder Falls and all its tributaries in this area is “Use IV”, pursuant to which they are protected as recreational trout waters (COMAR 26.08.02.08). Due to this designation, in-stream work may not be conducted during the period of March 1 through May 31, inclusive, during any year (COMAR 26.08.02.11); however, no streams are located within the study area. Additionally, KCI reviewed Maryland’s High Quality Waters (Tier II) list to identify any Tier II waters in the vicinity of the study area. Tier II waters are systems that exceed the minimum requirements for fishable and swimmable waters. No Tier II waters were identified in the vicinity of the study area (MDE, 2014). According to the Maryland 303(d) list of impaired waterways, the Lower Gunpowder Falls watershed is listed as Category 5 – impaired for total suspended solids and sulfates.

The Maryland Department of Planning, Land Use/Land Cover geographic information systems (Maryland Department of Planning, 2011) indicated a majority of the study area, and its immediate surroundings, is classified as Agriculture (Code 21), Transportation (Code 80), Forest (Code 41), and Low Density Residential (Code 11).

Topography

The study area is located within the Piedmont Physiographic Province. According to a review of the *White Marsh, Maryland 7.5’ Topographic Quadrangle* (United States Geological Survey, 2016) and other sources, topography within the study area is relatively flat at approximately 150 feet above mean sea level (MSL). A copy of the relevant USGS quadrangle map for the study area is included as Attachment 2 to this report.

Soils

According to the *Soil Survey of Baltimore County, Maryland* (United States Department of Agriculture-Soil Conservation Service [USDA-SCS], 1976) and more recently available digital Natural Resources Conservation Service (NRCS) Soil Survey Geographic Database (SSURGO) soils data for the County (NRCS Web Soil Survey, 2018), the predominant soil association found within the vicinity of the study area is the Beltsville-Chillum-Sassafras Association. Soils in this

association are described as level to moderately sloping, moderately well drained soils that have a subsoil of silt loam or silty clay loam and a fragipan, and well-drained soils that have a subsoil of sandy clay loam to silt loam; underlain by thick stratified sediment; on uplands. Within this association, three distinct soil units are present within the study area:

- Beltsville silt loam, 0-2% slopes (BeA)
- Beltsville silt loam, 2-5% slopes (BeB)
- Udorthents, highway, 0-65% slopes (UcF)

Mapped soil units are classified hydric based upon their listing on the *National Hydric Soils List by State* (USDA-NRCS, 2015) and the State and County lists in the web soil survey (NRCS Web Soil Survey, 2018). Hydric soils are defined as those soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part of the soil profile. The table below summarizes hydric components of soils within the study area as listed in either the National Hydric Soils List by State or the web soil survey.

Soil Series	Hydric (Y/N)	Hydric Component	Percent of Map Unit
Beltsville silt loam, 0-2% slopes (BeA)	No	N/A	N/A
Beltsville silt loam, 2-5% slopes (BeB)	No	Lenni-Undrained	5%
Udorthents, highway, 0-65% slopes (UcF)	No	N/A	N/A

A copy of the soil survey map for the study area is included as Attachment 3 to this report.

National Wetlands Inventory

The *National Wetlands Inventory (NWI) Map for White Marsh, Maryland* (U.S. Fish and Wildlife Service [USFWS], 1981-2002) does not identify any wetlands within the study area. Attachment 4 shows the locations of NWI-classified wetlands in the vicinity of the study area.

FEMA-Designated Floodplains

According to a review of Federal Emergency Management Agency (FEMA) Q3 flood data, no designated 100-year floodplains are present within the study area (*FEMA Panel No.2400100295G*). Attachment 5 shows the locations of FEMA-designated floodplains in the vicinity of the study area.

Wetland Delineation Methodology

KCI performed a field reconnaissance for the entire study area to determine the presence or absence of wetland areas during May 2018. Based upon this review, KCI determined that normal conditions were present on the site and that the “Routine Determination” method would be appropriate in order to identify wetland boundaries within the study area. In the field, wetland delineations were conducted using the criteria outlined in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region, Version 2.0* (Environmental Laboratory, 2012). A field investigation to delineate wetlands and waterways was conducted on May 21, 2018.

During the course of the field investigation, dominant plant species within suspected wetland areas were identified and recorded for each stratum present. The United States Army Corps of Engineers (USACE) *2016 National Wetland Plant List* (Lichvar, 2016) was used to determine the indicator status of the vegetation found within each community. KCI then characterized the plant community as hydrophytic or upland based upon the results of the Dominance Test and the Prevalence Index worksheets within the *Wetland Determination Data Form – Eastern Mountains and Piedmont Region*.

KCI assessed wetland hydrology within the study area based on the presence of one primary or two or more secondary hydrology indicators. Surface water inundation, depth to soil saturation, drift lines, water marks, and sediment deposits are some of the primary indicators listed in the *Wetland Determination Data Form – Eastern Mountains and Piedmont Region*. Secondary indicators include surface soil cracks, a sparsely vegetated concave surface, drainage patterns, and moss trim lines, as well as other less commonly found indicators.

