INTERSTATE 64 PENINSULA STUDY

NATURAL RESOURCES TECHNICAL MEMORANDUM

OCTOBER 2012

VDOT
Virginia Department of Transportation
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RICHMOND, VA 23219

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ACRONYMS

APF	Areas Protected from Fishing
CCB	Center for Conservation Biology
Corps	United States Army Corps of Engineers
CWA	Clean Water Act
CZMA	Costal Zone Management Area
EBL	Express Bus Lane
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
ESRI	Environmental Systems Research Institute
ETL	Express Toll Lane
FE	Federal Endangered
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Maps
FT	Federal Threatened
GIS	Geographic Information System
GPS	Global Positioning System
GWMA	Ground Water Management Area
HAPC	Habitat Area of Particular Concern
HOT	High Occupancy/Toll
HOV	High Occupancy Vehicle
HUC	Hydrologic Unit Code
I-64	Interstate 64
I-664	Interstate 664
I-95	Interstate 95
IPaC	Information, Planning, and Conservation
JPA	Joint Permit Application
LOS	Level of Service
MBT	Migratory Bird Treaty
MPO	Metropolitan Planning Organization
MSL	Mean Sea Level
NEPA	National Environmental Policy Act
NHD	Natural Heritage Division
NHS	National Highway System
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPS	United States National Park Service
NRCS	Natural Resources Conservation Service
NRI	National Rivers Inventory
NWI	National Wetlands Inventory
PCB	Polychlorinated Biphenyl
PEM	Palustrine Emergent
PFO	Palustrine Forested
PSS	Palustrine Scrub Shrub
PWC	Personal Water Craft
RCI	Reach Condition Index
RMA	Resource Management Area

RPA	Resource Protection Area
SAV	Submerged Aquatic Vegetation
SDWA	Safe Drinking Water Act
SE	State Endangered
ST	State Threatened
STRAHNET	Strategic Highway Network
SWPPP	Stormwater Pollution Prevention Plan
SYIP	Six-Year Improvement Program
TMDL	Total Maximum Daily Load
TPO	Transportation Planning Organization
USCG	United States Coast Guard
USDA	United States Department of Agriculture
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geologic Survey
USM	Unified Stream Methodology
VCZMP	Virginia's Coastal Zone Management Program
VDACS	Virginia Department of Agriculture and Consumer Services
VDCR	Virginia Department of Conservation and Recreation
VDEQ	Virginia Department of Environmental Quality
VDGIF	Virginia Department of Game and Inland Fisheries
VDH	Virginia Department of Health
VDOT	Virginia Department of Transportation
VFWIS	Virginia Fish and Wildlife Information Service
VIMS	Virginia Institute of Marine Science
VMRC	Virginia Marine Resources Commission
WUS	Waters of the United States

I. Introduction

The following report describes existing natural resources and conditions which may be impacted by the various Alternatives within the study area of the Interstate 64 (I-64) Peninsula Study. The purpose of this report is to summarize baseline conditions along the property, provide a comparison of the impacts to these resources for the different Alternatives, and summarize potential permits or environmental clearances needed prior to the construction of the project. This information can also serve as a basis for the Indirect and Cumulative Impacts Analysis.

A. Project Description

The Virginia Department of Transportation (VDOT), in cooperation with the Federal Highway Administration (FHWA), is evaluating options to improve the 75 mile long Interstate 64 (I-64) corridor from the Interstate 95 (I-95) (Exit 190) interchange in the City of Richmond to the Interstate 664 (I-664) (Exit 264) interchange in the City of Hampton. This study is known as the Interstate 64 Peninsula Study (hereinafter referred to as the I-64 Study in this document). As shown in **Figure 1**, the study area is located within seven localities, including the City of Richmond, Henrico County, New Kent County, James City County, York County, the City of Newport News, and the City of Hampton.

The number of lanes on existing I-64 varies through the study area. In the vicinity of the City of Richmond, from Exit 190 to Exit 197, there are generally three travel lanes in each direction. Between Exit 197 and mile marker 254, there are generally two travel lanes in each direction. Beginning at mile marker 254 and continuing east to the City of Hampton area, I-64 widens to four lanes in each direction with three general purpose lanes and one 2+ person High Occupancy Vehicle (HOV 2+) lane during the AM and PM peak periods. There are some additional lanes between closely spaced interchanges at the eastern end of the corridor to provide for easier merging of traffic on and off of the I-64 mainline.

B. Alternatives

There are a number of possible solutions to address the need for improvements along the I-64 corridor, as described in detail in the ***Alternatives Development Technical Memorandum***. The goals are to develop solutions that meet the project purpose and needs while avoiding and/or minimizing impacts to the human and natural environments. The following are the Alternatives being carried forward in this study:

1. No-Build Alternative

The No-Build Alternative serves as a baseline for the comparison of future conditions and impacts. The No-Build Alternative assumes that the projects currently programmed and funded in the VDOT's Fiscal Year 2013 - 2018 Six-Year Improvement Program (SYIP) will be implemented. In addition to the programmed VDOT projects, the Tidewater Super-Regional Model developed by VDOT and used for this study includes other projects within the corridor that are part of the Richmond Area Metropolitan Planning Organization (MPO) or Hampton Roads Transportation Planning Organization's (TPO) Constrained Long Range Plans, as well as the Rural Long Range Transportation Plans (which are not fiscally constrained) for the Richmond and Hampton Roads Planning District Commissions. Those projects form a part of the Base Conditions and the effects of these projects on I-64 traffic are accounted for in all 2040 No-Build analyses.

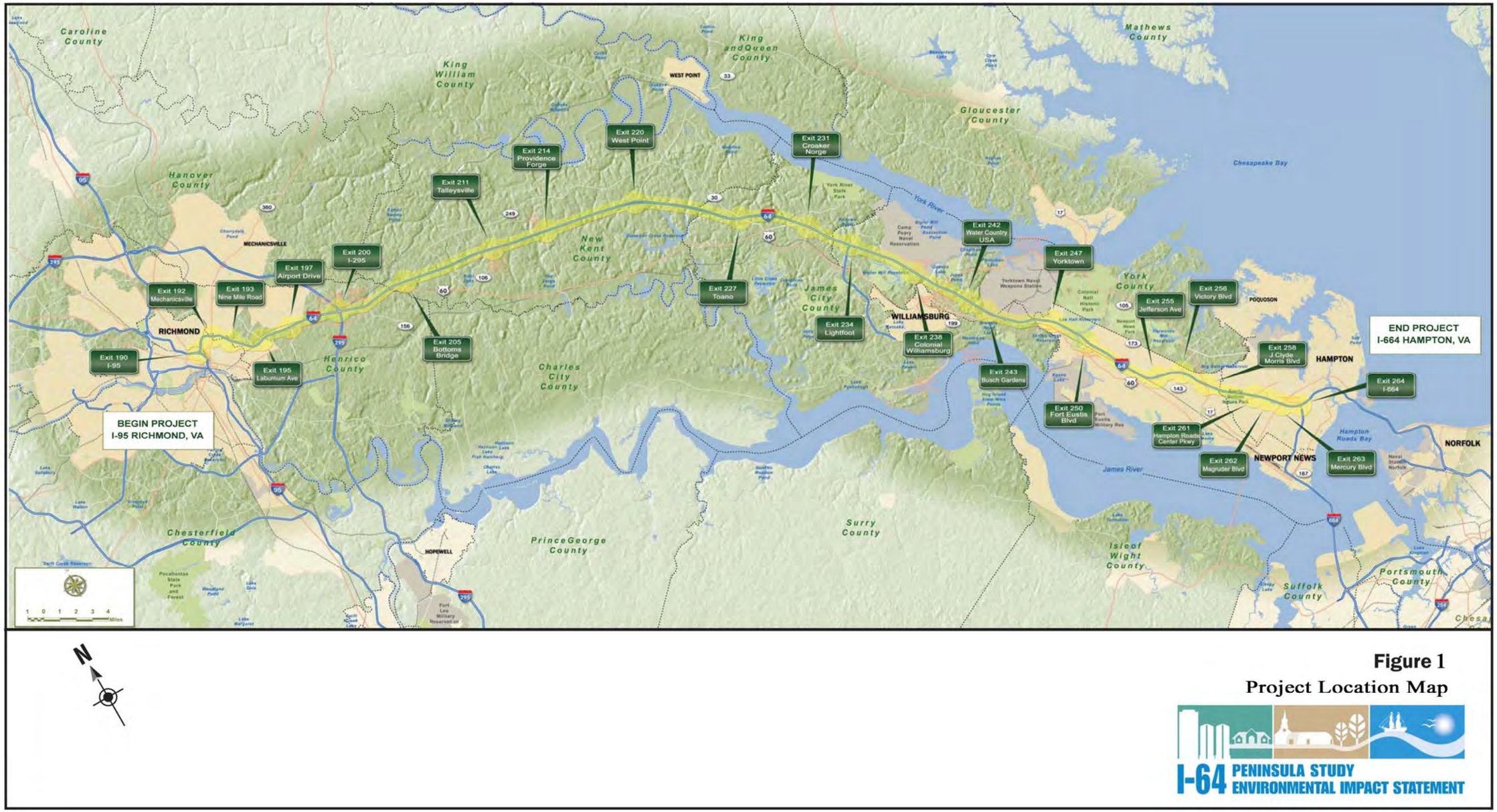


Figure 1
Project Location Map

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT

2. Alternatives 1A/1B General Purpose Lanes

These Alternatives involve adding additional general purpose travel lanes to the I-64 mainline to achieve a Level of Service (LOS) C or better in the design year 2040. Although there are numerous possible combinations for adding these lanes, the analysis focused on adding all needed lanes within the existing right of way, to the greatest extent practicable, to either the outside of the existing lanes, which is Alternative 1A, or to the inside of the existing lanes within the median, which is Alternative 1B. For Alternative 1B, the lanes are also proposed in the median to the greatest extent practicable. However, not all sections of the corridor have sufficient median area to accommodate the needed additional lanes so in these areas the additional lanes are proposed to the outside. For the 25 existing interchanges within the study area corridor, geometric deficiencies were examined along with design year 2040 traffic volumes and resulting LOS at each interchange location. Conceptual designs were investigated that would accommodate the future traffic and assumptions were made and applied to each interchange to establish a study footprint that would allow for enough flexibility during the final design stage to accommodate other concepts not yet examined. Further engineering and traffic analyses would be performed at each interchange as the project progresses. During the Interchange Modification Report (IMR) process, which is required by FHWA before any changes can be made to Interstate interchanges, each of these interchange configurations would serve as a starting point to be further studied and refined with a more in-depth examination of the needs at each location, in order to produce a constructible design.

3. Alternatives 2A/2B Full Toll Lanes

These alternatives evaluate the impacts of tolling the entire facility. However, as of the time of this study, there is no federal or state agreement in place that would allow for tolling I-64 from I-95 in the City of Richmond to I-664 in the City of Hampton. Therefore, these alternatives that involve tolling may or may not ultimately be possible. Notwithstanding, because tolling could be an option in the future, alternatives that involve tolling were considered in the range of possible alternatives evaluated. For the purposes of this study, it was assumed that if the facility is tolled, the tolling would be for all vehicles, in both directions, and for the entire length of the corridor from I-95 in the City of Richmond to I-664 in the City of Hampton. It was also assumed that there would be toll collection stations, using overhead gantries and all-electronic tolling, for every interchange-to-interchange sections of I-64. If Alternative 2A or 2B is selected, subsequent studies would refine the specifics of the tolling, such as whether or not it would encompass the entire length of the I-64 corridor along with the number and placement of the toll collection stations. In order to determine the number of lanes needed for Alternatives 2A/2B, the traffic studies included a toll diversion analysis. As a result of this analysis, the tolling of I-64 is expected to have either a neutral effect or result in a decrease in traffic volumes on the I-64 mainline due to people choosing to avoid a tolled I-64 and using other parallel routes instead. The tolls are not expected to result in increased volumes at any location on the I-64 mainline. This analysis indicated possible reductions to traffic on the I-64 corridor, however these reductions are not projected to change the number of lanes needed to achieve a LOS C or better in the design year 2040 from those indicated for the General Purpose Lanes Alternatives. Therefore, the proposed disturbance limits for Alternatives 2A/2B would be the same as Alternatives 1A/1B, respectively. Although there are numerous possible combinations for adding these lanes, the analysis focused on adding all needed lanes within the existing right of way, to the greatest extent practicable, to either the outside of the existing lanes, which is Alternative 2A, or to the inside of the existing lanes within the median, which is Alternative 2B. For Alternative 2B, the lanes are also proposed in the median to the greatest extent practicable. However, not all sections of the corridor have sufficient median area to accommodate the needed additional lanes so in these areas the additional lanes are proposed to the outside. In addition to the mainline improvements, due to only modest changes in traffic volumes, as determined in the toll diversion analysis, Alternatives 2A/2B also includes the same improvements to the 25 interchanges as described with Alternatives 1A/1B.

4. Alternative 3 Managed Lanes

This Alternative involves the addition of separated, managed lanes located in the median. These managed lanes were examined for the entire length of the I-64 study area from I-95 in the City of Richmond to I-664 in the City of Hampton. As previously described, not all sections of the I-64 corridor have sufficient median area to accommodate the addition of any lanes. In these areas, the facility is proposed to be widened to the outside of the existing general purpose lanes in order to accommodate the managed lanes between the eastbound and westbound general purpose travel lanes. Managed lanes can refer to many different strategies, including:

- High Occupancy Vehicle (HOV) lanes.
- High Occupancy Toll (HOT) lanes.
- Express Toll Lanes (ETL).
- Express Bus Lanes (EBL).

For any of the managed lanes that involve toll collection (HOT or ETL lanes), traditional toll plazas were not included. All toll collection would be conducted by overhead gantries with all-electronic tolling used to collect all tolls at highway speeds. The Environmental Impact Statement (EIS) study does not identify what type of managed lanes would be constructed. Based on the results of the capacity analysis, the lane configurations developed for Alternative 3 along the I-64 corridor are described in the ***Alternatives Development Technical Memorandum***. If Alternative 3 is selected, subsequent studies would refine the specifics of the managed lanes throughout the I-64 corridor.

II. Existing Conditions and Potential Impacts

The following sections summarize the existing natural environmental conditions that exist in the vicinity of the study corridor. A number of natural resources and specific conditions were identified within the study area of the I-64 Study, including:

- Topography.
- Geology and Soils.
- Surface waters
- Water quality
- Water supplies.
- Floodplains.
- Threatened and endangered species.
- Terrestrial and aquatic habitat and wildlife.
- Invasive species.

As part of the environmental review process for this study, various federal and state agencies were contacted and databases and websites were reviewed to determine the presence and status of the existing natural environmental conditions located within the study corridor. Several other environmental resource related features (e.g., parks and recreation areas, easements, prime farmlands, agricultural/forestal districts, etc.) are discussed in other reports developed for the EIS.

A. Topography

Methodology and Existing Conditions

The study area is located within the Coastal Plain Physiographic Province of Virginia. The Coastal Plain in Virginia extends inland from the coast about 110 miles to the Fall Line of Virginia and passes roughly through Fairfax County and the Cities of Fredericksburg, Richmond, Petersburg, and Emporia. The study corridor crosses two Coastal Plain sub-provinces: the Upland Sub-province and the Lowland Sub-province. The small sections of the corridor which cross the Coastal Upland Sub-province are

characterized as a broad upland with low slopes and gentle drainage divides. Steep slopes develop where the area is dissected by stream erosion. Elevations within this subprovince range from 60 – 250 feet above mean sea level (MSL). The majority of the study area corridor is generally characterized as coastal lowland drained by an elaborate network of streams and rivers, which flow east to the Atlantic Ocean. The Coastal Lowland Sub-province is flat, with low relief areas along major rivers and near coastal areas of the Chesapeake Bay. Elevations in the Coastal Lowlands are generally between 0-60 feet above mean MSL.

The length of the study corridor is north of the James River and south of the York River but crosses many major tributaries to these systems including the Chickahominy River at Bottoms Bridge and the headwaters of the Warwick River in Newport News. A dendritic network of creeks and small streams rise near the center of the landform and meander south and north to the James and York Rivers, respectively, producing a dissected landscape of ridges, steep slopes, and floodplains. The study area spans the following United States Geologic Survey (USGS) 7.5-minute quadrangle maps (from west to east): Richmond, Seven Pines, Quinton, Tunstall, Providence Forge, Walkers, Toano, Norge, Williamsburg, Hog Island, Yorktown, Mulberry Island, Newport News North, and Hampton. A topographic map showing the entire study area is included as **Figure 2**. This map was created using the Environmental Systems Research Institute (ESRI) World Topographic Map layer which was compiled to uniform cartography using a variety of best available sources from several data providers, including the USGS, United States Environmental Protection Agency (USEPA), United States National Park Service (NPS), Food and Agriculture Organization of the United Nations, Department of Natural Resources Canada, Agriculture and Agri-Food Canada, Dutch Kadaster, DeLorme, NAVTEQ, TomTom (select countries in Eastern Europe and select European island nations), and ESRI.

Within the study area, elevations range from 0 to 180 feet above MSL. According to the topographic maps of the area, the mean elevation through the proposed project area is approximately 82.14 feet above MSL.

Potential Impacts and Mitigation Measures

There is very little topographic relief along the corridor. In addition, the study involves potential widening along the existing, already disturbed I-64 corridor. In terms of topography, the highway corridor is already suitable for the proposed widening activities, and therefore, no adverse changes to topography would occur. No measures to mitigate potential topographic changes are warranted.