Soil pits were typically excavated to a depth of approximately 18-24 inches, barring refusal, or immediately below the A-horizon. KCI recorded soil texture and the color of the matrix and any concretions or soft masses within a representative soil sample were assigned hue, value, and chroma utilizing the *Munsell Soil Color Charts* (Munsell, 2000). All soil samples were thoroughly investigated for the presence of redoximorphic features and/or hydric soil indicators included in *Field Indicators of Hydric Soils* (NRCS, 2016) and the *Wetland Determination Data Form – Eastern Mountains and Piedmont Region*. KCI then classified soils as hydric or non-hydric based upon the presence or absence of hydric soil characteristics and indicators.

KCI determined areas to be wetlands once all three wetland parameters (vegetation, hydrology, and soils), as described above, were identified (Environmental Laboratory, 1987 and 2012). When wetlands and streams were identified in the field, their boundaries were flagged along the wetland/upland interface or along the ordinary high water mark, respectively. Closed wetland systems were identified with a “WP” in the system name, while open or linear systems that extended outside of the study area were identified with a “WL” in the system name. Boundaries

were marked in the field using consecutively numbered flagging tape, and flag locations were subsequently field located utilizing a total station survey apparatus. A map showing delineated wetlands and waterways is included as Appendix B to this report.

Vegetation, hydrologic, and soils data collected in the field, as well as information derived from the pre-fieldwork data review, were transferred to *Wetland Determination Data Forms - Eastern Mountains and Piedmont Region* in accordance with USACE protocols (1987 and 2012). Appendix C includes the Wetland Determination Data Forms for the upland and wetland sample plot locations and Stream Features Datasheets for WUS systems throughout the study area.

Representative photographs were taken throughout the study area and specifically of wetlands and stream systems in order to document field conditions at the time of the delineation. These photos have been included as Appendix D to this report.

May 2018 Field Investigation Results

The May 2018 field investigation located one nontidal wetland system within the study area. No waterways were identified during the investigation. Information concerning this system is outlined below and included in the appendices to this report.

Nontidal Wetlands

Wetland WP001 (Flags WP001-001 to WP001-007)

Wetland WP001 is a palustrine, forested, broad-leaved deciduous, temporarily flooded (PFO1A) wetland within the southeastern portion of the study area. This wetland occupies approximately 0.01 acre and is entirely within the study area. Wetland WP001 receives hydrology from groundwater and overland flow and is isolated in its location. This wetland was not identified on the *National Wetland Inventory Map for White Marsh, Maryland* (USFWS, 1981-2002).

KCI collected information from a sample plot within Wetland WP001 (Plot WP001-WET) in order to properly classify the predominant vegetation, soil characteristics, and hydrologic indicators. Vegetative cover in close proximity to the sample plot is dominated by persimmon (*Diospyros virginiana*), sweet gum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), Virginia creeper (*Parthenocissus quinquefolia*), fox grape (*Vitis labrusca*), poison ivy (*Toxicodendron radicans*), and euonymus species. Sassafras (*Sassafras albidum*), black cherry (*Prunus serotina*), Bradford pear (*Pyrus calleryana*), Japanese honeysuckle (*Lonicera japonica*), and garlic mustard (*Alliaria petiolata*), were also noted within the sample plot. Based on species composition, sample plot WP001-WET satisfies the hydrophytic vegetation criterion. Hydrologic indicators in the wetland include surface water, high water table, saturation, oxidized rhizospheres on living roots, sparsely vegetated concave surface, and geomorphic position.

Soil characteristics within Wetland WP001 are summarized in the following table:

Depth (inches)	Texture	Matrix	Redox Features
0-8	Silt clay loam	10YR 4/2	10YR 2/1, depletions in the matrix 7.5YR 4/6, concentrations in the matrix
8-20	Silt clay loam	5YR 5/2	5YR 5/8, concentrations in the matrix 7.5YR 4/1, depletions in the pore linings 10YR 2/1, depletions in the matrix

Hydric soil indicators were identified within the soil profile; therefore, sample plot WP001-WET satisfies the hydric soils criterion.

More information regarding the soils, vegetation, and hydrology found within Wetland WP001 can be found in the appendices to this report.

In addition to a sample plot within the wetland, an upland data point (UPL-2) was taken in close proximity to Wetland WP001 to classify the surrounding upland area. Vegetation at UPL-1 is dominated by eastern red cedar (*Juniperus virginiana*), black cherry (*Prunus serotina*), red maple, euonymus species, and Virginia creeper. Bradford pear, sweet gum, Japanese honeysuckle (*Lonicera japonica*), garlic mustard (*Alliaria petiolata*), and oriental bittersweet (*Celastrus orbiculatus*) were also noted within the sample plot. Based on the species composition, sample plot UPL-1 does not satisfy the hydrophytic vegetation criterion.