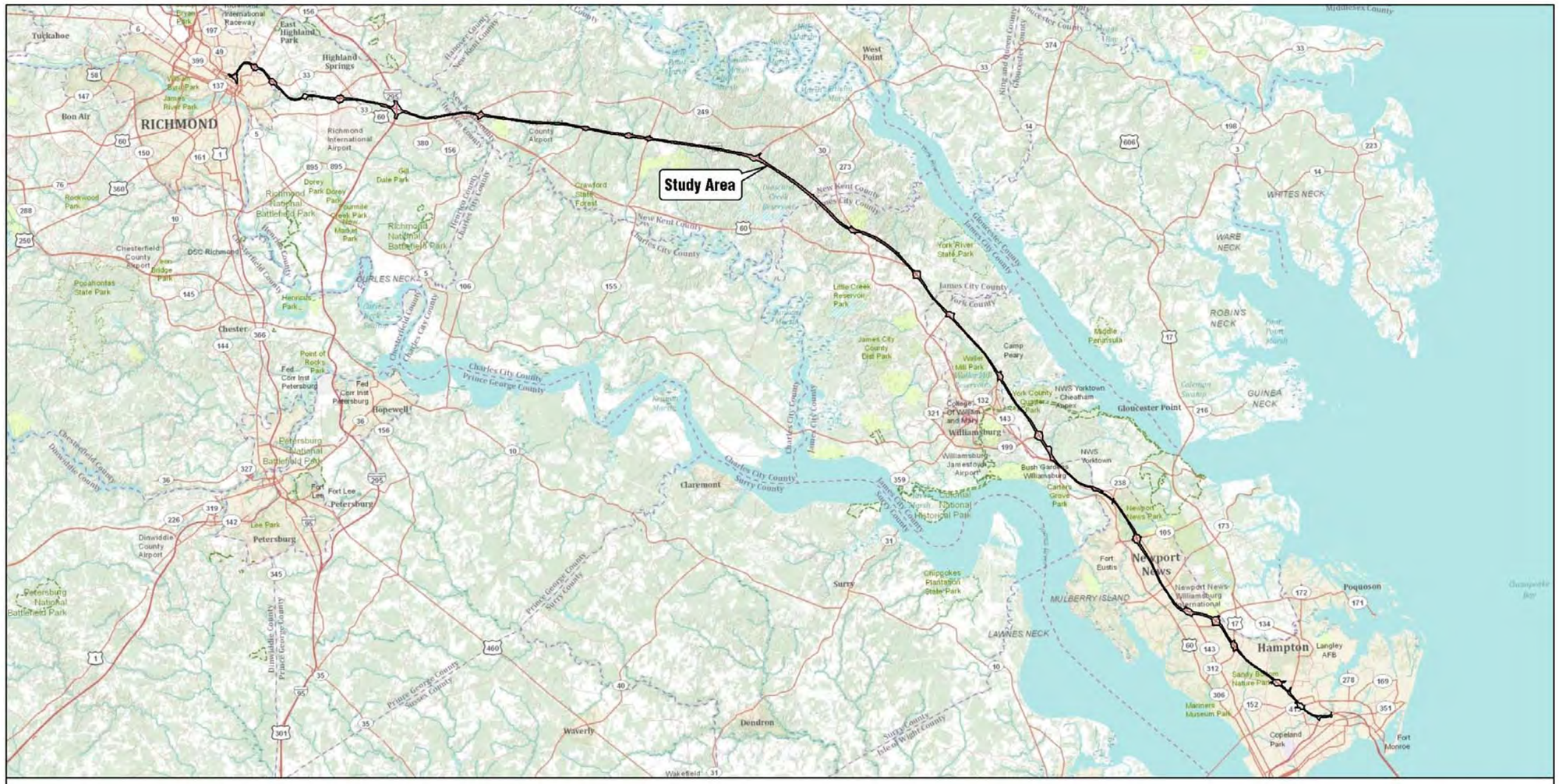
B. Geology

Methodology and Existing Conditions

The study area is located within the Coastal Plain Physiographic Province of Virginia. According to the Geologic Map of Virginia, the Coastal Plain is composed mostly of unconsolidated deposits, primarily alternating layers of sand, gravel, shell rock, silt, and clay. Geologically speaking, this physiographic province is still considered a young landscape sculpted during the last few million years by the repeated rising and falling of sea level during several cycles of Pleistocene glaciations.

The Coastal Plain, in general, is underlain by a thick wedge of sediments that increases in thickness from a featheredge near the fall zone to more than 4,000 meters under the continental shelf. These sediments rest on an eroded surface of Precambrian to early Mesozoic rock. Two-thirds of this wedge is comprised of late Jurassic and Cretaceous clay, sand, and gravel. These layers were stripped from the Appalachian mountains, carried eastward by rivers and deposited in deltas in the newly formed Atlantic Ocean basin.

A sequence of thin, fossiliferous marine sands of Tertiary age overlies the older strata. They were deposited in warm, shallow seas during repeated marine transgressions across the Coastal Plain. This pattern of deposition was interrupted about 35 million years ago by a large meteorite that plummeted into



N

1 inch = 5 miles

0 5 10 Miles

Source:
ESRI Basemap Service - World Topographic Map (August 2012)

Figure 2
Topographic Map

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT

a shallow sea, which created the Chesapeake Bay. It was subsequently buried under about 1.2 kilometers of younger sediment.

The latest soils of Tertiary and Quaternary sand, silt, and clay, which cover much of the Coastal Plain, were deposited during interglacial highstands of the sea under conditions similar to those that exist in the modern Chesapeake Bay and its tributaries.

The western end of the study corridor begins near the Fall Line of Virginia, a low escarpment where the sedimentary rocks of the Coastal Plain meet the metamorphic rocks of the Piedmont, and extends across the inner and outer Coastal Plain to the Chesapeake Bay. The Coastal Plain is a terraced landscape that steps down to the coast and to the major rivers.

The study area corridor includes both the Cenozoic Era Tertiary and Holocene formations. The corridor extending from the City of Richmond to south of the City of Williamsburg is underlain by Tertiary-age formations which consists of sand, mud, limey sand and muck. The Holocene-age formations, which consists of sand, marsh, and peat deposited in beaches, marshes, swamps, and estuaries underlies the eastern section of the corridor.

According to information provided by the Virginia Department of Conservation and Recreation (VDCR) through the project scoping process, there are no karst features located within the study area corridor.

Potential Impacts and Mitigation Measures

There are no geological conditions or unique geologic resources along the study area corridor that would be adversely affected by the proposed activities. Seismic risks are low and would not affect the construction or interstate operation. No mitigation action related to geological or seismic conditions is warranted. All limitations that may be associated with any geological constraints can be mitigated for through standard engineering practices.

C. Soils

Methodology and Existing Conditions

The study area is located within the Coastal Plain Physiographic Province of Virginia. Parent material in the Coastal Plain consists mainly of marine and alluvial deposits. It is very rich in quartz with most soils containing 50% with the highest concentration of up to 80 – 90%. Feldspars are also common in Coastal Plain parent material, but tend to be in lower quantity (up to 25%). Micas, iron oxides, heavy minerals and clay minerals are common in small amounts. Organic parent materials are common in the numerous swamps and marshes across the region.

The soils within the study area corridor were identified using the United States Department of Agriculture Soil (USDA) Natural Resources Conservation Service (NRCS) County Soil Surveys and digital mapping. Classified soils are grouped into general soil map units and have broad areas with distinctive patterns of soils, relief, and drainage. Each unit is named for the major soils it contains; however, a unit may also consist of several minor soil classifications. The soils in any one general soil map unit may differ across a region in slope, depth, drainage and other characteristics. The classified unit provides many details regarding the characteristics of the soil including soil structure or components, the ability to retain water, and how easily the soil erodes. For many counties/localities, there is a soil type identified as “NOT COM”, which stands for “Not Complete”, indicating a gap in the NRCS data.

According to NRCS, a hydric soil is a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part. The NRCS maintains the official list of hydric soils. The presence of hydric soils is required for the legal definition of a wetland.

Also according to NRCS, the likelihood of a soil type to erode can be expressed as a "K" value. The K factor is a soil erodibility factor which represents both susceptibility of soil to erosion and the rate of runoff, as measured under the standard unit plot condition. The higher the K value, the more easily the soil would erode. Soils high in clay have low K values (about 0.05 to 0.15) because they are resistant to detachment. Coarse textured soils, such as sandy soils, also have low K values (about 0.05 to 0.2) because of low runoff, even though these soils are easily detached. Medium textured soils, such as the silt loam soils, have a moderate K values (about 0.25 to 0.4) because they are moderately susceptible to detachment and they produce moderate runoff. Soils having a high silt content (K values greater than 0.4) are most erodible of all soils. They are easily detached, tend to crust, and produce high rates of runoff.

While the K value indicates the likelihood of a soil type to erode, there are a number of factors that also contribute to the soils erodibility. Organic matter reduces erodibility as it reduces the susceptibility of the soil to detachment and increases infiltration, reducing runoff and therefore, erosion. In addition, soil structure affects both susceptibility to detachment and infiltration. Permeability of the soil profile affects K because it affects runoff. Since the K factor represents soils in their natural state, the value may need to be increased if the subsoil is exposed or where the organic matter has been depleted, the soil's structure destroyed or soil compaction has reduced permeability.

There are a total of 115 soils map units within the study area, as identified from the NRCS Soil Survey Maps. The tables in **Appendix A** identify soil mapping units, along with general characteristics of those soil units, within the City of Richmond (14 soil map units), Henrico County (44 soil map units), New Kent County (36 soil map units), James City County (24 soil map units), York County (25 soil map units), City of Newport News (22 soil map units), and the City of Hampton (11 soil map units). It should be noted that the actual soil types throughout the study area, particularly in high population areas, may differ from the soil survey, primarily due to urban development that has occurred since the soil survey data was collected. Summary tables of the soil types and maps depicting the different soil types along the study area corridor are included in **Appendices A and B**, respectively.

There are a variety of soil units, with associated characteristics, identified across the corridor. Loamy soils, with a predominance of sand and silt, are common across the study area. Loam is a soil composed of sand, silt, and clay in approximate concentrations of 40-40-20%, respectively. Loam soils generally contain more nutrients and humus than sandy soils, have better drainage and infiltration of water and air than silty soils, and are easier to move through than clay soils.

Soils were identified ranging from somewhat extensively well drained to very poorly drained throughout the corridor. While varying ranges of soil drainage were identified throughout the corridor, the eastern part of the study area commonly exhibited poorly drained soils. In addition, hydric soils are located throughout the corridor and generally correspond to areas where wetland systems were identified (as described in Section D, below). In general, the depth to the water table decreases from west to east; however, the greatest water depths were associated with soil units located in the middle of the study area. There were varying levels of soil erodibility across the corridor with K values ranging from 0.1 (Catpoint fine sand in New Kent County; Nevarc-Uchee complex in New Kent County, James City County and the City of Newport News; Uchee loamy fine sand in New Kent County, James City County and the City of Newport News; and Seabrook-Urban land complex in Hampton City) to 0.49 (Duplin very fine sandy loam and Kempsville very fine sandy loam, clayey substratum in Henrico County).

The most prevalent soils, based on acreage within the study area corridor, are the Nevarc-Remlik complex found in New Kent and James City Counties. This soil unit is found on approximately 13% of the study area corridor and had the highest number of occurrences (202) along the corridor. The Chickahominy-Urban Land complex, found in York County and the Cities of Newport News and Hampton, and the

Kempsville-Emporia complex and Craven-Uchee complex, found in New Kent, James City, and York Counties, comprise approximately 18% (6% each) of the study area corridor.

Potential Impacts and Mitigation Measures

The proposed widening associated with the Build Alternatives would be built on the appropriate fill or cut materials. Soils used for this purpose would be subjected to specifications designed for the road building purposes. Any required mitigation of soils with substantial limitations would be resolved as part of the contract special provisions.

No substantial mitigation of soils with severe limitations is anticipated. Careful design and construction practices, as well as adherence to applicable erosion and sediment control regulations, stormwater management regulations, and on-site waste disposal regulations are sufficient to avoid impacts on soils. No mitigation measures are required.

D. Surface Waters

1. River Basin Information

The study area corridor falls within three of the twelve major river basins in Virginia, specifically the James River (Lower James River sub-basin), the York River, and the Chesapeake Bay/Atlantic Ocean and Small Coastal Basins. All drainage along the study area corridor ultimately flows from west to east, eventually entering the Chesapeake Bay. The following provides additional information on the major river basins and areas located along the study area corridor.

The USGS has assigned a hydrologic unit code (HUC) to all major watersheds in the United States. The western section of the corridor is located in the Lower James River watershed (HUC 02080206), with the drainage throughout this area of the corridor generally flowing to the south. The study area then drains to the northeast to the York River watershed (HUC 02080107). In York County, drainage again flows to the Lower James River watershed (HUC 02080206). The eastern section of the study area corridor drains to the Chesapeake Bay-Lynnhaven-Poquoson watershed (HUC 02080108). Table 1 describes the locations of the three major river basins along the corridor. In addition, the HUC eight digit watersheds are included on the mapping in Appendix C.

The James River Basin occupies the central portion of Virginia and covers 10,265 square miles or approximately 24% of the Commonwealth's total land area. As Virginia's largest river basin, it is composed of the Upper, Middle, and Lower James River sub-basins, as well as, the Appomattox River sub-basin. The James River Basin begins in the Alleghany Mountains and flows in a southeasterly direction to Hampton Roads where it enters the Chesapeake Bay. The river is formed by the confluence of the Jackson and Cowpasture Rivers and flows 242 miles to the Fall Line at the City of Richmond and another 106 miles to the Bay. Other major tributaries to the James River (from west to east) include the Maury River, Tye River, Rockfish River, Slate River, Rivanna River, Willis River, Appomattox River, Chickahominy River, Pagan River, Nansemond River, and the Elizabeth River.

The topography of the James River Basin varies throughout the four physiographic provinces that it spans. For the area west of the City of Richmond, the Piedmont Province extends to the Fall Line in the City of Richmond with scattered hills and small mountains, gradually turning into gently rolling slopes and lower elevation in the eastern portion of the province. The Fall Zone, which separates the Coastal Plain Province from the Piedmont Province, is a three mile stretch of river running through the City of Richmond where the river descends 84 feet as it flows from the resistant rocks of the Piedmont to the softer sediments of the Coastal Plain. Over 65% of the entire James River Basin is forested, with 19% in cropland and pasture. Approximately 12% is considered urban. The population of the entire James River Basin is concentrated in Tidewater and the Greater Richmond – Petersburg area.

In comparison to the James River Basin, the York River Basin is substantially smaller in size. This basin lies in the central and eastern section of Virginia and covers 2,674 square miles or 6% of the Commonwealth's total area. The headwaters of the York River begin in Orange County and flow in a southeasterly direction for approximately 220 miles to its mouth at the Chesapeake Bay. The York River is only approximately 30 miles in length and has only two major tributaries: the Pamunkey River (with the North and South Anna Rivers and the Little River as major tributaries) and the Mattaponi River (composed of the Matta, Po, and Ni Rivers).

Table 1: Major River Basins along the Study Area

Basin	HUC	General Drainage Direction	Approximate Watershed Boundary along the Project Corridor	Localities within the Project Corridor
Lower James	02080206	South	I-95 Interchange to Exit 227 (Toano)	City of Richmond, Henrico County, New Kent County, James City County
York	02080107	Northeast	Exit 227 (Toano) to Mile Marker 244 (just east of Exit 243, Busch Gardens)	James City County, York County
Lower James	02080206	South	Mile Marker 244 (just east of Exit 243, Busch Gardens) to Exit 255 (Jefferson Avenue)	York County, James City County, City of Newport News
Chesapeake Bay-Lynnhaven-Poquoson	02080108	North / East	Exit 255 (Jefferson Avenue) to I-664 Interchange	City of Newport News, City of Hampton

Lying in the Piedmont and Coastal Plain physiographic provinces, the York River Basin's topography is characterized by slightly rolling hills at the headwaters indicative of the Piedmont Physiographic Provide to the Coastal Plain Physiographic Province's gently sloping hills and flat farmland near its confluence with the Chesapeake Bay. Tributaries in the central Piedmont exhibit moderate and near constant profiles. Their flat slope largely characterizes streams in the Coastal Plain. Approximately 65% of the land area is forested. Farmland and pasture account for approximately 20% of the land area. Approximately 10% of the river basin land area is urban. The only major city that falls within this basin is a section of Williamsburg.

The Chesapeake Bay/Atlantic Ocean and Small Coastal Basins are located in the eastern part of Virginia and covers 3,592 square miles or approximately 8% of the Commonwealth's total land area. The combined basins encompass, in addition to the Bay itself, the small bays, river inlets, islands and shoreline immediately surrounding the Chesapeake Bay and the southern portion of the Delmarva Peninsula.

The topography of the Chesapeake Bay/Atlantic Ocean and Small Coastal Basin has little variation. The entire basin lies within the Coastal Plain Physiographic Province where elevations average no more than a few feet above sea level. More substantial elevation occurs along the central spine of the Eastern Shore portion, which forms a plateau about 45 feet above sea level. Much of the Chesapeake Bay/Coastal Basin

is marshland. About 30% of the Chesapeake Bay/Atlantic Ocean and Small Coastal Basin is forested, while nearly 22% is in cropland and pasture. Approximately 24% is considered urban.

Tributaries in the Chesapeake Bay/Atlantic Ocean and Small Coastal Basins drain into the Chesapeake Bay or the Atlantic Ocean. Major tributaries flowing into the Chesapeake Bay from the western shore are the Great Wicomico River, Piankatank River, Fleets Bay, Mobjack Bay including the East, North, Ware, and Severn Rivers, Poquoson River, Back River and Lynnhaven River.

A number of non-tidal and tidal surface water systems (including both wetlands and stream channels) are located along the study area corridor. These waters are detailed in the sections below. These systems have been identified both north and south of the mainline, as well as, within the median. Systems were also identified within and adjacent to a number of the interchanges. Stream channel types include perennial, intermittent, and ephemeral systems.

Major rivers along the study area corridor include the Shockhoe Creek, Chickahominy River, Boar Swamp, Rumley Marsh, Diascund Creek, Beaverdam Creek, Wahrani Swamp, Queen Creek, and Newmarket Creek. Numerous smaller tributary drainages to these major systems cross the study area.

2. Navigable Waters of the United States (Section 10 Waters)

Methodology and Existing Conditions

Navigable Waters of the United States are regulated by the United States Army Corps of Engineers (Corps) under Section 10 of the Rivers and Harbors Act of 1899. The Corps general definition of navigable waters of the United States is "those waters subject to the ebb and flow of the tide shoreward to the mean high water mark and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. A determination of navigability, once made, applies laterally over the entire surface of the waterbody, and is not extinguished by later actions or events which impede or destroy navigable capacity." This includes, by definition, all tidal waterbodies including streams/ rivers and wetlands.

According to both the Navigable Waters of the United States Section 10 of the Rivers and Harbor Act list (Norfolk District Corps, March 5, 2010) and the United States Department of Transportation (USDOT) National Transportation Atlas Database (Version 11), there are no navigable waters identified within the study area corridor. However, neither of these sources includes tidal features in their database. The Corps, by definition, considers all tidal systems as navigable. The tidal features along the study area corridor are detailed in Section D.3 below, and include the channels (4,467 linear feet) and associated wetland systems (29.53 acres) of Queen Creek and Newmarket Creek.

Potential Impacts and Mitigation Measures

No-Build Alternative

The No-Build Alternative would not involve any project-related construction or changes to the natural environment. As a result, project-related impacts to navigable waters from the No-Build Alternative are not anticipated.

Build Alternatives

In accordance with the federal and state regulations governing streams and wetlands, efforts have been made to reduce the potential for impacts to navigable waters, wherever possible. However, because the Build Alternatives involve the widening of an existing corridor which currently crosses Queen Creek and Newmarket Creek (and the associated wetlands) impacts are unavoidable. **Table 2** summarizes the potential impacts to navigable waters associated with the different Build Alternatives. The potential impacts to both streams and wetlands are very similar for all Build Alternatives.

The values listed in **Table 2** represent an overlay of each Build Alternative's construction footprint. The existing crossings over Queen Creek and Newmarket Creek are span bridges. Therefore, the true footprint of the impact would be minimized due to the widening of these existing bridges. Additional discussion of the tidal waters and avoidance and minimization and compensatory mitigation measures for navigable waters (tidal systems) for this study are detailed in Section D.3.