Soil characteristics at UPL-2 are summarized in the following table:

Depth (inches)	Texture	Matrix	Redox Features
0-3	Silt clay loam	7.5YR 4/3	N/A
3-10	Silt clay loam	5YR 4/6	7.5YR 4/3, depletions in the matrix 2.5YR 5/8, concentrations in the pore linings
10+	Fill material/gravel	Refusal	N/A

Hydric soil indicators were not identified within the soil profile; therefore, sample plot UPL-2 does not satisfy the hydric soils criterion. Wetland hydrologic indicators were not present in close proximity to upland sample plot UPL-2. Sample plot UPL-2 does not satisfy any of the three mandatory wetland criteria; therefore, this area is classified as upland.

A second upland data point (UPL-1) was taken on the northwest side of I-95 in an area suspected to be wetland. Vegetation at UPL-1 is dominated by sweet gum, black willow (*Salix nigra*), Virginia creeper, Japanese stiltgrass (*Microstegium vimineum*), and poison ivy. Bradford pear, multiflora rose (*Rosa multiflora*), common reed (*Phragmites australis*), milkweed (*Asclepias*

syriaca), soft rush (*Juncus effusus*), and carex species were also noted within the sample plot. Based on the species composition, sample plot UPL-1 satisfies the hydrophytic vegetation criterion. Hydrologic indicators within the sample plot included surface water, saturation, and geomorphic position.

Soil characteristics at UPL-1 are summarized in the following table:

Depth (inches)	Texture	Matrix	Redox Features
0-12	Silt clay loam	7.5YR 4/4	10YR 2/1, depletions in the matrix 7.5YR 5/8, concentrations in the matrix 10YR 4/2, depletions in the matrix
12+	Fill material	Refusal	N/A

Hydric soil indicators were not identified within the soil profile; therefore, sample plot UPL-1 does not satisfy the hydric soils criterion. Sample plot UPL-1 satisfies only two of the three mandatory wetland criteria; therefore, this area is classified as upland.

More information regarding the soils, vegetation, and hydrology found within the wetland WP001, upland data point (UPL-1), and upland data point (UPL-2) can be found in the appendices to this report.

Conclusions

The study area contains one palustrine, forested, broad-leaved deciduous, temporarily flooded (PFO1A) wetland, as described above. Information concerning this wetland system is summarized below, in tabular form and included in the appendices to this report.

Wetland System	Cowardin Classification*	Approximate Wetland Area within the Study Area
Wetland WP001	PFO1A	0.01 acre

* Based on National Wetland Inventory Classification System (Cowardin, et al. 1979).

Impacts to wetlands within the proposed project area will require a *Joint Federal/State Application for the Alteration of Any Floodplain, Waterway, Tidal, or Nontidal Wetland in Maryland*.

This report represents a study of the nontidal wetland and waterway resources as observed within the study area during May 2018. Investigations of this type reflect the current state of temporal and variable conditions and require individual professional judgment. This is, therefore, a professional estimate of the wetlands and waters of the U.S. located in the study area based on the delineation methodology utilized and the most recent and best-available information for the above mentioned site. Wetland boundaries, as currently defined for regulatory purposes, can only be

verified through a review by the U.S. Army Corps of Engineers and/or the Maryland Department of the Environment in consultation with the U.S. Environmental Protection Agency and U.S. Fish and Wildlife Service.

If you should have any questions regarding the information outlined above, or if you require additional information concerning this wetland delineation report, please do not hesitate to contact me.

Very truly yours,

KCI TECHNOLOGIES, INC.:



Jennifer Bird
Senior Project Manager
Natural Resources Practice

Direct Dial Phone: 410.316.7959
Email: jennifer.bird@kci.com

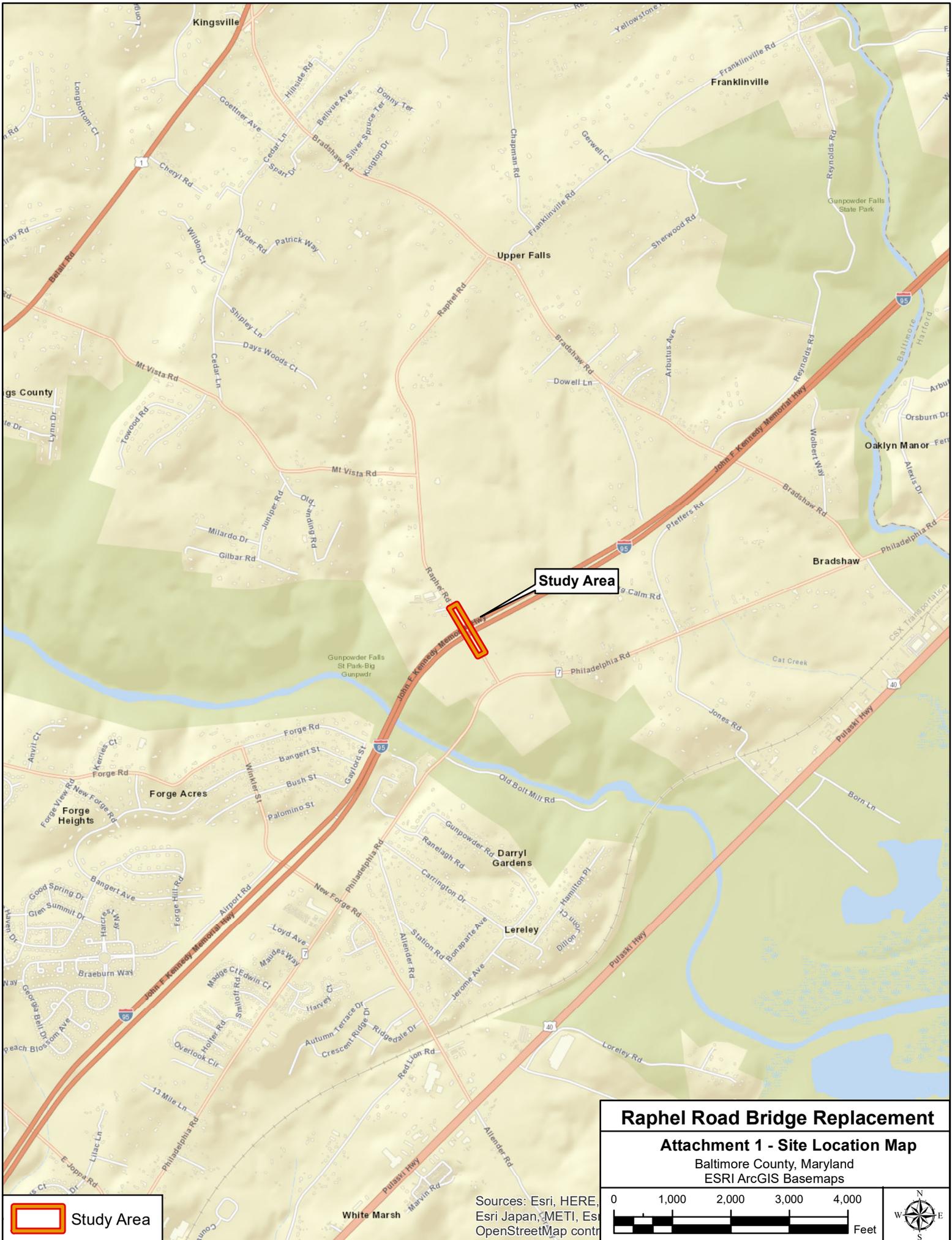
ak/jb

- Enclosures:**
- Attachment 1: Site Location Map
 - Attachment 2: USGS 7.5' Topographic Map
 - Attachment 3: Soils Map
 - Attachment 4: National Wetlands Inventory (NWI) Map
 - Attachment 5: Q3 Flood Map
-
- Appendix A: References
 - Appendix B: Map of Delineated Wetlands & Waterways
 - Appendix C: Data Point Forms: Routine Wetland Determination and Stream Features
 - Appendix D: Representative Site Photographs

CC: Dion Ho // KCI Highways
KCI File (22145228.50)

ATTACHMENT 1

Site Location Map



Study Area

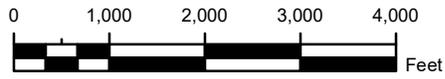
 **Study Area**

Raphel Road Bridge Replacement

Attachment 1 - Site Location Map

Baltimore County, Maryland
 ESRI ArcGIS Basemaps

Sources: Esri, HERE, Esri Japan, METI, Esri OpenStreetMap contr



ATTACHMENT 2

USGS 7.5' Topographic Map

ATTACHMENT 3

Soils Map

ATTACHMENT 4

National Wetlands Inventory (NWI) Map



Study Area
 NWI Designated Wetlands & Waterways

Source: Esri, DigitalGlobe, GeoEye, IGN, Aerotech, USDA, USGS, AEX, CNR, User Community, Esri contributors, and the National Geographic Society

Raphel Road Bridge Replacement

Attachment 4 - NWI Map

U.S. Department of Agriculture - SSURGO Soils
Natural Resource Conservation Service, 2016

0 500 1,000 1,500 2,000 Feet

PUBFx

ATTACHMENT 5

Q3 Flood Map



Study Area

Darryl Gardens

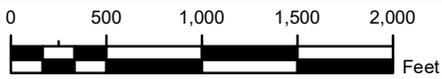
	Study Area
	FEMA 100-Year Floodplain

Raphael Road Bridge Replacement

Attachment 5 - Q3 Flood Map

Federal Emergency Management Agency, 2017
Q3 Flood Data for Baltimore County

Source: Esri, DigitalGlobe, GeoEye, USDA, USGS, AEX, CNES, User Community, Esri partners, and the U.S. Department of the Interior



APPENDIX A

References

Appendix A: References

Code of Maryland Regulations (COMAR). Continuously updated. *Code of Maryland Regulations, Title 26- Department of the Environment. 26.08.02.02- Designated Uses, 26.08.02.07- Surface Water Use Designation, 26.08.02.08- Stream Segment Designations, and 26.08.02.11-General Water Quality Certifications.* Maryland Department of the Environment.

Cowardin, L.M., V. Carter, F. Golet and E.T. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States.* United States Department of the Interior, USFWS, Washington, D.C.

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1.* United States Department of the Army, Waterways Experiment Station, Vicksburg, Mississippi.

Environmental Laboratory. 2012. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0).* United States Department of the Army, Research and Development Center, Vicksburg, Mississippi.

Federal Emergency Management Agency. 2014. *Q3 Flood Data for Baltimore County, Maryland (Unincorporated Areas). Community-Panel Number 2400100295G.*

Lichvar, R.W., D.L. Banks, N.C. Melvin, and W.N. Kirchner. 2016. *2016 National Wetland Plant List.* Phytoneuron 2016-30: 1-17.

Maryland Department of the Environment. 2014. List of Tier II Waters. <http://www.mde.state.md.us/programs/Water/TMDL/Water%20Quality%20Standards/Pages/HighQualityWatersMap.aspx>.

Maryland Department of Natural Resources (MDNR). Continuously updated. *Maryland's Environmental Resources and Land Information Network (MERLIN).* Annapolis, Maryland. Available at <http://www.mdmerlin.net>.

Maryland Department of Planning. 2011. Land Use/Land Cover. <http://planning.maryland.gov/ourwork/landUseDownload.shtml>

Munsell Color. 2000. *Munsell Soils Color Charts.* GretagMacbeth, New Windsor, New York.

State of Maryland. Continuously updated. MD iMAP website: <http://imap.maryland.gov/Pages/default.aspx>

United States Department of Agriculture (USDA), NRCS. 2016. *Field Indicators of Hydric Soils in the United States, Version 8.0.*

USDA, NRCS. Continuously updated. *Web Soil Survey*. Washington D.C. Available at <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>

USDA, NRCS. 2015. *National Hydric Soils List by State*. National Technical Committee for Hydric Soils, Washington, D.C.

USDA, Soil Conservation Service. 1976. *Soil Survey of Baltimore County, Maryland*. Maryland Agricultural Experiment Station.

United States Fish and Wildlife Service (USFWS). 1981-2016. *National Wetlands Inventory Map, White Marsh, Maryland Quadrangle Map*. USFWS, Washington, D.C.

United States Geological Survey (USGS). 2016. *White Marsh, Maryland 7.5' Quadrangle Map*. USGS, Reston, Virginia.

APPENDIX B

Map of Delineated Wetlands & Waterways

APPENDIX C

Data Point Forms: Routine Wetland Determination and Stream Features

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Raphel Road Bridge Replacement City/County: Baltimore County Sampling Date: 5/21/2018
 Applicant/Owner: Maryland Transportation Authority (MDTA) State: MD Sampling Point: WP001-WI
 Investigator(s): A. Wagoner, K. Myers Section, Township, Range: Kingsville
 Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 3%
 Subregion (LRR or MLRA): MLRA 147 Lat: 39.419604 Long: -76.404336 Datum: NAD 83
 Soil Map Unit Name: Beltsville silt loam, 2-5% slopes (BeB) NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes 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 <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: The sample plot satisfies the three mandatory wetland criteria; therefore, this area is classified as a palustrine, forested, broad-leaved deciduous, temporarily flooded (PFO1A) wetland. Significant rainfall has occurred within the past week. The sample plot is located at the toe of the Raphel Road embankment, is adjacent Interstate (I) 95 northbound, and a BGE easement. Trash is prevalent throughout the wetland, including tires.	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)	Secondary Indicators (minimum of two required) <input type="checkbox"/> Surface Soil Cracks (B6) <input checked="" 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"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
---	---

Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>4"</u> Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>Surface</u> Saturation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>Surface</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
--	--

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

Remarks:
 The sample plot satisfies the wetland hydrology criterion. Significant rains have occurred over the past week, contributing to the high surface water depths.