Table 2: Potential Impacts to Navigable Waters of the United States

Build Alternative	Tidal	
	E2EM1P Wetlands (acres)	Other Waters of the United States (linear feet)
Alternatives 1A/2A	28.01	3,012
Alternatives 1B/2B	27.76	2,932
Alternative 3	27.83	2,936

3. Waters of the United States (Section 404/Section 401)

Methodology and Existing Conditions

All surface waters, including streams, lakes, ponds, and wetlands are protected and regulated by both the Corps and the Virginia Department of Environmental Quality (VDEQ) through Sections 404 and 401, respectively, of the Clean Water Act (CWA). These systems are collectively referred to as Waters of the United States (WUS), and refer to water bodies such as streams, rivers, wetlands, reservoirs, etc. The VDEQ also regulates these resources through the Virginia Water Protection Permit (VWPP) Program Regulation 9 VAC 25-210. In addition, in Virginia the Virginia Marine Resources Commission (VMRC) has jurisdiction over subaqueous bottoms or bottomlands, tidal wetlands, and coastal primary sand dunes through the Virginia Wetlands Act (Chapter 13, Title 28.2 of the Code of Virginia). This agency specifically regulates physical encroachment in, on, or over these resources.

The assessment methodology to identify the presence and location of WUS, including wetlands, within the study area corridor included both desktop and field review components. The desktop component involved the review of the United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) maps and USGS 7.5-minute topographic quadrangles to identify perennial and intermittent streams subject to the regulations, Resource Protection Area (RPA) maps, hydrologic soils mapping, and natural color aerial imagery.

A surface water assessment was completed along the corridor in June, July, November and December of 2011 and March 2012. The field review was completed in areas which could be accessed within the study area corridor as depicted in the mapping in **Appendix C**. For sites where the areas could not be accessed due to fencing or landowner limitations, mapping of systems was conducted using the desktop review. Surface waters were designated as either a wetland (labeled WET) or other WUS (labeled WUS). The systems were further designated as being located north of the mainline ("N"), south of the mainline ("S"), or within the median ("M"). The same physical stream channel or wetland system may have different designations if they are located within more than one area (north or south of the mainline and/or within the median).

Wetlands were identified in the field in accordance with the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987) and supplemental guidance papers issued by the Corps, the NRCS, and the USFWS. This method requires the positive identification of three wetland parameters

during normal circumstances: hydrophytic vegetation, hydric soils, and wetland hydrology. After identification in the field, wetlands were then classified according to the Cowardin System, as described in *A Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979). Regional supplements were not followed and Rapanos forms were not completed as part of this study's scope of work. The supplements were not followed to maintain consistency with earlier work conducted by VDOT staff. The boundaries of the systems were mapped using Global Positioning System (GPS) and identified on project base mapping. Wetland data sheets and Unified Stream Methodology (USM) Form 1s were completed for representative systems (N, S, and M) along the corridor. The wetland data sheets and USM Forms are included in **Appendix D**. Tables summarizing various characteristics of each system are included in **Appendix E**. Road side ditches (some jurisdictional and others non-jurisdictional) were common along the corridor and were assessed following guidance provided by the Corps and VDEQ, both in written communication and in personal communication during a pre-field work site visit held with the Corps on June 8, 2011. The procedures for completing the wetland and stream assessment, including not using the regional supplement and the approach to address stormwater management features were discussed with and agreed to by the Corps during the June 8, 2011 meeting.

On August 17, 2011, an on-site meeting was held with the Corps to review representative identified wetland and other WUS areas along the study area corridor. A formal jurisdictional determination was not completed at this point in time as part of the study scope of work. Therefore, all linear footage and acreage estimates within this report referencing jurisdictional features are subject to verification by the Corps.

Uplands tend to be graded down to the road level. Fill material was generally identified near stream crossings / bridges throughout the study area corridor. At the eastern end of the corridor due to the low elevation and generally flat terrain the existing highway was constructed on fill to promote drainage and limit flooding. Where the median has not been graded or is now concreted, drainage ditches line both sides of the eastbound and westbound lanes. Some of these drainage ditches were considered as potentially jurisdictional while others were not. East of the Lee Hall/Newport News Reservoir, drainage ditches (many jurisdictional pending determination by the Corps) and sound barriers are common, which have added to the altering of the natural systems.

A number of both stream and wetland systems were identified within and surrounding the interchanges, north and south of the mainline and within the median. Many of the stream systems are unnamed tributaries to the major systems along the corridor. In addition, a number of the streams and wetlands appear to have developed as a result of the original roadway construction, and the consequent drainage and other factors associated with the roadway. As well, many of the larger rivers/stream and wetland systems are currently spanned by bridges. All identified systems (subject to the Corps jurisdictional determination) are show on the mapping in **Appendix C**.

A total of 99.93 acres of wetlands and 148,493 linear feet of other WUS were identified within the study area corridor. The acreage and linear footage of tidal and non-tidal resources are summarized in **Table 3**. A total of 70.40 acres of non-tidal and 29.53 acres of tidal wetlands were identified. The tidal wetlands were associated with Queen Creek and Newmarket Creek. These two stream systems were the only tidal streams identified within the study area (4,467 linear feet). Considering non-tidal stream systems, 127,563 linear feet of perennial channel, 12,490 linear feet of intermittent channel, and 3,800 linear feet of ephemeral channel were identified within the study area. In addition, 173 linear feet of lacustrine resources were identified.

Table 3: Identified Wetlands and Other Waters of the United States within the Study Area

Resource	Wetlands (acres)	Other Waters of the United States (linear feet)
Total Identified Resources	99.93	148,493
Non-Tidal Systems	70.40	144,026
Tidal Systems	29.53	4,467

Bridges with pier supports currently span the tidal systems, in addition to many of the larger, non-tidal resources. Any improvements along these areas would include the widening of the existing bridges, limiting the potential permanent impacts to primarily impacts associated with pier work.

As summarized in **Tables 4, 5, and 6**, the median had the least amount of both wetlands and other WUS. The greatest amount of wetlands and greatest amount of other WUS were identified south and north of the mainline, respectively. Regarding tidal features, the least amount of resources were identified within the median (0.66 acres of wetlands and 98 linear feet of other waters), the greatest amount of wetlands (21.73 acres) were identified south of the mainline, and the greatest amount of other WUS (4,249 linear feet) was located north of the mainline. Tables summarizing the quantity of impact for each stream and wetland system located within the study area are included in **Appendix F.**

Table 4: Location of Identified Wetlands and Other Waters of the United States within the Study Area

Location	Wetlands (acres)	Other Waters of the United States (linear feet)
North of Mainline	35.80	66,370
Median	18.09	19,275
South of Mainline	46.04	62,848

Table 5: Wetlands Identified within the Study Area

Classification	Acreage Located North of the Mainline	Acreage Located within the Median	Acreage Located South of the Mainline	Total Acreage
E2EM1P	7.14	0.66	21.73	29.53
PEM	11.60	0.22	11.28	23.10
PSS	2.74	0.06	1.92	4.72
PFO	14.32	17.15	11.11	42.58
			Grand Total	99.93

Palustrine systems are all non-tidal wetlands dominated by trees, shrubs, and persistent emergent herbaceous plants. Palustrine forested wetlands (PFO) were the most common types of wetlands identified within the study area (42.58 acres). These types of systems are non-tidal wetlands

characterized by the domination of woody vegetation greater than 20 feet in height with greater than 30% canopy cover. Many of these systems typically have an overstory of trees with an understory of young trees and shrubs and an herbaceous layer. All water regimes are potentially present, except subtidal and permanently flooded, are included. Estuarine intertidal emergent wetlands (E2EM) associated with Newmarket Creek and Queen Creek were the second most common type identified (29.53 acres). This large value is primarily due to the wide study area around the I-664 interchange near Newmarket Creek. These systems include deepwater tidal habitats and adjacent tidal wetlands that are usually semi-enclosed by land but have open, partly obstructed, or sporadic access to the ocean, with ocean-derived water at least occasionally diluted by freshwater runoff from the land. The upstream and landward limit is where ocean-derived salts measure less than 0.5 ppt during the period of average annual low flow.

Approximately 23.10 acres of palustrine emergent wetlands (PEM) were the identified within the study area. These non-tidal wetlands are characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years, and the systems are typically dominated by perennial plants. There is a variety of water regimes that influence the soil, vegetation and habitat characteristics. Palustrine scrub shrub wetlands (PSS) were the least common along the study corridor (4.72 acres). This non-tidal wetland type is generally defined by greater than 30% canopy cover of shrubs or small trees less than 20 feet in height. Plant species typically include true shrubs, young trees, and trees or shrubs that are small or stunted due to environmental conditions. All water regimes except subtidal and permanently flooded are potentially included in this system type.

Table 6: Other Waters of the United States Identified within the Study Area

Classification	Linear Feet Located North of the Mainline	Linear Feet Located within the Median	Linear Feet Located South of the Mainline	Total Linear Feet
Ephemeral	326	682	2,792	3,800
L2UBHh (Lacustrine)	0	115	57	173
R1UB2 (Tidal)	4,249	98	120	4,467
R2UB1 (Non-tidal Perennial)	560	27	8,501	9,088
R2UB2 (Non-tidal Perennial)	50,481	16,654	37,304	104,439
R2UB3 (Non-tidal Perennial)	3,181	500	10,356	14,037
R4UB2 (Non-tidal Intermittent)	7,506	1,198	3,718	12,423
R4UB3 (Non-tidal Intermittent)	67	0	0	67
			Grand Total	148,493

Non-tidal perennial stream systems were the most common types of other WUS (127,563 linear feet) identified within the study area. A perennial stream is a system which has constant flow at all times with the possible exception of times of extreme drought. Non-tidal intermittent channels were the second most common other WUS identified (12,490 linear feet). An intermittent channel is defined as a system with flow varying based on a number of factors including groundwater table and the discharge from feeder systems. Approximately 4,467 linear feet of tidal systems were identified along Newmarket Creek and Queen Creek. These systems are influenced by the ebb and flow of the ocean tides. Ephemeral channels are those channels which are not influenced by the groundwater table but only have water flowing through them as the direct response to recent and local precipitation. Approximately 3,800 linear feet of ephemeral channels were identified within the study area. Approximately 173 linear feet of lacustrine system, associated with the Newport News/Lee Hall Reservoir were identities within the study area. Lacustrine systems are those systems which include area of open water greater than 20 acres or more that are 6.6 feet in depth. A number of jurisdictional ditches (pending determination by the Corps) were identified along the corridor. These systems included WUS 6N, WUS 7N, WUS 8N, WUS 10N, and WUS 13N.

The USM is a collaborative effort between the Corps (Norfolk District) and the VDEQ. The USM is a method to simply assess characteristics of a potentially impacted stream and determine the required compensatory mitigation for that system based, in part, on the impact type (e.g., filling, culverts, etc.). The USM is a four part process consisting of the following: 1) assign a Reach Condition Index (RCI) to the stream to be impacted; 2) assess the type or severity of impact; 3) determine the compensation requirement; and, 4) determine what types of and the amount of the various compensation practices that would satisfy the compensation requirement. To determine the RCI, the condition of the channel is assessed for the following four characteristics: channel condition, riparian buffer, in-stream habitat, and channel alteration. In following the USM, RCI scores can range from 0 (lowest condition) to 1.5 (highest condition).

For this study, representative stream channels were assessed using the USM to determine the RCI for that specific reach. Required compensatory mitigation requirements can not be determined at this time as the specific impact type and linear footages are not available. This determination would be completed as part of the permitting process for the project. The RCI scores for the assessed channels ranged from 0.5 (an ephemeral channel) to 1.5 (the Chickahominy River). The USM Form 1s are included in **Appendix D**. The RCI values for the assessed resources are included in the summary table in **Appendix E**.

The majority of both wetland and other WUS systems have been influenced to some degree by the roadway itself or the intense development along the corridor, particularly those systems in or near the Cities of Richmond, Newport News, and Hampton. Many of the systems have been heavily manipulated through past ditching or filling activities associated with the road development and previous improvements. In addition, a number of the channels appear to have developed from drainage from the roadway and a number of wetland systems appear to have developed through constraints associated with and drainage to the interchanges and median. Despite the high degree of previous disturbance, these systems may still provide ecological functions such as wildlife habitat, flood control, and water quality benefits such as nutrient uptake and sediment trapping.

Potential Impacts and Mitigation Measures

No-Build Alternative

The No-Build Alternative would not involve any project-related construction or changes to the natural environment. As a result, project-related environmental effects from the No-Build Alternative are not anticipated.

Build Alternatives

In accordance with the federal and state regulations governing streams and wetlands, efforts have been made to reduce the potential for impacts to jurisdictional WUS, including wetlands, wherever possible. However, because this study involves the widening of an existing corridor which currently crosses numerous stream and wetland systems, impacts are unavoidable. In addition, along the greatest areas of impacts and in areas where bridges already exist, the true footprint of the impact would be minimized due to the widening of the existing bridges. In these cases, the potential activity in surface waters may simply result from the installation of piers. Also, in many cases the impacts are the result of culvert extensions and not complete fill of the system itself. In addition, since the construction area for all Build Alternatives is similar, the difference in total impacts among the Alternatives is similar.

Tables 7, 8, and 9 summarize the potential impacts resulting from each Build Alternative to WUS, including wetlands, along the study area corridor. As shown below, the overall impacts associated with Build Alternatives are very similar. While all Build Alternatives result in very similar overall impacts, the highest amount of both wetland and stream channel tidal impacts would occur from Build Alternatives 1A/2A. The wetland acreages and stream linear footages listed in all summary tables in Section D represent the values associated with an overlay of each Build Alternative's construction footprint.

Table 7: Potential Impacts to Waters of the United States, Including Wetlands

Build Alternative	Wetlands (acres)	Other Waters of the United States (linear feet)
Alternatives 1A/2A	66.11	112,237
Alternatives 1B/2B	64.95	113,544
Alternative 3	66.73	112,516

Table 8: Potential Impacts to Non-Tidal Waters of the United States

Build Alternative	Non-Tidal						
	PFO Wetlands (acres)	PSS Wetlands (acres)	PEM Wetlands (acre)	Perennial Channel (linear feet)	Intermittent Channel (linear feet)	Ephemeral Channel (linear feet)	Lacustrine System (linear feet)
Alternatives 1A/2A	19.74	3.09	15.27	97,148	8,764	3,139	173
Alternatives 1B/2B	19.94	2.39	14.86	98,300	9,064	3,075	173
Alternative 3	20.85	2.91	15.14	96,865	9,405	3,138	173

Table 9: Potential Impacts to Tidal Waters of the United States

Build Alternative	Tidal	
	E2EM1P Wetlands (acres)	Other Waters of the United States (linear feet)
Alternatives 1A/2A	28.01	3,012
Alternatives 1B/2B	27.76	2,932
Alternative 3	27.83	2,936

Tables summarizing the quantity of impact for each stream and wetland system for each Build Alternative are included in **Appendix F. Tables 10 through 15** provide a further breakdown of wetland and stream impacts per resource classification for each Build Alternative.

Table 10: Potential Impacts to Wetlands - Alternatives 1A & 2A

Classification	Acreage Located North of the Mainline	Acreage Located within the Median	Acreage Located South of the Mainline	Total Acreage
E2EM1P	7.06	0.66	20.29	28.01
PEM	9.69	0.22	5.36	15.27
PSS	2.17	0.06	0.86	3.09
PFO	8.72	4.75	6.27	19.74
			Grand Total	66.11

Table 11: Potential Impacts to Other Waters of the United States - Alternatives 1A & 2A

Classification	Linear Feet Located North of the Mainline	Linear Feet Located within the Median	Linear Feet Located South of the Mainline	Total Linear Feet
Ephemeral	326	380	2,433	3,139
L2UBHh (Lacustrine)	0	115	57	173
R1UB2 (Tidal)	2,833	98	81	3,012
R2UB1(Non-Tidal Perennial)	534	27	7,218	7,779
R2UB2 (Non-Tidal Perennial)	43,549	5,088	30,665	79,302
R2UB3 (Non-Tidal Perennial)	3,181	173	6,714	10,067
R4UB2 (Non-Tidal Intermittent)	5,550	90	3,124	8,764
R4UB3 (Non-Tidal Intermittent)	0	0	0	0
			Grand Total	112,237

Table 12: Potential Impacts to Wetlands - Alternatives 1B & 2B

Classification	Acreage Located North of the Mainline	Acreage Located within the Median	Acreage Located South of the Mainline	Total Acreage
E2EM1P	7.04	0.66	20.07	27.76
PEM	9.69	0.22	4.95	14.86
PSS	2.06	0.06	0.27	2.39
PFO	8.64	5.84	5.46	19.94
			Grand Total	64.95

Table 13: Potential Impacts to Other Waters of the United States - Alternatives 1B & 2B

Classification	Linear Feet Located North of the Mainline	Linear Feet Located within the Median	Linear Feet Located South of the Mainline	Total Linear Feet
Ephemeral	312	398	2,365	3,075
L2UBHh (Lacustrine)	0	115	57	173
R1UB2 (Tidal)	2,770	98	65	2,932
R2UB1 (Non-tidal Perennial)	534	27	7,209	7,770
R2UB2 (Non-tidal Perennial)	43,495	6,748	30,179	80,422
R2UB3	3,181	239	6,687	10,107
R4UB2	5,527	427	3,110	9,064
R4UB3	0	0	0	0
			Grand Total	113,544

Table 14: Potential Impacts to Wetlands - Alternative 3

Classification	Acreage Located North of the Mainline	Acreage Located within the Median	Acreage Located South of the Mainline	Total Acreage
E2EM1P	7.04	0.66	20.13	27.83
PEM	9.73	0.22	5.19	15.14
PSS	2.13	0.06	0.72	2.91
PFO	8.72	6.47	5.66	20.85
			Grand Total	66.73

Table 15: Potential Impacts to Other Waters of the United States - Alternative 3

Classification	Linear Feet Located North of the Mainline	Linear Feet Located within the Median	Linear Feet Located South of the Mainline	Total Linear Feet
Ephemeral	325	409	2,404	3,138
L2UBHh (Lacustrine)	0	115	57	173
R1UB2 (Tidal)	2,769	98	68	2,936
R2UB1 (Non-tidal Perennial)	536	27	7,246	7,808
R2UB2 (Non-tidal Perennial)	42,292	7,208	30,277	79,777
R2UB3 (Non-tidal Perennial	3,181	275	5,824	9,280
R4UB2 (Non-tidal Intermittent)	5,829	464	3,113	9,405
R4UB3 (Non-tidal Intermittent)	0	0	0	0
			Grand Total	112,516

The mitigation measures for stream and wetland impacts would be identified for the Preferred Alternative during final design. These measures would include avoidance and minimization efforts to the greatest extent practicable. Some measures which may be considered include: the use and appropriate placement of erosion and sediment control measures and best management practices; the use of upgraded erosion and sediment controls in environmentally sensitive areas; bridging/spanning of streams and wetlands; alignment shifts around specific systems; the use of cofferdams; steepening of slopes and the use of retaining walls on steeper slopes; properly countersunk culverts; stream relocation to improve skew angle and shorten culverts if new culverts are necessary; and ensuring groundwater recharge/wetland hydrology maintenance through the location of outfalls and infiltration trenches. Following construction practices, any additional stormwater generated through new impervious surfaces would be treated through improved stormwater management systems.