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

Sampling Point: WP001-WET

Tree Stratum (Plot size: <u>30ft radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Diospyros virginiana</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>
2. <u>Liquidambar styraciflua</u>	<u>15</u>	<u>Y</u>	<u>FAC</u>
3. <u>Sassafras albidum</u>	<u>5</u>	<u>N</u>	<u>FACU</u>
4. <u>Prunus serotina</u>	<u>2</u>	<u>N</u>	<u>FACU</u>
5. <u>Acer rubrum</u>	<u>15</u>	<u>Y</u>	<u>FAC</u>
6. <u>Pyrus calleryana</u>	<u>2</u>	<u>N</u>	<u>NI</u>
<u>49</u> = Total Cover			
50% of total cover: <u>24.5</u> 20% of total cover: <u>9.8</u>			
Sapling Stratum (Plot size: <u>15ft radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Liquidambar styraciflua</u>	<u>15</u>	<u>Y</u>	<u>FAC</u>
2. <u>Euonymus species</u>	<u>10</u>	<u>Y</u>	<u>NI</u>
3. _____			
4. _____			
5. _____			
6. _____			
<u>25</u> = Total Cover			
50% of total cover: <u>12.5</u> 20% of total cover: <u>5</u>			
Shrub Stratum (Plot size: <u>15ft radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____			
2. _____			
3. _____			
4. _____			
5. _____			
6. _____			
<u>0</u> = Total Cover			
50% of total cover: <u>0</u> 20% of total cover: <u>0</u>			
Herb Stratum (Plot size: <u>5ft radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Lonicera japonica</u>	<u>25</u>	<u>N</u>	<u>FACU</u>
2. <u>Parthenocissus quinquefolia</u>	<u>40</u>	<u>Y</u>	<u>FACU</u>
3. <u>Alliaria petiolata</u>	<u>5</u>	<u>N</u>	<u>FACU</u>
4. _____			
5. _____			
6. _____			
7. _____			
8. _____			
9. _____			
10. _____			
11. _____			
<u>70</u> = Total Cover			
50% of total cover: <u>35</u> 20% of total cover: <u>14</u>			
Woody Vine Stratum (Plot size: <u>30ft radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Vitis labrusca</u>	<u>5</u>	<u>Y</u>	<u>FACU</u>
2. <u>Parthenocissus quinquefolia</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>
3. <u>Toxicodendron radicans</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>
4. _____			
5. _____			
<u>25</u> = Total Cover			
50% of total cover: <u>12.5</u> 20% of total cover: <u>5</u>			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 62.5 (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
 - 2 - Dominance Test is >50%
 - 3 - Prevalence Index is ≤3.0¹
 - 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 - Problematic Hydrophytic Vegetation¹ (Explain)
- ¹Indicators of hydric soil and wetland hydrology must 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

Remarks: (Include photo numbers here or on a separate sheet.)
 The sample plot satisfies the hydrophytic vegetation criterion. Canopy coverage is located on the edge of the wetland.

SOIL

Sampling Point: WP001-V

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	10YR 4/2	85	10YR 2/1	5	D	M	sicl	organic matter
			7.5YR 4/6	10	C	M		
8-20	5YR 5/2	78	5YR 5/8	10	C	M	sicl	gravel present
			7.5YR 4/1	10	D	PL		
			10YR 2/1	2	D	M		

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked 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)
- 2 cm Muck (A10) (LRR N)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Polyvalue Below Surface (S8) (MLRA 147, 148)
- Thin Dark Surface (S9) (MLRA 147, 148)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- Umbric Surface (F13) (MLRA 136, 122)
- Piedmont Floodplain Soils (F19) (MLRA 148)
- Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Coast Prairie Redox (A16) (MLRA 147, 148)
- Piedmont Floodplain Soils (F19) (MLRA 136, 147)
- 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: N/A
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks: The sample plot satisfies the hydric soils criterion.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Raphel Road Bridge Replacement City/County: Baltimore County Sampling Date: 5/21/2018
 Applicant/Owner: Maryland Transportation Authority (MDTA) State: MD Sampling Point: UPL-1
 Investigator(s): A. Wagoner, K. Myers Section, Township, Range: Kingsville
 Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 1%
 Subregion (LRR or MLRA): MLRA 147 Lat: 39.420588 Long: -76.405175 Datum: NAD 83
 Soil Map Unit Name: Beltsville silt loam, 0-2% slopes (BeA) NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes 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 <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks: The sample plot satisfies only two of the three mandatory wetland criteria; therefore, this area is classified as upland. Significant rainfall has occurred over the past week. The sample plot is located adjacent to the Raphel Road embankment at the toe of slope, an open field, and Interstate (I) 95 southbound. Power lines are present within the sample plot. The soils and hydrology are disturbed as they are dominated by fill material and asphalt.	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)	Secondary Indicators (minimum of two required) <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"/> Stunted or Stressed Plants (D1) <input checked="" type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>1"</u> Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>Surface</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Remarks: The sample plot satisfies the wetland hydrology criterion. A significant amount of rain has occurred within the past week.	