Coordination with the Corps, VDEQ, and VMRC would be required during the permitting phase of the project to determine the jurisdictional limits of surface waters and to make a final determination of the need for and type of permits. Both temporary and permanent effects to jurisdictional wetland and stream systems from any of the Build Alternatives would require a permitting decision from these agencies. Based on the scale of the project, the multiple individual impact area crossings and the potential for tidal impacts it is anticipated that a Section 404 Individual Permit from the Corps, a Virginia Water Protection (VWP) Individual Permit from the VDEQ, and a Subaqueous Bottomlands Permit from the VMRC would be required. For VDOT projects, VMRC issues the VGP-1 permit for subaqueous bottom encroachments where the drainage area of the impact zone(s) exceeds five square miles. Wetland impacts are exempted for the State.

Compensatory mitigation would likely be required for permanent impacts to stream and wetlands resulting from the construction activities. Compensatory mitigation is typically required in the same or adjacent HUC within the same watershed and physiographic province as the impact. As part of the permitting process, mitigation options would be investigated using the various agency resources including the July 2004 Joint Corps and VDEQ *Recommendations for Wetland Compensatory Mitigation: Including Site Design, Permit Conditions, Performance Criteria, and Monitoring Criteria* and the associated *Mitigation Checklist*, as well as the March 2008 Offsite Mitigation Guidelines. Of greatest significance, on April 10, 2008, new regulations providing guidance for compensatory mitigation was jointly issued by the Corps and USEPA. The new mitigation rule, which became effective June 9, 2008, changed the federal permitting preference regarding how compensatory mitigation is accomplished for project impacts to jurisdictional surface waters. This rule does not change when compensation is required.

The new rule provides the following preference for compensatory mitigation options:

1. Purchase of compensatory mitigation bank credits.
2. Purchase of an approved in-lieu fee fund credits.
3. Watershed approach based mitigation by the permittee.
4. On-site mitigation/in-kind mitigation by the permittee.
5. Off-site mitigation/out-of-kind mitigation by the permittee.

Both the Corps and VDEQ have currently adopted this hierarchy of compensatory mitigation options for permanent impacts to jurisdictional surface waters. There are currently a number of compensatory mitigation banks that have the appropriate available credits for the potential impacts. The final compensatory mitigation option would be determined during the project's permitting process.

In addition, the compensatory mitigation requirements for both streams and wetlands would be determined for the selected Build Alternative during the permitting phase. The current typical compensatory mitigation to impact ratios for non-tidal forested, scrub-shrub, and emergent wetlands are 2:1, 1.5:1, and 1:1, respectively. The compensatory mitigation to impact ratio for tidal emergent wetlands

is determined on a case-by-case basis; however, 2:1 is typical for these systems. The approved assessment methodology to determine the required stream compensation would be completed as part of the compensatory mitigation plan. As detailed above, at the time of this document, the approved assessment methodology is the USM. All potentially impacted channels would need to be assessed and the USM methodology completed in full to determine the compensatory mitigation requirements for the project. Compensatory mitigation for tidal stream systems would be determined on a case-by-case basis. Compensatory mitigation is typically required for unavoidable stream impacts to greater than 300 linear feet of stream at a crossing. However, this determination would be made on a project-by-project basis and due to the scale of this specific project, this threshold may be waived. At this time, compensatory mitigation is not typically required for impacts to jurisdictional ditches. The requirements for compensation for jurisdictional ditch impacts would be determined during the permitting process. Compensatory mitigation is not typically required for open water impacts (e.g., piers in open waters) but this requirement would be reviewed on a case-by-case basis.

In accordance with the existing regulations and standard permit conditions, all temporary impacts would also be required to be restored to their original contours and re-vegetated with the same or similar species. Additional compensatory mitigation other than previously stated for temporary impacts is typically not required through the permitting process.

E. Water Quality

Methodology and Existing Conditions

State and federal law requires VDEQ to report to the USEPA, as well as the local citizens, the condition of the Commonwealth's water systems. Section 305(b) of the CWA requires each state to submit a biennial report to USEPA describing the quality of its navigable waters. The 305(b) report provides VDEQ's best overall assessment of water quality conditions in the State. The 305(b) process assesses six primary designated uses (identified below), as appropriate for a particular waterbody, based on the regulatory Water Quality Standards. These primary uses are further broken into sub-categories.

- Aquatic Life Use - supports the propagation, growth, and protection of a balanced indigenous population of aquatic life which may be expected to inhabit a waterbody. In Chesapeake Bay waters (mainstem and tributaries), this use is divided into sub-uses that target specific aquatic life assemblages.

- Recreation Use - supports swimming, boating, and other recreational activities.

- Fish Consumption Use - supports game and marketable fish species that are safe for human health.

- Shellfishing Use - supports the propagation and marketability of shellfish (clams, oysters, and mussels).

- Public Water Supply Use - supports safe drinking water.

- Wildlife Use - supports the propagation, growth, and protection of associated wildlife.

Virginia's Water Quality Standards define the water quality needed to support each of these uses by establishing the numeric criteria that physical and chemical data are assessed against. If a waterbody contains more of a pollutant than is allowed by the Water Quality Standards, it would not support one or more of its designated uses as described above. Such waters are considered to have an "impaired" quality. According to the State, "impairment" refers to an individual parameter or characteristic that

violates a Water Quality Standard. A system fails to support a designated use when it has one or more impairments.

To determine if the designated uses are being met, the VDEQ tests, or obtains data for, selected water systems (including rivers, lakes and tidal waters) for pollutants at more than 1,000 locations across the Commonwealth on an annual basis. The samples are tested for over 130 contaminants including levels of nutrients, solids, bacteria associated with human and animal wastes, toxic metals, some pesticides and harmful organic compounds. Field tests are also performed for dissolved oxygen, pH, temperature, salinity, and additional indications of water quality. Sediment samples are tested for the presence of pesticides and other harmful compounds including levels of nutrients, solids, bacteria associated with human and animal wastes, toxic metals, some pesticides and harmful organic compounds. Waters that do not meet standards are reported to the citizens of Virginia and the USEPA in *Virginia Water Quality Assessment 305(b)/303(d) Integrated Report*.

VDEQ has developed this impaired waters list in even years since 1992. The impaired waters list describes segments of streams, lakes and estuaries that exhibit violations of Water Quality Standards. The report details the pollutant responsible for the violations, and the suspected cause and source of the pollutant. All anthropogenically impaired waters in Virginia are placed on a federally mandated 303(d) impaired waters list. Waters that are impaired due to human activities require a plan to restore water quality and associated designated use(s). VDEQ schedules each of these waters for development of a Total Maximum Daily Load (TMDL), which is a reduction plan that defines the limit of a pollutant(s) that a water can receive and still meet water quality standards. A TMDL Implementation Plan is developed after a TMDL is approved by USEPA. Once fully implemented, the TMDL Implementation Plan would restore the impaired waters and maintain its water quality.

The type of water quality data or parameters collected is determined by the waterbody's classification and corresponding Water Quality Standards. The information gathered from the monitoring stations determines the "use support" status of waterbodies, or how well a waterbody supports its designated uses. The categories are divided into the following categories based on USEPA guidelines. VDEQ has included sub-categories to these federally mandated categories, as described in the "impaired waters" Categories 4 and 5 below.

- Category 1 – Waters support one or more designated uses.

- Category 2 - Available data and/or other information indicate that some, but not all of the designated uses are supported.

- Category 3 – Insufficient data and/or information to determine whether any designated uses are met.

- Category 4 – Waters are impaired or threatened but do not need a TMDL.
  - USEPA Category 4A – water is impaired or threatened for one or more designated uses but does not require a TMDL because the TMDL for specific pollutant(s) is completed and USEPA approved.

  - USEPA Category 4B – water is impaired or threatened for one or more designated uses but does not require the development of a TMDL because other pollution control requirements (such as VPDES limits under a compliance schedule) are reasonably expected to result in attainment of the Water Quality Standard by the next reporting period or permit cycle.

  - USEPA Category 4C – water is impaired or threatened for one or more designated uses but does not require a TMDL because the impairment is not caused by a pollutant and/or is determined to be caused by natural conditions.

- Category 5 – Waters are impaired and do need a TMDL.
  - Virginia Category 5A - a Water Quality Standard is not attained. The water is impaired or threatened for one or more designated uses by a pollutant(s) and requires a TMDL (303d list).

  - Virginia Category 5B - the Water Quality Standard for shellfish use is not attained. One or more pollutants causing impairment require TMDL development.

  - Virginia Category 5C - the Water Quality Standard is not attained due to "suspected" natural conditions. The water is impaired for one or more designated uses by a pollutant(s) and may require a TMDL (303d list). Water Quality Standards for these waters may be re-evaluated due to the presence of natural conditions.

  - Virginia Category 5D - the Water Quality Standard is not attained where TMDLs for a pollutant(s) have been developed but one or more pollutants are still causing impairment requiring additional TMDL development.

  - Virginia Category 5E - effluent limited facilities are not expected to meet compliance schedules by next permit cycle or reporting period.

The VDEQ released the *Final 2010 305(b)/303(d) Water Quality Assessment Integrated Report* (Integrated Report) on February 9, 2011. The 2010 Integrated Report is a summary of the water quality conditions in Virginia from January 1, 2003 through December 31, 2008.

As previously detailed, the study area corridor falls within three of the twelve major river basins in Virginia: the James River (Lower sub-basin), the York River, and the Chesapeake Bay/Atlantic and Small Coastal Basins. A number of stream systems and other waterbodies, including reservoirs, in the vicinity of and draining from the study area have been listed as impaired in the 2010 Integrated Report. As summarized in **Table 16**, of those listed, nine surface waters that fall within the study area corridor have been listed as impaired (Categories 4 and/or 5) waters. In addition, according to the 2010 Integrated Report, a number of the systems and tributaries both within and in the vicinity of the study area corridor are under Virginia Department of Health (VDH) Fish Consumption Advisories. These advisories result from elevated levels above the state standards for the listed contaminant potentially associated with human health concerns.

Of these nine Category 4 or 5 waters, the Cause Categories for these waters were identified as 4A, 5A, or 5C. According to the 2010 Integrated Report, a Category 4A water is a water that is impaired or threatened for one or more designated uses but does not require a TMDL because the TMDL for specific pollutant(s) is completed and USEPA approved. In addition, all Category 5 waters are considered impaired and likely needing a TMDL. While waters categorized as 5A, 5B, or 5D in the 2010 Impaired Waters List are waters that VDEQ believes need a TMDL study, Category 5C waters are believed to be impaired due to natural conditions, and further study of each water are needed to determine if a TMDL is applicable or if changes to Water Quality Standards are appropriate to reflect those natural conditions. However, 5C waters are still listed with TMDL development dates in the Impaired Waters List.

Table 16: VDEQ 2010 Impaired Waters (Categories 4 and 5) Intersecting the Study Area

Basin	Water Name	Designated Use	Cause Category	Cause Name
James	Gillies Creek	Recreation	5A	*Escherichia coli*
		Aquatic Life	5A	pH
	Stony Run	Recreation	5A	*Escherichia coil*
	Rumley Marsh	Aquatic Life	5C	Dissolved Oxygen; pH
	Diascund Creek	Recreation	5A	*Escherichia coli*; Dissolved Oxygen
		Aquatic Life	5C	Dissolved Oxygen
	Beaverdam Creek	Aquatic Life	5C	Dissolved Oxygen
	Lee Hall (Newport News) Reservoir	Aquatic Life	5A	Copper; Dissolved Oxygen
		Wildlife	5A	Copper
		Fish Consumption	5A	Mercury & PCB in Fish Tissue
York	Queen Creek	Fish Consumption	5A	PCB in Fish Tissue
		Recreation	4A	*Enterococcus*
		Shellfishing	4A	Fecal Coliform
		Aquatic Life; Shallow-Water SAV	5A	Aquatic Plants (Macrophytes)
		Aquatic Life; Open-Water Aquatic Life	5A	Dissolved Oxygen
Chesapeake Bay/ Atlantic/ Small Coastal	Newmarket Creek – Lower	Aquatic Life; Open-Water Aquatic Life	5A	Dissolved Oxygen
		Aquatic Life; Shallow-Water SAV	5A	Aquatic Plants (Macrophytes)
		Fish Consumption	5A	PCB in Fish Tissue
		Recreation	4A	*Enterococcus*
		Shellfishing	4A	Fecal Coliform
	Newmarket Creek – Upper	Aquatic Life; Open-Water Aquatic Life	5A	Dissolved Oxygen
		Aquatic Life; Shallow-Water SAV	5A	Aquatic Plants (Macrophytes)
		Fish Consumption	5A	PCB in Fish Tissue
		Recreation	4A	*Enterococcus*
		Shellfishing	4A	Fecal Coliform

Six systems, including one reservoir, in the James River basin were listed as impaired in the 2010 Integrated Report. Gillies Creek, Stony Run and Diascund Creek have been placed on the 303(d) list with an impaired use for Recreation for *Escherichia coli*. The sources of the *Escherichia coli* impairments for the three systems are listed as "Unknown". However, Combined Sewer Overflows are also listed for this impairment in Gillies Creek. Rumley Marsh, Diascund Creek, and Beaverdam Creek were all listed for Dissolved Oxygen (Recreation), with the source of this impairment stated as Natural Conditions – Water Quality Standards Use Attainability Analysis Needed. Levels of pH measured beyond the required standard were identified in Gillies Creek and Rumley Marsh, causing an impaired designated use for Aquatic Life. For Rumley Marsh, 2010 was the initial listing of this impaired use.

The Lee Hall Reservoir (also commonly referred to as the Newport News Reservoir) was listed for exceeding copper levels (for both the Aquatic Life and Wildlife designated uses). This impairment was initially listed for the reservoir in 2004. In addition, PCB and Mercury concentrations in the reservoir have exceeded state standards, resulting in the issuance of fish advisories from the VDH. This year (2010) was the first year these impairments have been listed for the reservoir. The reservoir was also listed for Dissolved Oxygen (Aquatic Life), with the initial listing for this impairment occurring in 2006. The source(s) of all the impairments for the reservoir are listed as "Unknown" in the 2010 Integrated Report.

Queen Creek, the only listed watercourse along the corridor in the York River Basin, was listed for *Enterococcus* (Recreation), Shellfishing (Fecal Coliform), Aquatic Life/Open-Water Aquatic Life (Dissolved Oxygen) and Aquatic Life/Shallow-Water Submerged Aquatic Vegetation (SAV) (Aquatic Plants [Macrophytes]). In addition, Queen Creek has posted a PCB Fish Consumption advisory based on the assessment activities. All source(s) of impairments are listed as "Unknown" with the exception of the Aquatic Life/Shallow-Water SAV designated use. These listed sources include Non-Point Source and Point Source and Combination of Stormwater Wet Weather Discharges, Industrial and Municipal Point Source Discharges, Loss of Riparian Habitat, Atmospheric Deposition of Nitrogen, Internal Nutrient Recycling; Agricultural Practices, Sediment Resuspension (Clean Sediment) and Sources Outside the state Jurisdiction or Borders. This system was initially listed in 1998 for 1998 (Shellfishing – Fecal Coliform). There are no new listed impairments in 2010.

In the Chesapeake Bay/Atlantic/Small Coastal Basins, both the upper and lower sections of Newmarket Creek have been listed for Aquatic Life/Open-Water Aquatic Life (Dissolved Oxygen), Aquatic Life/Shallow-Water SAV (Aquatic Plants [Macrophytes]), Recreation (*Enterococcus*), Shellfishing (Fecal Coliform), and Fish Consumption (PCB in Fish Tissue). The source(s) of the PCB in Fish Tissue and *Enterococcus* are listed as "Unknown". Sources for the Dissolved Oxygen and Aquatic Plants (Macrophytes) impairment are listed in the report and include Non-Point Source and Point Source and Combination of Stormwater Wet Weather Discharges, Loss of Riparian Habitat, Municipal and Industrial Point Source Discharges, Atmospheric Deposition of Nitrogen, Internal Nutrient Recycling, Agricultural Practices, and Sources Outside the State Jurisdiction or Borders. For both sections of Newmarket Creek, the systems were originally listed in 1998 (for Shellfishing - Fecal Coliform), and there were no new listed impairments in 2010.

A table providing a detailed summary, including the water name and location, designated use, cause group code, category and name, source of pollutant(s), date of initial listing, and TMDL schedule of the impaired waters (Categories 4 and 5) located within the study area corridor is included in **Appendix G**. These systems, as well as systems in the vicinity of the study area, are also depicted on the mapping included in **Appendix H**.

Potential Impacts and Mitigation Measures

No-Build Alternative

The No-Build Alternative would not involve any project-related construction or changes to the natural environment. As a result, project-related environmental effects from the No-Build Alternative are not anticipated.

Build Alternatives

All of the Build Alternatives have the potential to increase levels of certain contaminants within the affected surface waters. These increases would be expected to be minimized with the use of approved sediment and erosion control during construction and implementation of stormwater best management practices. However the Build Alternatives could still affect water quality to some degree, exacerbating problems within sub-watersheds where contaminant levels are already elevated.

Potential impacts during construction could include physical disturbances or alterations, accidental spills, and sediment releases that can affect aquatic life. During construction, wind and rain could severely erode large areas of soil exposed following the removal of vegetation, considerably increasing sediment load to receiving waters. While all of the Build Alternatives have the post-construction potential to affect existing surface waters to a degree, the relatively small amount of new impervious surfaces and related pollutants that the project would add, in addition to the improved stormwater management practices, would be expected to cause only minimal changes, if any, to the corridor water quality.

A number of the surface waters listed as "impaired" are designated, at least in part, due to *Escherichia coli*, *Enterococcus*, and Fecal Coliform. These parameters, in addition to PCB, Mercury, and Copper contamination, would not be affected by highway construction. Another major parameter of impairment in the listed streams is Dissolved Oxygen. Since Dissolved Oxygen concentrations can become adversely low following algal blooms resulting from nutrient loading, any use of nutrient-rich fertilizers or excessive stormwater discharges resulting from the road project could contribute to impairment of the systems. This could also lead to elevated levels of pH, which were causes of contamination in Gillies Creek and Rumley Marsh. The failure to meet the Designated Use for Aquatic Life/Shallow-Water SAV in Newmarket Creek (both the lower and upper sections) and Queen Creek may be increased through the roadway project due to nutrient loading or excessive stormwater discharges (as noted above) and through excessive clearing of existing vegetation.

After construction, impacts associated with the use of the roadway would be primarily based on the potential for contamination of surface waters by runoff from new impervious surfaces. These runoff constituents would likely include heavy metals, salt and associated materials, organic molecules, and nutrients. However, this runoff would be treated by improved stormwater management facilities. Therefore, potential impacts are expected to be minimal, if any.

As part of the construction practices, minimizing or restricting the use of nutrient-bearing (phosphorus and nitrogen) fertilizers, following the proper application of the appropriate fertilizer and/or utilizing appropriate stormwater management facilities that effectively prohibit nutrient loading of receiving waters for the Alternative crossings may be considered, as appropriate. These practices should be implemented not just in the vicinity of streams impaired due to low Dissolved Oxygen, but to all systems to prevent the systems from being listed as impaired in the future. These control measures would also assist in off-setting impairment due to changes in pH and reduced SAV. In addition, clearing practices should be limited to the greatest extent possible to reduce potential for impairment to the systems. Based on the impairments listed, any crossing in the vicinity of a waterway may include stormwater management plans designed specifically to address the particular condition. During construction, all appropriate erosion and sediment control measures would be employed and although impervious surface would increase runoff post-construction, all stormwater would be treated through improved stormwater management facilities.

F. Surface and Groundwater Supply

Methodology and Existing Conditions

The Coastal Plain region in Virginia is composed mostly of unconsolidated deposits, primarily alternating layers of sand, gravel, shell rock, silt, and clay. These extremely permeable layers hold substantial amounts of groundwater. Therefore, the pollution potential in the uppermost unconfined aquifer within this area is very high due to the high permeability and high population density and agricultural activities in the area.

A large portion of Virginia's groundwater use in this region occurs in the two separate groundwater systems: one shallow, one deep. In many areas, a shallow unconfined aquifer system lies above

relatively impermeable clay beds and is the source of water for hundreds of domestic and other small capacity wells. The principal source of major groundwater withdrawals is a deeper system of confined aquifers. The recharge area to these aquifers occurs many miles away where the formations outcrop but infiltration from the water table and a shallower confined aquifer also recharge the deeper confined aquifers. This allows for the passage of pollutants to these deeper regions.

The natural water quality in the Coastal Plain aquifers is high except in areas where saltwater, iron, and hydrogen sulfide occurs. In aquifers near a salt water interface, salt water may migrate west as aquifers are pumped. As a result, water from the deep aquifers near the lower York-James Peninsula generally contains high chloride concentrations, requiring treatment for domestic use. According to the USGS, more than 125 million gallons of water are pumped every day from the aquifers, supplying roughly one million people.

The USEPA defines a sole source aquifer as one which supplies at least 50% of the drinking water consumed in the area overlying the aquifer. According to the USEPA Sole Source Aquifer Virtual Aquifer Map, no sole source aquifers, as defined under Section 1424(e) of the Safe Drinking Water Act, have been designated in the study area or the immediate vicinity. As summarized below, there are a number of reservoirs that provide the population's drinking water.

Under the Ground Water Management Act of 1992, the VDEQ manages groundwater through a program regulating the withdrawals in certain areas called Ground Water Management Areas (GWMA). Currently, there are two GWMAs in the State, including the Eastern Virginia GWMA which comprises the area east of I-95 and south of the Mattaponi and York Rivers. From the City of Richmond/Henrico County border to the study termini in the City of Hampton, the study area corridor lies within the Eastern Virginia GWMA. In accordance with the Ground Water Management Act, any person or entity wishing to withdraw 300,000 or more gallons of groundwater per month in the GWMA must obtain a permit from the VDEQ. However, this project would not involve any water withdrawals.

Seven reservoirs are located in the vicinity of the study area corridor, with the study area bisecting one (Lee Hall/Newport News Reservoir) and intersecting with the upstream limits of Diascund Creek Reservoir. Reservoir information was obtained from various sources, including locality Geographic Information System (GIS) data, communication with localities, locality government websites and Google maps. **Table 17** provides a summary of the reservoirs located in the vicinity of the study area corridor. The locations of these reservoirs are identified on various mapping in this document including **Figure 1** and the mapping in **Appendix C**.

Diascund Creek Reservoir is located in New Kent County south of the study area corridor, near Exit 220 (West Point). Drainage along the study area corridor from approximately the New Kent County line to the Exit 227 (Toano) is to the reservoir. Major stream systems (and their smaller tributaries) that cross the study area corridor and draining to this reservoir include Diascund Creek, Beaverdam Creek, Wahrani Swamp, and Barnes Swamp. Little Creek Reservoir is located in James City County south of the study area corridor, near Exit 231 (Croaker/Norge). Drainage along the study area corridor flows northeast, away from the Little Creek Reservoir. Although located in the two Counties, the water itself in both of these reservoirs is owned by the City of Newport News.

Waller Mill Reservoir, which is surrounded by Waller Mill Park and is the City of Williamsburg's major source of treated waters, is located in York County, south of the mainline, east of Exit 234 (Lightfoot). The reservoir was created by damming the upstream section of Queen Creek. Systems within the study area boundary along this area drain northeast, away from the reservoir.

Skiffes Creek Reservoir is located in the City of Newport News, just south of the mainline near Exit 247 (Yorktown). Drainage from the study area is to the reservoir. The corridor directly crosses the Lee Hall Reservoir (also referred to as the Newport News Reservoir) east of Mile Marker 294. This reservoir, which is formed from the damming of the Warwick River, is surrounded by the Newport News City Park and is an important source of drinking water for the Hampton Roads Peninsula. The Harwoods Mill Reservoir is located in the City of Newport News north of the study area corridor, near Exit 256 (Victory Boulevard). This 265 acre impoundment is the terminal reservoir for the City of Newport News water supply system. Water is pumped into Harwoods Mill from Chickahominy River, and the Diascund Creek and Little Creek Reservoirs. Drainage from the study area corridor flows away from this reservoir. Big Bethel Reservoir is located in York County and the City of Newport News, north of the mainline, near Exit 258 (J Clyde Morris Boulevard). Several systems drain from the study area corridor to this reservoir, including Brick Kiln Creek.

Table 17: Reservoirs in the Vicinity of the Study Area

Reservoir Name	Reservoir Location	Drainage Flow from the Study Area Corridor
Diascund Creek Reservoir	New Kent County (near Exit 220, West Point), south of the corridor	South to the reservoir; corridor bisects upstream limits of reservoir
Little Creek Reservoir	James City County (near Exit 231, Croaker/Norge); south of the corridor	Northeast away from the reservoir
Waller Mill Reservoir	York County (east of Exit 234, Lightfoot); south of the corridor	Northeast away from the reservoir
Skiffes Creek Reservoir	City of Newport News (near Exit 247, Yorktown), south of the corridor	South to the reservoir
Lee Hall Reservoir/Newport News Reservoir	City of Newport News (near mile marker 249)	Study area corridor directly crosses the reservoir
Harwoods Mill Reservoir	City of Newport News (near Exist 256, Victory Boulevard), north of the corridor	South away from the reservoir
Big Bethel Reservoir	York County and the City of Newport News (near Exit 258, J Clyde Morris Boulevard), north of the corridor	Northeast to the reservoir

The VDH - Office of Drinking Water reviews projects for the proximity of the site to public drinking water sources. Through the project scoping process, the VDH provided the following information related to the proximity of public drinking water sources (groundwater wells, springs, and surface water intakes) to the study area corridor.

According to information provided by VDH, for the seven groundwater sources identified in Zone 1 in **Table 18**, only one public groundwater source is located within 100 feet of the existing edge of pavement along the study area corridor. This public groundwater well is owned by New Kent Farms, and is located north of the westbound exit ramp at Exit 211 (Talleysville) in New Kent County. The approximate location of this well is included in **Figure 3**. In addition, of the surface water intakes noted in the **Table 19**, no public surface water intake is located within 100 feet of the existing edge of pavement along the study area corridor.

The Safe Drinking Water Act (SDWA), as amended in 1996, expanded the protection from groundwater based public water supply systems to all public water supply systems, including surface water. The SDWA also required an assessment to evaluate every public water supply system's vulnerability or susceptibility to contamination. The SDWA also required Virginia to develop a Source Water Assessment Program and to submit the plan to the USEPA. This amendment included Virginia adopting a one mile wellhead protection zone around all groundwater public sources. The VDH received USEPA approval for their plan and completed that assessments and susceptibility evaluations on all public water supply systems in the Commonwealth in 2006.

According to the VDH-Office of Drinking Water, they do not manage or administer designated wellhead protection zones along the study area corridor. In addition, according to VDH, of the seven localities along the corridor, only New Kent County and James City County have water supply protection plans; however, they do not have designated protection zones.

Table 18: VDH Groundwater Sources within the Study Localities

Location	City of Richmond	Henrico County	New Kent County	James City County	York County	City of Newport News	Total Wells
Zone 1 (wells within 1,000 feet)	0	0	3	3	1	0	7
Zone 2 (wells within 1 mile)	0	0	16	13	8	4	41
Total Wells in Locality	0	0	19	16	9	4	48

Table 19: VDH Surface Water Intakes within the Study Localities

Location	City of Richmond	Henrico County	New Kent County	James City County	York County	City of Newport News	Total Surface Water Intakes
Zone 1 (intake <5 mile into watershed)	0	0	1	0	2	2	5
Zone 2 (intake >5 miles into watershed)	0	0	1	1	0	0	2
Total Surface Water Intakes in Locality	0	0	2	1	2	2	7


CRESS TER
SEDGE DR
VINEYARDS PKWY
Farms of New Kent
Exit 211 Talleysville
64
New Kent County
106
HALSTEAD LN
Aerial imagery courtesy of VGIN, 2009
INTERSTATE 64 PENINSULA STUDY
Virginia Deptartment of Health Public Wells and Springs Groundwater Sources
Limits of Alternative 1A/2A
Limits of Alternative 1B/2B
Limits of Alternative 3
Existing Right of Way
Figure 3: Farms of New Kent Groundwater Well Location
VDOT
Virginia Department of Transportation
N
0
500
1,000
Feet

Potential Impacts and Mitigation Measures

No-Build Alternative

The No-Build Alternative would not involve any project-related construction or changes to the natural environment. As a result, project-related environmental effects from the No-Build Alternative to either the groundwater or surface water resources are not anticipated.

Build Alternatives

Surface Waters

All of the Build Alternatives have the potential to increase levels of contaminants within the affected surface waters draining to the reservoirs. The four reservoirs either crossed by or receiving drainage from the study area corridor include Diascund Creek Reservoir, Skiffes Creek Reservoir, Lee Hall Reservoir/Newport News Reservoir, and Big Bethel Reservoir. The increases in contaminants would be expected to be minimized with the use of both the appropriate sediment and erosion control during construction and the implementation of best management practices.

Potential impacts during construction could include physical disturbances or alterations, accidental spills, and sediment releases that can affect aquatic life and water quality are potential impacts that could occur during construction activities. During construction, wind and rain could severely erode large areas of exposed soil, either through the removal of existing vegetation or staged stockpiles. This erosion could lead to an increased sediment load to surrounding surface waters. While all the Build Alternatives have the potential to affect existing surface waters to a degree, the relatively small amount of new impervious surfaces and related pollutants that the project would add, in addition to improved stormwater treatment facilities, would be expected to cause no or only minimal changes to the water quality of the surface waters surrounding the study area corridor.

Impacts associated with the use of the roadway following construction would be primarily based on the potential for contamination of surface waters by runoff from new impervious surfaces. These runoff constituents would likely include heavy metals, salt and associated materials, organic molecules, and nutrients. However, this runoff should be treated by improved stormwater management facilities. Therefore, potential impacts to the receiving waters are expected to be minimal, if any.

During construction, the potential for impacts to the reservoirs would be minimized through strict adherence to the required appropriate erosion and sediment control practices, which include best management practices such as silt fence, straw bales, check dams, sediment basins and other methods to capture potential sediment from exposed soils. In addition, the amount of clearing of existing vegetation would be minimized to the greatest extent possible and areas of exposed soils would be stabilized as soon as possible to prevent additional erosion. Following construction, the generated runoff would be treated in accordance with the state guidelines for stormwater management and then released to surface waters. Any crossing draining to a reservoir may include stormwater management plans designed specifically to address any potential impact to the surface water supply.

Groundwater

The Build Alternatives would be constructed on the surface, with no anticipated deep excavations, and are anticipated to have no or minor affects to groundwater in the aquifers along the corridor. Only small changes in the movements of the shallow groundwater table are likely to occur during grading and construction. In addition, the urbanized nature of the sections of the corridor with the greatest construction footprint make it unlikely that runoff from the post-construction interstate would reach the groundwater table. The generated runoff would be treated in accordance with the state guidelines for stormwater management and then released to surface waters.

The construction footprints of each Build Alternative would not impact the identified public groundwater supply well located north of the west bound exit ramp at Exit 211 (Talleysville) in New Kent County. It is possible that there are private drinking water wells within the vicinity of the study area. No determination was made for this study which properties utilize public water and those which utilize well water. Further investigations during the right of way acquisition would be necessary to make these determinations. However, potential impacts to any groundwater well resulting from any of the Build Alternatives are likely non-existent.

As noted by the VDH, potential impacts to public water distribution systems or sanitary sewage collection systems must be verified by the local utility prior to construction practices. Further investigations to determine the presence, operational status, and location of individual wells would be performed as part of property acquisition and right of way management for the construction project. Closures and/or relocation of the identified New Kent Farms public well (or any other identified well), if required, would be completed by following the Virginia Waterworks Regulation and other applicable VDOT or locality standard. Closures and relocation of private wells, if required, would be completed by using the Virginia Private Well Regulation and other applicable VDOT standard or locality standard.

Runoff generated both during and post-construction would not likely reach the groundwater table. In addition, the generated runoff would be treated in accordance with the state guidelines for stormwater management and then released to surface waters.

G. Chesapeake Bay Resource Protection Areas

Methodology and Existing Conditions

The study area corridor is located within the Chesapeake Bay Watershed. As part of their commitment to protecting the Bay, localities have adopted the Chesapeake Bay Preservation Act (The Bay Act) into its local ordinance in 1990. The Bay Act offers guidelines and requirements to protect and improve the water that flows into the Chesapeake Bay. The vegetated riparian buffers located along the streams and wetlands are included as RPAs under the Bay Act. RPAs include the land area within 100 feet of a perennial stream bank or edge of wetlands adjacent to the perennial stream. RPAs are protected under both state law and local ordinances. In general, no development, land disturbance, or vegetation removal is allowed in an RPA without approval by the state and County. The Bay Act also designates Resource Management Areas (RMAs). RMAs include floodplains, highly erodible soils (including steep slopes), highly permeable soils, non-tidal wetlands not included in RPAs, and any other sensitive lands that either County feels are necessary to help protect the quality of water resources. Development is permitted within RMAs, but it must adhere to the criteria established in the county's comprehensive plan.

Potential Impacts and Mitigation Measures

According to the Division of Chesapeake Bay Local Assistance the construction, installation, operation, and maintenance of roadways and their appurtenant structures are conditionally exempt from the *Chesapeake Bay Preservation Area Designation and Management Regulations*, provided they are constructed in accordance with:

- Regulations promulgated pursuant to the Erosion and Sediment Control Law (§ 10.1-560 et. seq. of the Code of Virginia) and the Stormwater Management Act (§ 10.1-603.1 et. seq. of the Code of Virginia).
- An erosion and sediment control plan and a stormwater management plan approved by the VDCR, or local water quality protection criteria at least as stringent as the above state requirements.

Any improvement work associated with the project has the potential to affect RPA and RMA regions. Due to the regulation exemption stated above, the project is not under jurisdiction in terms of The Bay

Act. Therefore, provided that the guidance in the above section is followed, no additional avoidance or minimization techniques are necessary.

H. Floodplains

Methodology and Existing Conditions

Steep slopes typically separate the uplands from the bottom land along the region's streams. Narrow floodplains line the upper reaches of streams throughout most of the study area. Broader floodplains occur along the Chickahominy River, Boar Swamp, Rumley Marsh, Diascund Creek, Beaverdam Creek, Wahrani Swamp, Queen Creek, and Newmarket Creek. Dams have inundated the floodplains along Shiminoe Creek and the Warwick River in the study area.

Several federal regulations govern fill and construction in floodplains to ensure that proper consideration is given to the avoidance and mitigation of adverse floodplain effects. These regulations include Executive Order 11988, US Department of Transportation Order 5650.2, entitled the "Floodplain Management and Protection", and the National Flood Insurance Act of 1968. In Virginia, the VDCR is responsible for coordination of all state floodplain programs, and floodplains are also governed by local Flood Insurance Programs administered by localities and supervised by the Federal Emergency Management Agency (FEMA). The VDCR Floodplain Management Program and VDOT construction specifications for the roadway itself also address downstream floodplain and floodway effects.

The approximate locations of 100-year floodplain limits in the corridor are based on data from FEMA. The 100-year floodplain refers to the areas along or adjacent to a stream or body of water that are capable of storing or conveying floodwaters during a 100-year storm. The approximate locations of the 100-year floodplains in the corridor are shown on the mapping in **Appendix I.**

Within the study area boundary, FEMA designated 100-year floodplains are located alongGillies Creek and an unnamed tributary, Boar Swamp and an unnamed tributary, the Chickahominy River and an unnamed tributary, Higgins Swamp, Crump Swamp, Allens Run, Toe Ink Swamp and an unnamed tributary, Schiminoe Creek, Rumley Marsh, Diascund Creek and two unnamed tributaries, Beaverdam Creek, Wahrani Swamp, upper limits of Diascund Creek Reservoir, Barnes Swamp, Skimino Creek, Whiteman Swamp and an unnamed tributary, and Blows Mill Run. The total acreage of mapped 100-year floodplains within the study area corridor is 50.01 acres. The total acreage of floodplain for each stream channel is summarized in **Table 20.** Individual floodplain acreages within the corridor ranged from 0.12 acres (Barnes Swamp) to 14.96 acres (Chickahominy River). In addition to the Chickahominy River, Rumley Marsh and the upper limits of the Diascund Creek Reservoir each had five or greater acres of designated floodplain within the study area.

Potential Impacts and Mitigation Measures

No-Build Alternative

The No-Build Alternative would not involve any project-related construction or changes to the natural environment. As a result, project-related environmental effects from the No-Build Alternative are not anticipated.

Build Alternatives

The majority of the floodplain encroachments from the proposed Build Alternatives would be from the perpendicular crossing of floodplains, not from longitudinal (parallel) encroachments which were avoided. These longitudinal crossings have been avoided because they would result in more floodplain fill, reducing conveyance and floodplain storage.

Table 20: FEMA 100-year Floodplains Located within the Study Area

Stream Name	Map No.	Acreage in Study Area
Unnamed tributary to Gillies Creek	4	0.95
Gillies Creek	4	3.76
Boar Swamp	8	0.67
Unnamed tributary to Boar Swamp	8	0.56
Chickahominy River	9	14.96
Higgins Swamp	9	2.79
Unnamed Tributary to the Chickahominy River	10	0.21
Crump Swamp	11	0.55
Unnamed Tributary to Toe Ink Swamp	11	1.42
Allens Run	12	0.36
Toe Ink Swamp	12	1.10
Schiminoe Creek	13	0.84
Rumley Marsh	14	5.00
Diascund Creek	15	1.71
Unnamed Tributary to Diascund Creek	16	0.64
Unnamed Tributary to Diascund Creek	16	0.38
Beaverdam Creek	19	4.77
Wahrani Swamp	19	0.69
Upper Limits of Diascund Creek Reservoir	20	5.55
Barnes Swamp	20	0.12
Skimino Creek	25	0.18
Whiteman Swamp	30	1.01
King Creek	31	1.05
Blows Mill Run	33	0.76
	Grand Total	**50.01**

Tables 21 and 22 summarize the potential specific encroachments (expressed as area in acres crossed by the construction footprint) into FEMA-designated 100-year floodplains for each Build Alternative and for each floodplain system. The approximate locations of the 100-year floodplain crossing for each Build Alternative are shown on the mapping in **Appendix I.** All of the Build Alternatives would affect each identified 100-year non-tidal floodplain to some degree. Cumulatively, the impacts would be least with Alternatives 1B/2B and greatest with Alternatives 1A/2A. Placement of a substantial amount of fill is not anticipated in any of the floodplains. It is expected that the majority of encroachments would result from minimal cut/fill activities and the construction of bridges crossing the systems.