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

Sampling Point: UPL-1

<u>Tree Stratum</u> (Plot size: <u>30ft radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A)
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>5</u> (B)
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>80</u> (A/B)
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
<u>0</u> = Total Cover				
50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				
<u>Sapling Stratum</u> (Plot size: <u>15ft radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Prevalence Index worksheet:
1. <u>Liquidambar styraciflua</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>	Total % Cover of: _____ Multiply by: _____
2. <u>Pyrus calleryana</u>	<u>5</u>	<u>N</u>	<u>NI</u>	OBL species _____ x 1 = _____
3. <u>Salix nigra</u>	<u>10</u>	<u>Y</u>	<u>OBL</u>	FACW species _____ x 2 = _____
4. _____	_____	_____	_____	FAC species _____ x 3 = _____
5. _____	_____	_____	_____	FACU species _____ x 4 = _____
6. _____	_____	_____	_____	UPL species _____ x 5 = _____
<u>25</u> = Total Cover				Column Totals: _____ (A) _____ (B)
50% of total cover: <u>12.5</u> 20% of total cover: <u>5</u>				Prevalence Index = B/A = _____
<u>Shrub Stratum</u> (Plot size: <u>15ft radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators:
1. _____	_____	_____	_____	<input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation
2. _____	_____	_____	_____	<input checked="" type="checkbox"/> 2 - Dominance Test is >50%
3. _____	_____	_____	_____	<input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹
4. _____	_____	_____	_____	<input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
5. _____	_____	_____	_____	<input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)
6. _____	_____	_____	_____	¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
<u>0</u> = Total Cover				
50% of total cover: <u>0</u> 20% of total cover: <u>0</u>				
<u>Herb Stratum</u> (Plot size: <u>5ft radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Definitions of Five Vegetation Strata:
1. <u>Parthenocissus quinquefolia</u>	<u>20</u>	<u>Y</u>	<u>FACU</u>	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).
2. <u>Rosa multiflora</u>	<u>2</u>	<u>N</u>	<u>FACU</u>	Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.
3. <u>Phragmites australis</u>	<u>2</u>	<u>N</u>	<u>FACW</u>	Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.
4. <u>Asclepias syriaca</u>	<u>10</u>	<u>N</u>	<u>FACU</u>	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.
5. <u>Juncus effusus</u>	<u>5</u>	<u>N</u>	<u>FACW</u>	Woody vine – All woody vines, regardless of height.
6. <u>Microstegium vimineum</u>	<u>15</u>	<u>Y</u>	<u>FAC</u>	
7. <u>Carex sp.</u>	<u>10</u>	<u>N</u>	<u>NI</u>	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
<u>64</u> = Total Cover				
50% of total cover: <u>32</u> 20% of total cover: <u>12.8</u>				
<u>Woody Vine Stratum</u> (Plot size: <u>30ft radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Present?
1. <u>Toxicodendron radicans</u>	<u>40</u>	<u>Y</u>	<u>FAC</u>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
<u>40</u> = Total Cover				
50% of total cover: <u>20</u> 20% of total cover: <u>8</u>				
Remarks: (Include photo numbers here or on a separate sheet.)				
The sample plot satisfies the hydrophytic vegetation criterion.				

SOIL

Sampling Point: UPL-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		
0-12	7.5YR 4/4	76	10YR 2/1	2	D	M	sicl	gravel, fill material present
			7.5YR 5/8	2	C	M		
			10YR 4/2	20	D	M		
12+	---	--	---	--	--	--	refusal	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked 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)
- 2 cm Muck (A10) (LRR N)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Polyvalue Below Surface (S8) (MLRA 147, 148)
- Thin Dark Surface (S9) (MLRA 147, 148)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- Umbric Surface (F13) (MLRA 136, 122)
- Piedmont Floodplain Soils (F19) (MLRA 148)
- Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Coast Prairie Redox (A16) (MLRA 147, 148)
- Piedmont Floodplain Soils (F19) (MLRA 136, 147)
- 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: Fill material
 Depth (inches): 12+

Hydric Soil Present? Yes No

Remarks: The sample plot does not satisfy the hydric soils criterion. The soils are disturbed due to the presence of fill material and asphalt in the area surrounding the sample plot.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Raphel Road Bridge Replacement City/County: Baltimore County Sampling Date: 5/21/2018
 Applicant/Owner: Maryland Transportation Authority (MDTA) State: MD Sampling Point: UPL-2
 Investigator(s): A. Wagoner, K. Myers Section, Township, Range: Kingsville
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 3%
 Subregion (LRR or MLRA): MLRA 147 Lat: 39.419506 Long: -76.404365 Datum: NAD83
 Soil Map Unit Name: Beltsville silt loam, 2-5% slopes (BeB) NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes 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 <input type="checkbox"/> No <input checked="" type="checkbox"/> Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks: The sample plot does not satisfy any of the three mandatory wetland criteria; therefore, this area is classified upland. Significant rainfall has occurred within the past week. The sample plot is located on the embankment of Raphel Road, and is adjacent to Interstate (I) 95 northbound, and a BGE easement. Utility poles run adjacent to the sample plot. The soils are disturbed as they are dominated by fill material.	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)	Secondary Indicators (minimum of two required) <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"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? (includes capillary fringe) Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: Remarks: The sample plot does not satisfy the wetland hydrology criterion.	