Table 21: Potential Impacts to FEMA 100-year Floodplains

Build Alternative	Potential Encroachment (acres)
Alternatives 1A/2A	21.08
Alternatives 1B/2B	17.56
Alternative 3	20.80

Table 22: Potential Impacts to FEMA 100-year Floodplains for Individual Stream Systems

Stream Name	Map No.	Acreage Impacted by Alternatives 1A/2A	Acreage Impacted by Alternatives 1B/2B	Acreage Impacted by Alternative 3
Unnamed tributary to Gillies Creek	4	0.82	0.82	0.82
Gillies Creek	4	2.47	1.95	2.42
Boar Swamp	8	0.49	0.39	0.45
Unnamed tributary to Boar Swamp	8	0.46	0.34	0.46
Chickahominy River	9	10.81	8.26	9.68
Higgins Swamp	9	0.87	0.00	0.41
Unnamed Tributary to the Chickahominy River	10	0.00	0.00	0.00
Crump Swamp	11	0.17	0.19	0.22
Unnamed Tributary to Toe Ink Swamp	11	0.18	0.20	0.28
Allens Run	12	0.12	0.12	0.15
Toe Ink Swamp	12	0.74	0.72	0.74
Schiminoe Creek	13	0.14	0.15	0.19
Rumley Marsh	14	0.17	0.32	0.45
Diascund Creek	15	0.24	0.34	0.37
Unnamed Tributary to Diascund Creek	16	0.15	0.18	0.20
Unnamed Tributary to Diascund Creek	16	0.24	0.15	0.16
Beaverdam Creek	19	0.55	0.62	0.84
Wahrani Swamp	19	0.07	0.12	0.14
Upper Limits of Diascund Creek Reservoir	20	0.31	0.62	0.74
Barnes Swamp	20	0.00	0.00	0.00
Skimino Creek	25	0.03	0.03	0.02
Whiteman Swamp	30	1.01	1.01	1.01
King Creek	31	1.05	1.05	1.05
Blows Mill Run	33	0.00	0.00	0.00
Grand Totals		**21.08**	**17.56**	**20.80**

The potential acres of floodplain impacts for each Build Alternative are tentative estimates, as the engineered cut/fill calculations are preliminary and may be subject to change. In addition, the estimates are based on the footprint of the area, and not necessarily a direct crossing or impact to the floodplain. Many of these "crossings" would actually consist of the widening of existing bridges, thus reducing the actual impact acreage.

Individual impacts to any one floodplain would be relatively small in both size and severity. Future design would focus on avoiding and minimizing floodplain encroachment to ensure that the design is consistent with Executive 11998 and FHWA policy as set forth in 23 CFR 650. Hydraulic and hydrologic studies would be performed to determine if any floodplain encroachments would have negative effects on storage areas for floodwaters or alter flooding characteristics. Techniques that would be investigated to further minimize or avoid impacts may include alignment shift to ensure the narrowest possible crossing and bridging of floodwaters to further reduce encroachment and allow for unrestricted passage of floodwaters. At proposed bridge crossings, the minimum number of piers to ensure structural stability should be placed within floodways. Feasible construction methods that would not require the placement of construction causeways would be evaluated during the design phase. Should it become necessary, fill

placed for temporary construction causeways or work bridges would be removed and preconstruction floodplain conditions would be restored immediately following construction. Breastwalls and fill placed within floodplains for bridge abutments would be minimized.

All construction occurring within the FEMA designated 100-year floodplain must comply with the VDOT floodplain construction requirements which does not allow any change to the surface water elevation. These requirements consider structural evaluations, fill levels, and grading elevations. In accordance with the VDOT requirements, no change in surface water elevation would be permissible as part of the project final design and construction. Avoidance and minimization efforts, including the bridging/spanning of these systems, would be followed to the greatest extent practicable. In addition to mitigation measures designed to reduce the amount of floodplain encroachment by Alternatives, VDOT's highway construction specifications require implementation of stormwater management practices to address concerns such as post-development runoff associated with storm events and downstream channel capacity. These standards require that stormwater management facilities be designed to reduce stormwater flows to pre-construction conditions for up to a 10-year storm event. Also, during final design, a hydraulic study would be conducted that would ensure that no substantial increase in downstream flooding would occur.

Also, indirect impacts may include increased sedimentation entering the systems from disturbed floodplains as a result of the construction activities. To minimize indirect impacts to the floodplain, the appropriate erosion and sediment control measures, in accordance with VDCR standards, should be implemented and maintained. Hydrology and hydraulic analyses may be necessary to determine if there would be a rise in normal water surface elevation at the areas of potential encroachment, in which case FEMA may require a revision to the FIRMs during final design.

I. Wild and Scenic Rivers

Methodology and Existing Conditions

The Wild and Scenic Rivers Act of 1968 is a federal act adopted for specific free-flowing rivers that have outstanding natural, cultural, or recreational features. The Act classifies designated rivers as Wild, Scenic, or Recreational. Wild river areas are those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent areas of primitive America. Scenic river areas are those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but still accessible in places by roads. Recreational river areas are those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.

All rivers classified under the Act must first be listed on the National Rivers Inventory (NRI). The NRI is a federal list that includes rivers that are free-flowing and have one or more "outstandingly remarkable values." Under provisions of the Act, if a federal action compromises the designation of a Wild and Scenic River or forecloses the possibility of future designation (of a NRI river) under the Act, implementation of the federal action must be coordinated with the U.S. Department of Interior. According to the USFWS Wild and Scenic Rivers list (2011), there are no Wild, Scenic, or Recreational Rivers designated under the federal Act that exist within the study area. There are also no rivers within the study area listed in the NRI.

The Virginia Scenic Rivers Program's (established under the Commonwealth of Virginia Scenic Rivers Act) intent is to identify, designate, and help protect rivers and streams that possess outstanding scenic, recreational, historic, and natural characteristics of Statewide significance for future generations. The Commonwealth of Virginia Scenic Rivers Act affords protection to waters of Statewide importance. The

VDCR oversees the Commonwealth's Scenic Rivers Program. Based on comments received from VDCR, there are no systems within the study area corridor listed as a Scenic River. While the section of the Chickahominy River from Route 360 to the New Kent County line is listed as a Scenic River, the section of the Chickahominy River crossing the study area corridor was identified as a potential Scenic River.

Potential Impacts and Mitigation Measures

Since there are no federally designated systems in the study area, the proposed project poses no direct or indirect impacts to Wild, Scenic, or Recreational rivers and no avoidance or minimization techniques are necessary.

There are no state listed Scenic Rivers within the study area corridor. The VDCR commented that the Chickahominy River is a potential Scenic River. The No-Build Alternative would have no impact to the Chickahominy River. VDCR recommended that any impacts to the river crossing by the Build Alternatives be mitigated using native plants to stabilize land disturbance in the study area. In addition, the existing crossing consists of a span bridge, which would likely be widened as part of the improvements associated with all of the Build Alternatives, thereby, reducing any potential effects on the system.

J. Threatened, and Endangered Species

Methodology and Existing Conditions

The USFWS and the National Marine Fisheries Service (NMFS) regulate and protect federally listed threatened and endangered species under the Endangered Species Act (ESA) of 1973 with the primary goal of conserving and recovering listed species. The ESA, with few exceptions, prohibits activities affecting threatened and endangered species unless authorized by a permit. The legal federal status of a species is determined by the USFWS and the NMFS. This status is used for all animals listed as endangered or threatened by the United States government and receiving protection under the federal ESA. Listed federally endangered (FE) species are those taxon threatened with extinction throughout all or a substantial portion of its range. Listed federally threatened (FT) species are taxon likely to become endangered in the foreseeable future.

In addition to the federal oversight, threatened and endangered species are also regulated at the state level. The Virginia Department of Game and Inland Fisheries (VDGIF) has adopted the federal list as well as a state list of endangered and threatened species, with the primary focus of managing Virginia's wildlife to maintain optimum populations of all species and conserve biodiversity. In addition, through a Memorandum of Agreement established between the VDCR and Virginia Department of Agriculture and Consumer Services (VDACS), the VDCR represents VDACS in comments regarding potential impacts on state- listed threatened and endangered plants and insect species. The legal state status is determined by the VDGIF (all animals except insects) and the VDACS (plants and insects). A state endangered (SE) species is defined as a species that is in danger of extinction throughout all or a substantial portion of its range. A state threatened (ST) species is defined as a species that is likely to become endangered within the foreseeable future.

As part of the project scoping process, comments were requested from the USFWS and NMFS to determine the presence of federal threatened or endangered species and with the VDGIF, VDCR, and VDACS for the identification of state threatened and endangered species. Comments from the agencies and additional information related to threatened and endangered species are included in **Appendix J**. No comments have been received from the USFWS, NMFS, or VDGIF. However, as detailed below, various database searches and reviews have been conducted for both threatened and endangered species.

The study identified ten federal and state threatened and/or endangered species or their habitat located within a two mile radius of the study area corridor. Most of these species were listed with numerous occurrences throughout the corridor. These species are listed in **Table 23,** and the mapping in **Appendix K** shows the location of these resources along the corridor. This summary only includes species which have been documented/confirmed through the review process within the two mile radius of the center line of the study area, in addition to the assessed potential habitat areas for small whorled pogonia conducted as part of the I-64 Study.

The information generated from the resources listed below, in addition to other natural resource agency documents and information, was used to develop a Species Conclusion Table for the identified species. This information is included in **Appendix J**.

The following sections provide additional details regarding the resource reviews, agency coordination, and identified species.

1. VDCR Comments

The VDCR-DNH commented that, according to its search in the agency's Biotic Data System, numerous natural heritage resources have been documented within two miles of the study area corridor. Natural heritage resources are defined by the agency as the habitat or rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations. The table generated by the agency is included in **Appendix J**. VDCR-DNH specifically noted the potential for the following two plants to occur in the study area: Small whorled pogonia (*Isotria medeoloides*) which is currently classified as threatened by the USFWS and as endangered by the VDACS, and Swamp pink (*Helonias bullata*), which is currently classified as threatened by the USFWS and as endangered by the VDACS. Through the scoping letter response, VDCR noted that, within a two mile radius of the corridor, Small whorled pogonia was noted in three instances, with one of those occurrences at Ware Creek, and Swamp pink was noted in one instance at Broadwater Creek.

Table 23: Threatened and Endangered Species Mapped within a Two Mile Radius of the Study Area

Common Name	Scientific Name	Legal Status
Rafinesque's eastern big-eared bat	*Corynorhinus rafinesquii macrotis*	SE
Peregrine falcon	*Falco peregrinus*	ST
Canebrake rattlesnake	*Crotalus horridus*	SE
Mabee's salamander	*Ambystoma mabeei*	ST
Eastern tiger salamander	*Ambystoma tigrinum tigrinum*	SE
Loggerhead sea turtle	*Caretta caretta*	FT / ST
Bald eagle	*Haliaeetus leucocephalus*	ST
Small whorled pogonia	*Isotria medeoloides*	FT / SE
Swamp pink	*Helonias bullata*	FT / SE
Harper's fimbristylis	*Fimbristylis perpusilla*	SE

A summary of the listed plant and animals provided by VDCR is included in **Table 24**. This table lists the common and scientific names, the federal and state listing status, the number of occurrences identified within a two mile radius of the corridor, and the Global and state ranks of each species.

Table 24: VDCR Listed Threatened and Endangered Species within a Two Mile Radius of the Study Area

Common Name	Scientific Name	Global Rank	State Rank	Legal Status	Number of Occurrences
Bald eagle	*Haliaeetus leucocephalus*	G5	S2S3B, S3N	ST	7
Canebrake rattlesnake	*Crotalus horridus* (Coastal Plain population)	G4	S1	SE	5
Mabee's salamander	*Ambystoma mabeei*	G4	S1S2	ST	5
Eastern tiger salamander	*Ambystoma tigrinum*	G5	S1	SE	1
Harper's fimbristylis	*Fimbristylis perpusilla*	G2	S1	SE	1
Small whorled pogonia	*Isotria medeoloides*	G2	S2	FT/SE	3
Swamp Pink	*Helonias bullata*	G3	S2S3	FT/SE	1
Peregrine falcon	*Falco peregrinus*	G4	S1B, S2N	ST	1

Global ranks are assigned by a consensus of the network of natural heritage programs, scientific experts, and NatureServe (a non-profit conservation organization) to designate the range wide rarity of a species or subspecies. The ranks are assigned after considering a suite of factors including the number of occurrences (populations), number of individuals, and severity of threats to the species and its habitats. Global ranks found in the Rare Plant and Animal Lists identified for the I-64 Study are as follows:

G2 - Very rare and imperiled with 6 to 20 occurrences or few remaining individuals; or because of some factor(s) making it vulnerable to extinction.

G3 - Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range; or vulnerable to extinction because of other factors. Usually fewer than 100 occurrences are documented.

G4 - Common and apparently secure globally, although it may be rare in parts of its range, especially at the periphery.

G5 - Very common and demonstrably secure globally, although it may be rare in parts of its range, especially at the periphery.

State ranks are assigned in a similar manner to global ranks, with values that range from S1-S5, but consider only factors within the political boundaries of Virginia. State ranks found in the Rare Plant and Animal Lists within a two mile radius of the I-64 study area are as follows:

S1 - Extremely rare and critically imperiled with 5 or fewer occurrences or very few remaining individuals in Virginia; or because of some factor(s) making it especially vulnerable to extirpation in Virginia.

S2 - Very rare and imperiled with 6 to 20 occurrences or few remaining individuals in Virginia; or because of some factor(s) making it vulnerable to extirpation in Virginia.

S3 - Rare to uncommon in Virginia with between 20 and 100 occurrences; may have fewer occurrences if found to be common or abundant at some of these locations; may be somewhat vulnerable to extirpation in Virginia.

S_B - Breeding status of an animal (primarily used for birds) in Virginia; these species typically inhabit Virginia only during the breeding season.

S_B/S_N - Breeding and nonbreeding status of an animal (primarily used for birds) in Virginia

2. VDACS Comments

In response to the project scoping request, VDACS commented that although "unlikely", there is the possibility that endangered plants or insects could occur in the vicinity of the I-64 corridor. The agency noted that while these species were found in the localities along the study area, it is not known if they are located within the study area boundary. The species with the greatest potential for occurring along the study area corridor include Small whorled pogonia, Swamp pink, and New Jersey rush (*Juncus caesariensis*).

3. USFWS Information, Planning, and Conservation On-Line System

While no official comments were received from the USFWS to date, McCormick Taylor conducted the USFWS Information, Planning, and Conservation (IPaC) on-line system for the study area corridor. Through the use of the USFWS IPaC on-line system, several federal threatened or endangered species were identified within the study area boundary. These species included Small whorled pogonia *(Isotria medeoloides*), classified as threatened in 1994 and occurring in Henrico, New Kent, James City and York Counties; Swamp pink *(Helonias bullata)*, classified as threatened in 1988 and occurring in the City of Richmond and Henrico and New Kent Counties; Piping plover *(Charadrius melodus)*, classified as threatened in 1986 and occurring in the City of Hampton, and Sensitive joint-vetch *(Aeschynomene virginica)*, classified as threatened in 1992 and occurring in York County. However, the exact locations of these occurrences were not identified. The IPaC species list and information is included in **Appendix J**.

4. Center for Conservation Biology Bald Eagle Nest Locator

Both the VDGIF and the VDCR recommends contacting the Center for Conservation Biology (CCB) at the College of William and Mary to obtain the updated information regarding Bald eagle (*Haliaeetus leucocephalus*) issues. Additionally, McCormick Taylor conducted a Bald eagle nest locator search using the CCB on-line system. Bald eagles are currently de-listed under the federal ESA; however, they are still recognized as a threatened species at the state level and are protected by the federal Bald and Golden Eagle Protection Act (Eagle Act) (16 U.S.C. §668-668d) and the Migratory Bird Treaty Act (MBT Act) (16 U.S.C. §703-712).

The CCB's nest locator was used to determine the approximate location of eagle's nests throughout the study area corridor. A total of eleven nests were found to be within a two mile radius of the study area. However, no nests were located within 660 feet of the study area corridor, with the closest nest (Nest Code NK0702 south of the mainline near mile marker 222 in New Kent County) located approximately 1,450 feet from the study area boundary. Nests located within the 660 foot radius considered the nest protection zone, would elevate the review and protective measures required by the agencies. A summary of the CCB's nest location results are included in the table below and included on the mapping in **Appendix K**.

Table 25: CCB Bald Eagle Nest Locations within a Two Mile Radius of the Study Area

County	Nest Code	Status
New Kent	NK0701	Active / Occupied
New Kent	NK0702	Active / Occupied
James City	JC0704	Active / Occupied
James City	JC0805	Active / Occupied
James City	JC1107	Active / Occupied
James City	JC0401	Active / Occupied
James City	JC0703	Active / Occupied
James City	JC1108	Recently Active
York	YK1103	Active / Occupied
York	YK0204	Active / Occupied
York	YK0703	Active / Occupied

Bald eagle concentrations areas are also located along the James River and the river's tributaries in the vicinity of the project corridor.

5. VDGIF Virginia Fish and Wildlife Information Service Database

In addition to requesting threatened and endangered species information as detailed above, the federal and state threatened and endangered species were also mapped using the Virginia Fish and Wildlife Information Service (VFWIS) database maintained by VDGIF.

The location of listed state and federal threatened and endangered species (animal only) identified within a two mile radius of the corridor generated from the VFWIS is included on the mapping in **Appendix K** and summarized in **Table 26**. This summary only includes species which have been documented/confirmed within the two mile radius of the center line of the study area corridor.

Table 26: VFWIS Database Documented Threatened and Endangered Species within a Two Mile Radius of the Study Area

Common Name	Scientific Name	Legal Status	TIER	Feature Count
Rafinesque's eastern big-eared bat	*Corynorhinus rafinesquii macrotis*	SE	I	1
Peregrine falcon	*Falco peregrinus*	ST	I	3
Canebrake rattlesnake	*Crotalus horridus*	SE	II	30
Mabee's salamander	*Ambystoma mabeei*	ST	II	55
Eastern tiger salamander	*Ambystoma tigrinum tigrinum*	SE	II	1
Loggerhead sea turtle	*Caretta caretta*	FTSE	I	4

Through analysis of the VDGIF VFWIS data, six species were identified as either state or federally threatened or endangered. Three species are considered Tier I and three species are considered Tier II. As indicated in the VDGIF Virginia's Comprehensive Wildlife Conservation Strategy Plan (2005), Tier 1 and Tier II species are defined as the following:

> **Tier I -** Critical conservation need. Faces an extremely high risk of extinction or extirpation. Populations of these species are at critically low levels, face immediate threat(s), or occur within an extremely limited range. Intense and immediate management action is needed.

Tier II - Very high conservation need. Has a high risk of extinction or extirpation. Populations of these species are at very low levels, face real threat(s), or occur within a very limited distribution. Immediate management is needed for stabilization and recovery.

Bald eagles (which are listed as a Tier II species) are not included in this section, but are discussed in Section J.4.

As shown on the mapping in **Appendix K**, of the species identified, the Mabee's salamander (near Exit 243 - Busch Gardens and Exit 250 - Fort Eustis, and Mile Marker 261) and the Canebrake rattlesnake (near Exit 256 - Victory Boulevard and from Exits 258 - J Clyde Morris Boulevard to 261 - Hampton Roads Center Parkway) are located in the immediate vicinity of the study area corridor.

6. Species Profiles

The following provides general summaries of the major state or federal threatened or endangered species documented by the agencies (either through database searches or written correspondence) within a two mile radius of the centerline of the study area corridor. The general location of the documented species is included on the mapping in **Appendix K**.

Small whorled pogonia *(Isotria medeoloides*) – Federal Threatened/State Endangered

The small whorled pogonia was listed as FE for protection under the Endangered Species Act on September 9, 1982 and was reclassified from endangered to threatened on October 6, 1994 (USFWS 1982, 1994). The Small whorled pogonia is listed as state-endangered by the Commonwealth of Virginia. In Virginia, most populations occur in the coastal plain and piedmont. Small whorled pogonia has been documented in 21 counties (and one city), including James City County, New Kent County, York County, and the City of Williamsburg (USFWS 2012). Through their response as part of the scoping process, VDCR indicated that small whorled pogonia was noted in three instances within a two mile radius of the study area corridor, with one of those indicated at Ware Creek.

Small whorled pogonia typically occurs on mesic sites in mixed-deciduous or mixed-deciduous coniferous forests that are generally in second- or third-growth successional stages. Most occupied sites have been cutover in the past and allowed to regenerate for at least several decades. Occupied sites typically have sparse to moderate ground cover, a relatively open understory, and proximity to long persisting canopy breaks associated with logging roads, streams, and large tree falls. Direct destruction, as well as habitat loss and alteration are principle reasons for the species' decline.

As part of this study, EEE Consulting, Inc. conducted a reconnaissance level habitat evaluation for the FT, SE Small whorled pogonia within the study area corridor. Potential habitat was identified using a combination of desktop review of relevant data resources, windshield reconnaissance conducted from a vehicle, and pedestrian spot checks of the highest quality habitat areas. Of the fifteen areas identified as the potential highest quality habitat areas, only the southeast area of Exit 238 (Colonial Williamsburg) was determined to be of high potential habitat. The other fourteen areas were either determined to be of medium (13 areas) or low (1 area) quality. The full report and mapping showing the location of the field assessed areas and their classifications are included in **Appendix L**.

Swamp pink *(Helonias bullata)* – Federal Threatened/State Endangered

Swamp pink inhabits groundwater-influenced, perennially saturated, nutrient-poor headwater wetlands and is sensitive to hydrologic alterations to its habitat. The plant is commonly associated with some evergreens, including Pitch pine, Atlantic white cedar, American larch, Black spruce, Red spruce, and with Red maple. It often grows on hummocks formed by trees, shrubs, and sphagnum moss. The hummocks keep the roots moist but not submerged. Through their response as part of the scoping

process, VDCR indicated that within a two mile radius of the corridor, Swamp pink was noted in one instance at Broadwater Creek.

The major direct threat to this species is habitat loss. Indirect threats result from activities that affect the hydrologic regime including such upslope activities as timber harvesting, land clearing and development, and agriculture. Downstream threats to the hydrology of a swamp pink habitat arise from flooding caused by road crossings with culverts that become blocked and beaver activity.

Piping plover *(Charadrius melodus)* - Federal Threatened/State Threatened
The Piping plover was listed as federal threatened in Virginia in 1986 and is currently listed as state threatened in Virginia. The Piping plover is a small, inconspicuous shorebird with a sand-colored back, narrow black neck ring, white belly, orange legs and a small orange and black bill.

This species is considered native to Virginia. Piping plover is known to occur in Accomack, the City of Hampton, Northampton, City of Portsmouth, and City of Virginia Beach. Virginia is part of this population's southern breeding range and since 1986 has supported a relatively stable number of nesting pairs. The Piping plover lives the majority of its life on open sandy beaches or rocky shores, often in high, dry sections away from water. Piping plovers typically nest on sparsely vegetated ocean-facing beaches, sand flats and washovers. Since the late 1990's, 100% of the breeding activity in Virginia has occurred on the Eastern Shore's barrier islands. Piping plovers have many natural enemies such as raccoons, foxes, crows, gulls and other birds and mammals. Storms and spring high tides often wash out a portion of the nests and/or drown flightless chicks. In addition, the prevalence of pets and increased pedestrian and off-road vehicle traffic on nesting beaches reduce the success of nesting pairs.

Piping plover was identified as potentially occurring within the vicinity of the study area through the IPaC database. While the Piping plover is considered state threatened, the VDGIF VFWIS data did not indicate the presence of the bird within a two mile radius of the corridor.

Sensitive joint-vetch *(Aeschynomene virginica)* – Federal Threatened/State Endangered
Sensitive joint-vetch is an annual legume native to the eastern United States. In Virginia, populations are found along the Potomac, Mattaponi, Pamunkey, Rappahannock, Chickahominy, and James Rivers and their tributaries. This plant usually attains a height of three to six feet in a single growing season, but may grow as tall as eight feet. The flowers are yellow, streaked with red and the fruit is a pod, turning dark brown when ripe. The species is known to occur in Charles City, Chesterfield, Essex, Henrico, James City, King and Queen, King William, New Kent, Richmond, Stafford, Surry, and Westmoreland Counties, primarily along the Potomac, Rappahanock, Mattaponi, Pamunkey, Chickahominy, and James Rivers. It is currently listed as a FE and SE species.

Sensitive joint-vetch occurs in fresh to slightly brackish tidal river systems, within the intertidal zone where populations are flooded twice daily. It typically occurs at the outer fringe of marshes or shores; its presence in marsh interiors may be a result of nutrient deficiencies, ice scouring, or muskrat herbivory. The Sensitive joint-vetch is found in locations where plant diversity is high and annual species are prevalent. Bare to sparsely vegetated substrates appear to be a habitat feature of critical importance for establishment and growth of this species. Plants flower from July through September and into October in some years. Fruits are produced from July through late October, concurrent with flowering. Direct impact and habitat destruction are some of the highest threats to this species.

Sensitive joint-vetch was identified as potentially occurring within the vicinity of the study area through the IPaC database. While the plant is considered SE, it was not identified within a two mile radius of the study area corridor through the state agency information review and coordination efforts.

Bald eagle (*Haliaeetus leucocephalus*) – State Threatened
Bald eagles are currently de-listed under the federal ESA; however, they are still recognized as a threatened species at the state level and are protected by the federal Bald and Golden Eagle Protection Act (Eagle Act) (16 U.S.C. §668-668d) and the Migratory Bird Treaty Act (MBT Act) (16 U.S.C. §703-712). A large raptor, the Bald eagle has a wingspread of about 7 feet. Adults have a dark brown body and wings, white head and tail, and a yellow beak. Juveniles are mostly brown with white mottling on the body, tail, and undersides of wings. Adult plumage usually is obtained by the 6th year. In flight, the Bald eagle often soars or glides with the wings held at a right angle to the body.

The Bald eagle is not overly common to the Coastal Plain and Piedmont regions, remaining relatively close to large bodies of water. However, they are more common in summer and winter in the Chesapeake Bay region and surrounding counties. The Bald eagle prefers habitats near seacoasts, rivers, large lakes, oceans, and other large bodies of open water with an abundance of fish. The Bald eagle requires old-growth and mature stands of coniferous or hardwood trees for perching, roosting, and nesting. Selected trees must have good visibility, an open structure, and proximity to prey, but the height or species of tree is not as important as an abundance of comparatively large trees surrounding the body of water. Forests used for nesting should have a canopy cover of no more than 60%, and no less than 20%, and be in close proximity to water.

While the Bald eagle may be sensitive to human activity, it has been known to quickly adjust to constant noise associated with transportation activity. Since the banning of pesticides, the species has made extensive recovery across the United States. The current primary threat to the species is habitat fragmentation and destruction.

Rafinesque's eastern big-eared bat *(Corynorhinus rafinesquii macrotis)* – State Endangered
The Rafinesque's eastern big-eared bat was designated as a SE species in 1987 and listed as a federal candidate in 1994. This is a medium sized bat, with the dorsal hair gray-brown with black bases, and the ventral hair whitish-yellowish with black bases. The fur is long and shaggy and it has huge ears up to twice the length of the head connected across the forehead. There is a glandular mass on either side of the muzzle, and elongated nostril openings. The total length (male smaller than female) is 80-110 mm, with a wingspread from 265-301 mm, and a weight of 7.9-13.6 grams.

The bat is incidental in Virginia because it has adapted to temperate, arboreal zones found only in the extreme southeast. This bat is rare in Virginia and particularly susceptible to human disturbance. Both subspecies are at the edge of their ranges in Virginia, so their occurrence here is tenuous at best. They are uncommon to rare throughout their range, and both seem to be declining. They prefer roosting sites near mature forests and adjacent to rivers and other permanent bodies of water; manmade structures that are most often used have few openings to the attic and have tin roofs, type of structures may have been influence by the socio-economics of the area (eg. types of houses built); they prefer structures with low light levels. The attics of structures were used more due to higher temperatures during gestation and early growth periods. More closed canopy forest surround occupied sites than the unoccupied ones; tree cavities or other alternate roosts are important to avoid predators and fulfill thermoregulatory needs; tree roosts may be better winter roosts.

Peregrine falcon *(Falco peregrinus)* – State Threatened
Due to recovery success, the Peregrine falcon has been federally delisted; however, the bird is still listed as ST. Through the scoping process, VDCR indicated that the bird was noted within a two mile radius of the study area corridor.

The Peregrine falcon is characterized by long pointed wings having a distinct sickle-shaped silhouette. Also unique to this species is the notched beak that is used to kill prey by severing the spinal column at

the neck. The falcon is a crow-sized bird, weighing just over two pounds with a wing span of approximately 3 feet. An adult peregrine has a dark grey back and crown, dark bars or streaks on a pale chest and abdomen, and heavy malar (cheek) stripes on the side of the face. Immature peregrines are buff colored in front and have dark brown backs; adults are white or buff in front and bluish-gray on their backs. Females and males are identical appearance; however, the female can be a third larger than the male. They typically nest on the side of cliffs, or if in cities, on the roofs of large buildings.

Canebrake rattlesnake *(Crotalus horridus)* – State Endangered
The Canebrake rattlesnake is a large venomous snake reaching a maximum length in Virginia of about 5.5 feet. As the only rattlesnake found in southeastern Virginia, it is easily identified by its distinctive black tail and rattle. The Canebrake is a physically distinct variant of the timber rattlesnake *(Crotalus horridus)* which ranges from New England to Minnesota and south to Florida and Texas. In Virginia, Canebrakes occur only as two populations in the southeastern corner of the state. On the Lower Peninsula they occur in the Cities of Hampton and Newport News, and York County; and south of the James River they are still found in Isle of Wight County, and in the Cities of Suffolk, Chesapeake, and Virginia Beach.

Mature hardwood forests are the preferred habitat of Canebrake rattlesnakes, but the snakes also are found in mixed hardwood-pine forests, cane thickets, and in the ridges and glades of swamps. They prefer areas with numerous logs and a substantial layer of leaves and humus. Canebrakes overwinter in the bases of hollow trees and stumps and in the underground tunnels resulting from stump and root decomposition. Habitat destruction or modification, and persecution by humans, are the primary threats to canebrake rattlesnakes.

Through the scoping process, VDCR indicated that the Canebrake rattlesnake (Coastal Plain population) was noted in five instances within a two mile radius of the study area corridor.

Mabee's salamander *(Ambystoma mabee)* - State Threatened
The Mabee's salamander was listed as a ST species in 1987. This is a relatively small species, with adults ranging from 8 – 12 centimeters, with a small head and long slender toes. The coloration is dark brown-gray to black with silvery white flecks that are abundant on the sides, but sparse on the back. The belly is light gray or gray-brown with a few flecks.

Known populations are low in number and tend to be isolated. Their range is restricted to the lower Coastal Plain of the Carolinas and Virginia. This species is known to occur in six localities in the coastal plain in extreme southeastern Virginia: one each in the Cities of Hampton and Suffolk and the counties of York, Southampton, Gloucester, and Isle of Wight. It is also found in the City of Newport News. The species is considered highly threatened, primarily by urbanization through the destruction of the sensitive habitat areas.

The species are found in savannas in burrows at the edges of bogs or ponds and in low wet woods and swamps. Breeding sites in Virginia are fish-free vernal ponds or ephemeral coastal plain sinkholes up to 1.5 meters deep, with surrounding forests generally composed of hardwoods mixed with pine. It is also found in low areas adjacent to coastal rivers and pine savannas, and in bogs, ponds, low wet woods, and swamps.

Eastern tiger salamander *(Ambystoma tigrinum tigrinum)* – State Endangered
The Eastern tiger salamander was listed as a SE species in 1987. This is Virginia's largest mole salamander reaching a maximum total length of 33-35 centimeters. It is a robust species with a broad head with relatively small eyes and an extremely long tail comprising approximately half of the total length. The back is dark brown to black with olive-yellow to brownish-yellow spots or blotches on the

back, sides, and belly. The blotches continue laterally and blend into the olive-yellow center creating a jagged- edged lateral line.

According to VDGIF, this native Virginia species may be more abundant than it appears due to its reclusive nature, although it is very restricted in Virginia. Four Virginia sites are known: one each from York, Mathews, Hanover, and Augusta Counties. However, potential breeding habitat around the York County site has been destroyed and the Hanover County site was known to have a large fish population and is probably extirpated. Therefore, this species can be considered extant in only two sites in Virginia – Mathews and Augusta Counties.

Breeding habitats include limestone sinkhole ponds and Coastal Plain vernal pools associated with wetlands. The terrestrial habitat is only generally described as that with a substrate suitable for burrowing, or sandy areas near shallow pools, chiefly in pine savannas. Unique habitat associations include springs and seeps, vernal pools, bottomland hardwoods and freshwater wetlands. They may inhabit any type of woodland or marshy grassland and are found in leaf letter, debris and humus.

Loggerhead sea turtle *(Caretta caretta)* – Federal Threatened/State Threatened
This large sea turtle has a carapace that is heart shaped, without striations on the surface, and brown to reddish brown in color. The plastron (lower shell) is hingeless, smaller than the carapace (upper shell), and cream to yellowish in color. Star-shaped light and dark streaks may be present on the carapace. The top of the head, the neck, and the front of the fore-flippers are reddish brown. The snout is short and the upper jaw is yellowish brown. The entire undersurface, side of the neck, and parts of the flippers are cream to yellow.

The Loggerhead is the most abundant sea turtle in Virginia's coastal waters. It is found only in salt water, in the Chesapeake Bay from Baltimore south, in all the major rivers along Virginia's coast, and into channels between barrier islands. This species is a wanderer which prefers moderately deep bays, and has been found in streams, marshes and many miles into the sea. The Chesapeake Bay is an important summer foraging area for subadults between the ages of 5 and 15 years. Nearly all nesting sites are on barrier islands in the United States. Nesting habitat is a sand beach that is high enough that it is not inundated by high tides nor soaked by groundwater rising from below. The Loggerhead forages in the bay and its estuaries primarily for horseshoe crabs. It would also consume other crustaceans, sea grasses, sponges, fish, mollusks, and snails.

According to VDGIF, there have been known occurrences of the Loggerhead sea turtle in York County and the Cities of Hampton, Norfolk, and Newport News.

Potential Impacts and Mitigation Measures
No-Build Alternative
The No-Build Alternative would not involve any project-related construction or changes to the natural environment. As a result, project-related environmental effects from the No-Build Alternative are not anticipated.

Build Alternatives
All of the Build Alternatives have the potential to affect threatened or endangered species or habitats along the study area corridor. The habitat of two species, the Mabee's salamander (near mile markers 244 and 260.5) and the Canebrake rattlesnake (near mile markers 256.5 and 258.5), was identified within the immediate vicinity of the study area. Each Build Alternative intersects the identified mapped habitat areas for these species. For projects affecting the Mabee's salamander, the VDGIF typically recommends maintaining an undisturbed naturally vegetated buffer of at least 300 meters around the identified habitat pond. In addition, any impact to the habitat (pond) automatically infers an impact to the species. For the

Canebrake rattlesnake, recommendations may include practices such as education requirements for the construction contractors and the installation of passageways under road systems. The potential presence of both species would require close coordination with the regulatory agencies and potential survey/assessment and design considerations.

The study also identified areas of potential habitat for the small whorled pogonia within the Alternative limits. As a federally listed threatened plant, prior to the issuance of a permit, the permittee must demonstrate that the species would not be harmed. A habitat survey conducted by a certified specialist would likely be required for this species as part of the project permitting process. While habitat surveys can be performed throughout the year, the detailed species survey, which must be conducted by a USFWS approved professional, must be completed between May 25th and July 15th of a given year and submitted to the agencies for their review and recommendations.

Eleven Bald eagle nests were identified within the two mile radius of the study area corridor, which require special coordination with the regulatory agencies, with possible construction time-of-year restrictions. However, all of the nest locations were located outside of the 660-foot nest protection zone, and there are no anticipated impacts to this species.

One occurrence of the Peregrine falcon was identified near the western study termini, in downtown Richmond. The buffered limits of the habitat are approximately 350 feet from the study area corridor. The VDGIF typically recommends a time-of-year restriction for construction activities within 600 vertical feet of the nest. Therefore, there is not an anticipated impact to this species.

The presence of federal and state threatened or endangered species, including those listed above, in the vicinity of the study area requires special consideration and coordination with various federal and state agencies at all stages of the project. Through the coordination with these agencies, potential impacts to target species and their habitats can be evaluated and avoided by implementing various practices as part of the project design. Examples of mitigation measures to avoid impacts to threatened and endangered species and their habitats which may be employed include shifting alignment to avoid potential areas, spanning/bridging resources and the use of bottomless arch culverts, countersinking of culverts, limiting clearing of existing vegetation to the greatest extent possible, strict adherence to erosion and sediment control guidelines and the implementation of stormwater best management practices, and adherence to maintaining applicable buffer widths to a species habitat. In addition, as noted above, construction time-of-year restrictions may be required for a given species.

Every attempt should be made to incorporate the preliminary recommendations into the design as much as possible. However, certain recommendations may not be practicable. Specific agency coordination should conducted during the final design and permitting stage of the project at which time more detailed agency recommendations would be determined.

As the project progresses, additional coordination would be required with the appropriate agencies for all species identified within the two mile radius of the study area corridor. If impacts cannot be avoided, time-of-year restrictions for construction may be required and these restrictions would be determined through the permitting process. In addition, a Section 7 consultation (in accordance with the ESA) may be required for a species if impacts can not be avoided. Also, habitat assessments and species surveys may be required to determine the presence of a threatened or endangered plant species or habitat. These species surveys must be completed by an agency certified or approved specialist, and may have restrictions on time-of-year when the surveys can be conducted.