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

Sampling Point: UPL-2

Tree Stratum (Plot size: <u>30ft radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Pyrus calleryana</u>	<u>5</u>	<u>N</u>	<u>NI</u>
2. <u>Juniperus virginiana</u>	<u>15</u>	<u>Y</u>	<u>FACU</u>
3. <u>Prunus serotina</u>	<u>20</u>	<u>Y</u>	<u>FACU</u>
4. <u>Acer rubrum</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>
5. <u>Liquidambar styraciflua</u>	<u>5</u>	<u>N</u>	<u>FAC</u>
6. _____			
	<u>65</u> = Total Cover		
50% of total cover: <u>32.5</u>	20% of total cover: <u>13</u>		

Sapling Stratum (Plot size: <u>15ft radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____			
2. _____			
3. _____			
4. _____			
5. _____			
6. _____			
	<u>0</u> = Total Cover		
50% of total cover: <u>0</u>	20% of total cover: <u>0</u>		

Shrub Stratum (Plot size: <u>15ft radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Euonymus sp.</u>	<u>20</u>	<u>Y</u>	<u>NI</u>
2. <u>Lonicera japonica</u>	<u>5</u>	<u>N</u>	<u>FACU</u>
3. _____			
4. _____			
5. _____			
6. _____			
	<u>25</u> = Total Cover		
50% of total cover: <u>12.5</u>	20% of total cover: <u>5</u>		

Herb Stratum (Plot size: <u>5ft radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Lonicera japonica</u>	<u>25</u>	<u>N</u>	<u>FACU</u>
2. <u>Parthenocissus quinquefolia</u>	<u>40</u>	<u>Y</u>	<u>FACU</u>
3. <u>Alliaria petiolata</u>	<u>5</u>	<u>N</u>	<u>FACU</u>
4. <u>Celastrus orbiculatus</u>	<u>10</u>	<u>N</u>	<u>FACU</u>
5. _____			
6. _____			
7. _____			
8. _____			
9. _____			
10. _____			
11. _____			
	<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>30ft radius</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____			
2. _____			
3. _____			
4. _____			
5. _____			
	<u>0</u> = Total Cover		
50% of total cover: <u>0</u>	20% of total cover: <u>0</u>		

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 25 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>25</u>	x 3 = <u>75</u>
FACU species <u>120</u>	x 4 = <u>480</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>145</u> (A)	<u>555</u> (B)

Prevalence Index = B/A = 3.8

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must 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

Remarks: (Include photo numbers here or on a separate sheet.)
 The sample plot does not satisfy the hydrophytic vegetation criterion.

SOIL

Sampling Point: UPL-2

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		
0-3	7.5YR 4/3	100	--	--	--	--	sicl	gravel present
3-10	5YR 4/6	73	7.5YR 4/3	25	D	M	sicl	
			2.5YR 5/8	2	C	PL		
10+	--	--	--	--	--	--	refusal	

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

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)	³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)	<input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 147, 148)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 136, 147)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)		
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122)		
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)		
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)		

Restrictive Layer (if observed): Type: <u>Fill material/gravel</u> Depth (inches): <u>10"</u>	Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
--	---

Remarks: The sample plot does not satisfy the hydric soils criterion.

APPENDIX D

Representative Site Photographs

Photographic Record

KCI Technologies, Inc.

Agency: Maryland Transportation Authority (MDTA)
Project: Raphel Road Bridge Replacement
Project No. - 22145228.50



Photographer: K. Myers
Date: 5/21/18
Frame No. 1
Direction: West
Comments: View of Wetland
Sample Plot WP001-WET



Photographer: K. Myers
Date: 5/21/18
Frame No. 2
Direction: N/A
Comments: View of Wetland
Sample Plot WP001-WET soils

Photographic Record

KCI Technologies, Inc.

Agency: Maryland Transportation Authority (MDTA)
Project: Raphel Road Bridge Replacement
Project No. - 22145228.50



Photographer: K. Myers
Date: 5/21/18
Frame No. 3
Direction: East
Comments: View of Upland
Sample Plot UPL-1



Photographer: K. Myers
Date: 5/21/18
Frame No. 4
Direction: N/A
Comments: View of Upland
Sample Plot UPL-1 soils

Photographic Record

KCI Technologies, Inc.

Agency: Maryland Transportation Authority (MDTA)
Project: Raphel Road Bridge Replacement
Project No. - 22145228.50



Photographer: K. Myers
Date: 5/21/18
Frame No. 5
Direction: East
Comments: View of Upland
Sample Plot UPL-2



Photographer: K. Myers
Date: 5/21/18
Frame No. 6
Direction: N/A
Comments: View of Upland
Sample Plot UPL-2 soils