K. Terrestrial and Aquatic Habitat and Wildlife

Methodology and Existing Conditions

The presence of federal and state identified habitat areas or specific wildlife resources in the vicinity of the study area require special consideration and coordination with the various federal and state agencies throughout project development. Although parklands and other natural areas are present throughout the corridor, sections of the corridor, particularly near the Cities of Richmond, Newport News, and Hampton, are highly urbanized where most natural resources have been altered during years of landscape manipulation for development. However, within the central section of the corridor, there are a number of undisturbed and/or highly naturalized areas in the vicinity of the study area. Despite the many years of disturbance that has diminished the extent and quality of the natural habitat within the corridor, there remains a number of natural resources that enhance the area. Many of these resources, summarized below, are found throughout the corridor and are regulated by a number of different federal and state agencies.

A variety of upland forest communities and diverse tidal and freshwater wetlands and stream systems are found in the Coastal Plain physiographic province in Virginia. The upland forests that originally covered much of the Virginia Coastal Plain have been extensively cleared or altered, making it difficult to determine which species and natural communities were once naturally prevalent. Much of the contemporary forest consists of successional or silvicultural stands of loblolly pine (*Pinus taeda*) and secondary pine-hardwood forests that have developed after repeated timbering or agricultural abandonment. The most mature remnant stands on mesic uplands are typically characterized by associations of American beech (*Fagus grandifolia*), several oaks (*Quercus* spp.), and American holly (*Ilex opaca var. opaca*). Patches of drier oak-dominated forest and steep bluffs with dense forests of chestnut oak (*Quercus montana*), beech, and mountain-laurel (*Kalmia latifolia*) are fairly common in the dissected inner Coastal Plain, especially north of the James River.

Streams and wetlands of the Coastal Plain are extensive and support a great variety of natural communities. The diversity of wetlands in this region spans a range of freshwater to saline, lunar-tidal estuaries; tidal and palustrine swamps; non-riverine, groundwater-saturated flats; seasonally flooded ponds and depressions; seepage slope wetlands; and various tidal and non-tidal aquatic habitats. Tidal Freshwater Marshes and Tidal Hardwood Swamps occur only along the James River and estuarine rivers to the north.

Specific terrestrial and aquatic habitat and wildlife conditions and concerns are noted throughout this report, and some features are expanded below. The majority of the study area is located within the existing, previously disturbed right of way of the roadway corridor. Within the study area, there are a number of wetlands and other WUS systems that were identified within the study area boundary through either a desktop review or field analysis as detailed in Section D above. As noted in Section L (below), due to the mode of transport by various types of vehicles traveling the corridor, both aquatic and terrestrial exotic and invasive species are very common along the roadway.

The following are specific terrestrial and aquatic habitat and wildlife resources reviewed by federal and state agencies in Virginia.

1. Anadromous Fish Use Areas

Anadromous fish are those migratory fish species which spend most of their lives in the sea and migrate to fresh water to breed. One of VDGIF's roles is to document both confirmed and potential Anadromous Fish Use Areas throughout Virginia. Anadromous fish have historically played an important economic role in Virginia. According to VDGIF, over the past few decades, monitoring has noted that anadromous fish populations such as shad and herring are severely depressed. The Commonwealth is actively addressing this decline and taking steps to restore the migratory pathways of the species. Through these

efforts, the Commonwealth is hopeful that the anadromous fish populations eventually return to, or near, historic levels with fish passage, supplemental stocking, and a harvest moratorium all contributing to the recovery. This population increase would have important recreational and commercial impacts. Many of these species also contribute to the food chain as forage for predatory fish and provide a marine-based energy source to freshwater systems.

The VDGIF maintains a database that identifies stream reaches that are confirmed or potential migration pathways, spawning grounds, or summer areas for anadromous fish. The species included in the VDGIF assessment are Alewife (*Alosa pseudoharengus*), Blueback herring (*Alosa aestivalis*), American shad (*Alosa sapidissima*), Hickory shad (*Alosa mediocris*), Striped bass (*Morone saxatilis*), and some populations of Yellow perch (*Perca flavescens*). Upstream boundaries are established at either migratory impediments, such as dams, or where habitat becomes unsuitable.

Based on information generated from the VFWIS, the VDGIF has identified the following (summarized in **Table 27**) Confirmed and Potential Anadromous Fish Use Area designations within a two mile radius of the study area corridor. These were identified due to the documented occurrence of anadromous and/or semi-anadromous fish species within, and/or adjacent, to various portions of the study area. The Potential and Confirmed Anadromous Fish Use Areas are included on the mapping in **Appendix K**.

Table 27: VFWIS Documented Anadromous Fish Use Areas within a Two Mile Radius of the Study Area

Status	Major River Basin	Study Area Corridor Locality	Stream Name (VDGIF ID)	Confirmed Species
Confirmed	James	James City	Diascund Creek	Blueback herring, Striped bass, Yellow perch
		Richmond, Henrico County	James River (2)	American shad, Blueback herring, Striped bass, Yellow perch
		York County	Halfway Creek	Yellow perch
		James City County, Newport News, Hampton	James River 1	Alewife, American shad, Blueback herring, Hickory shad, Striped bass, Yellow perch
	York	James City County	France Swamp	Yellow perch
		James City County	Ware Creek	Alewife, Blueback herring
		York County	York River	Alewife, American shad, Blueback herring, Hickory shad, Striped bass, Yellow perch
Potential	York	York County	Jones Millpond Creek	--
		York County	King Creek	--
		York County	Queen Creek	--
		York County	Carter Creek	--
		York County	Skimino Creek	--
	James	Newport News	Warwick River	--
		James City County, Newport News	Skiffes Creek	--

The NMFS NOAA division also oversees anadromous and diadromous fish resources. This organization has not provided any official comments to date. However, based on information on the divisions website (http://www.nmfs.noaa.gov/pr/species/fish/), both Alewife and Blueback herring were listed as both a Candidate Species and a Species of Concern. A Candidate Species is a species that is undergoing a status review that NMFS has announced in a *Federal Register* notice, and is being considered for listing under the ESA as an endangered or a threatened species, but not yet the subject of a proposed rule. A Species of Concern is a species which the agency has some concerns regarding status and threats, but for which insufficient information is available to indicate a need to list the species under the ESA.

In addition to the database search, direct coordination was also initiated with the NMFS NOAA staff to discuss the potential for species to be located within the vicinity of the project corridor which were not yet included in the database. The Atlantic sturgeon (*Acipenser oxyrhinchus oxyrhinchus*) was listed as FE on February 6, 2012. However, this species has not yet been included in the agencies database. Through communication with the NMFS NOAA staff, this species has been identified within the York River and it's tributaries.

2. Colonial Water Birds

According to the CCB, Colonial Water Birds (also referred to as Colonial Wading Birds or Colonial Nesting Birds) include herons, egrets, ibises, gulls, terns, skimmers, cormorants, and pelicans. These birds share the unusual characteristic of nesting in dense assemblages, with the result of this behavior being that they typically breed in very few locations. The loss of these breeding areas may have profound consequences on a population level. In addition, due to their position in the aquatic food web, they are considered to be good indicators of ecosystem health. The most substantial threats to Colonial Water Birds include human disturbance, predation, habitat loss, and contaminants. Protection of sensitive colonies clearly depends on the availability of timely information of the birds locations. Development of strategic management plans to protect these species and breeding areas requires a broader understanding of population trends. Both the VDCR and VDGIF comment on a project's effect on this resource.

Through the project scoping process, the VDCR identified one natural heritage resource denoted as an Animal Assemblage within a two mile radius of the study area corridor, as listed in the table in **Appendix J**. This Animal Assemblage was a Colonial Wading Bird Colony (with a Global rank of G5 and a state rank of S2) located at Beaverdam Creek.

A review of the VDGIF database identified a number of Colonial Water Bird designations within the two mile radius of the study area corridor. However, there were no colonies within the immediate vicinity of the corridor. The identified colonies were predominantly great blue heron (*Ardea herodias*) while great egret (*Ardea alba*) colonies were also fairly common. Six great blue heron colonies are located within a half mile of the study area corridor (south of the mainline near mile markers 217.5 and 221.5; north of the mainline near mile markers 221, 223.5, 229, and 229.5). Only one of these colonies is located within 500 feet of the study area (north of the mainline at mile marker 229.5). The colonies were found primarily along the Chickahominy River and France Swamp, but also noted along Beaverdam Creek, Diascund Creek, and Wahrani Swamp. Yellow-crowned night heron (*Nyctanassa violacea*) colonies were identified in smaller numbers, and a single least tern (*Sternula antillarum*) colony was identified within the vicinity of the study area. The least tern colony is located within a half mile of the study area south of the mainline near mile marker 256. The Colonial Water Bird designations located within a two mile radius of the study area corridor are included on the mapping in **Appendix K.**

3. Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act (as amended by the Sustainable Fisheries Act of 1996) require all federal agencies to consult with the NMFS, NOAA division, on all on all actions or propose actions that are permitted, funded or undertaken by the federal agency which may

adversely affect essential fish habitat (EFH). Any federal agency that takes an action that could adversely affect EFH by reducing the quantity or quality of habitat must work with NMFS to identify impacts and steps for conserving the habitat and reducing the impact of that action. As defined by NOAA, EFH includes all types of aquatic habitat—wetlands, coral reefs, seagrasses, rivers—where fish spawn, breed, feed, or grow to maturity. The review for EFH considers all lifecycle stages including adults, juvenile, larvae, and eggs.

The NOAA EFH on-line mapping systems were used to identify potential regulated resources within the vicinity of the study area corridor. Official comments from NMFS have not been received for this study.

According to NOAA's EFH Mapper v2.0 and EFH data inventory, one NOAA Habitat Area of Particular Concern (HAPC) was designated within the study area corridor. HAPCs are discrete subsets of EFH that provide extremely important ecological functions or are especially vulnerable to degradation. These areas are rare, particularly susceptible to human-induced degradation, especially ecologically important, or located in an environmentally stressed area. The HAPC designation does not confer additional protection or restrictions upon an area, but can help prioritize conservation efforts and federal actions with potential adverse impacts to HAPC would be more carefully scrutinized during the consultation process and would be subject to more stringent EFH conservation recommendations. According to NOAA's EFH Mapper v2.0 and EFH data inventory, a HAPC is designated for the Sandbar shark (*Carcharhinus plumbeus)* for all stages of the lifecycle throughout the eastern part of the corridor, from approximately just west of the Queen Creek crossing to the project termini in the City of Hampton.
A number of additional EFH designations are identified in the vicinity of the project corridor according to the NOAA Guide to EFH Designations in the Northeastern United States on-line mapping system (http://www.nero.noaa.gov/hcd/index2a.htm). This guide provides a geographic species list of EFH designations completed by the New England Fishery Management Council, Mid-Atlantic Fishery Management Council, South Atlantic Fishery Management Council, and the NMF in the Northeastern United States. Species with designated EFH for at least one life cycle stage within the vicinity of the corridor include: Windowpane flounder (*Scophthalmus aquosus*), Bluefish (*Pomatomus saltatrix*), Atlantic butterfish (*Peprilus triacanthus*), Summer flounder (*Paralichthys dentatus*), Black sea bass (*Centropristis striata*), King mackerel (*Scomberomorus cavalla*), Spanish mackerel (*Scomberomorus maculatus*), Cobia (*Rachycentron canadum*), Red drum (*Sciaenops occelatus*), Dusky shark (*Carcharhinus plumbeus*), and Sandbar shark (*Carcharhinus plumbeus*). The database identified EFH habitat for all species listed above throughout the corridor, with the exception of the Windowpane flounder and the Dusky shark, whose EFH habitat is limited to approximately east of Williamsburg. A HAPC was also indentified in this database for the Sandbar shark, as noted above.

NOAA EFH Areas Protected from Fishing (APF) are areas in which the NMFS and the regional fishery management councils have used the EFH provisions established in Section 303(a)(7) of the Magnuson-Stevens Fishery Conservation and Management Act to prevent, mitigate, or minimize adverse effects from fishing on EFH. NMFS has not prohibited fishing in there areas, but steps such as anchoring restorations and gear prohibitions, have been taken to minimize the impact that fisheries have on EFH. According to NOAA's EFH Mapper v2.0 and EFH data inventory, while the James River and the York River are designated as Southern Fishing Management Areas to Hopewell and West Point, respectively, no EFH APF are designated for any waterway within the study area.

4. Natural Communities

The VDCR identifies resources considered natural heritage resources across the state. The VDCR identified a number of Natural Communities (which are considered natural heritage resources) within a two mile radius of the study area corridor. These Natural Communities, as listed in the table in **Appendix J**, include Mesic Mixed Hardwood Forest, Basic Mesic Forest, Piedmont/Coastal Plain Oak - Beech/Heath Forest, Coastal Plain Dry Calcareous Forest/Woodland, Oak/Heath Forest, Coastal Plain

Depression Wetland, Tidal Freshwater Marsh, Tidal Oligohaline Marsh, Coastal Plain/Piedmont Basic Seepage Swamp, and Non-Riverine Flatwood/Swamp. These natural community types may be located throughout the project corridor.

The Grafton Ponds Natural Area Preserve, which is owned by the City of Newport News but is under VDCR jurisdiction, is located in the study vicinity, but not within the study area corridor. The 375 acre Grafton Ponds Natural Area Preserve is located west of Exit 250, approximately 2,600 feet north of the mainline.

Grafton Ponds are listed as a Coastal Plain Depression Wetland Natural Community by the VDCR. While this Natural Community type has not yet been ranked by the state, according to the VDCR, Grafton Ponds represent Virginia's best remaining example of a coastal plain pond complex, and the state considers these rare wetland complexes as areas deserving high levels of protection from development. The features are formed from the dissolution of underlying calcareous marine deposits within the Yorktown formation. While the systems themselves are considered rare, they support several locally-rare or ST species including Harper's fimbristylis, Mabee's salamander, Pond spice, Cuthbert turtlehead, and Barking treefrog.

5. Submerged Aquatic Vegetation

The Virginia Institute of Marine Science (VIMS) at the College of William and Mary monitors and maintains a database for the presence and health of SAV in the Chesapeake Bay and its watershed. The organization also reviews projects for potential impacts to SAV resulting from that project. SAV beds filter polluted runoff, provide food for waterfowl, and provide habitat for blue crabs, juvenile rockfish, and other aquatic species. SAV beds not only indicate the presence of high water quality, their establishment helps to improve water quality in the area.

As part of the Annual SAV Monitoring Program, since 2001 VIMS has been orthorectifying aerial images that cover SAV beds. According to the VIMS SAV 2011 Interactive Map, while there are SAV beds documented in the James River and York River, and several major tributaries to these systems including the Chickahominy River, there are no SAV beds within the vicinity of the study area corridor.

To date VIMS has not provided comments as part of the scoping process for this project. In addition, no other agency or database search has provided information regarding SAV along the study area corridor.

6. Trout Waters, Threatened and Endangered Waters, Shellfish Areas

The VDGIF also tracks the presence of and reviews projects for impacts to trout, threatened and endangered waters, and shellfish areas throughout Virginia. Threatened and endangered waters are streams and rivers that contain documented occurrences of federal or state listed threatened or endangered species and their associated habitat. Trout waters include documented wild trout streams, stocked trout waters or recreational trout fisheries.

According to VDGIF VFWIS data, there are no trout waters, threatened or endangered waters, or shellfish areas in the vicinity of the study area.

Potential Impacts and Mitigation Measures

No-Build Alternative

The No-Build Alternative would not involve any project-related construction or changes to the natural environment. As a result, project-related environmental effects from the No-Build Alternative are not anticipated.

Build Alternatives

All of the Build Alternatives have the potential to impact terrestrial and aquatic habitat or species along the study area corridor. Extensive coordination with the different agencies should continue throughout all stages of project development to reduce potential impacts to these resources. In addition, avoidance and minimization of potential impacts to the natural environment and wildlife should be considered throughout the design and construction phases of the project. Permitting of the project would also address avoidance, minimization, and compensatory mitigation measures, as needed.

All of the Build Alternatives specifically have the potential to impact unique wildlife resources including Anadromous Fish Use Areas, EFH, and Colonial Water Birds. However, as specifically discussed below, the impacts would be negligible following the measures outlined in the following sections.

Terrestrial Wildlife and Habitat

Because the Build Alternatives consist of widening along an existing corridor, the proposed activities would not likely affect any substantial forest resource. Because the proposed Build Alternatives follow an existing highway corridor, and much of the corridor is already within an urbanized or developed area, impacts to terrestrial habitat would be limited to the displacement of small sections of remaining, often disjunct, non-contiguous tracts of forests. The existing corridor poses a barrier to wildlife movements that would not be substantially altered by the proposed Alternatives. The threat of mortality or injury to wildlife within the corridor would persist but would not likely increase in any measurable amount due to the improvements.

Potential exists for temporary impacts to wildlife with the displacement of vegetated cover within the construction footprint. The mechanical removal of cover would cause animal migration away from the disturbance resulting in temporary decrease in habitat usage by mostly common edge-dwelling species. Construction activities may also result in wildlife mortality. Foraging behaviors and wildlife use may also be associated with slope stabilization practices, but would only be on a temporary basis.

VDCR Natural Communities noted above are not anticipated to be impacted by any of the Build Alternatives to any measurable degree.

As part of the construction practices, the removal of existing vegetation should be avoided to the greatest extent practicable to minimize potential impacts to the terrestrial system. In addition, all measures to reduce the construction footprint, in general, should be followed as part of the final design. Cut and fill should be minimized to the greatest extent practical to ensure structural stability of the roadway and associated structures. Particularly in areas of environmental concern, steeper than conventional slopes should be considered as part of the design. In addition, the implementation of best management practices for erosion and sediment control and the abatement of pollution loading would minimize potential impacts to adjoining habitats and communities.

To avoid attraction of species to the edge of the roadway, VDOT should consider excluding landscaping options which intentionally provide wildlife habitat or attract wildlife, such as those species with high feeding values. Where feasible, passageways for terrestrial wildlife should be provided and maintained beneath proposed bridges and any elevated structures to help minimize effects of wildlife corridor bisection. Fencing should also be considered to minimize motorized collisions with wildlife and to help direct wildlife towards any maintained passageways.

Additional measures to prevent the colonization of invasive species are discussed in Section L.

Aquatic Wildlife and Habitat

All of the Build Alternatives would reduce aquatic habitat within the corridor to a small degree. The extension of culverts could lead to the direct loss of fish and macroinvertebrates within the construction zone and would permanently alter the available habitat in the impacted areas. However, these areas would likely be colonized again, following the construction activities. There is the potential for increased water quality degradation from stormwater runoff due to the increase in impervious surface affecting overall water quality. However, the relatively small impervious impact that may occur is unlikely to affect the aquatic habitat or the makeup of biological communities to any appreciable degree and best management practices would be employed to reduce potential impacts.

The presence of natural areas and federal and state listed natural habitat and unique wildlife resources in the vicinity of the study requires special consideration and coordination with various federal and state agencies. Through the coordination with these agencies, potential impacts to target species and their habitats can be evaluated and avoided by implementing various practices as part of the project design. Examples of mitigation measures which may be employed to avoid impacts to wildlife and their habitats include shifting alignment to avoid potential areas, spanning/bridging resources and the use of bottomless arch culverts, countersinking of culverts, limiting clearing of existing vegetation to the greatest extent possible, the strict adherence to erosion and sediment control guidelines and the implementation of stormwater best management practices, and the adherence to maintaining applicable buffer widths to a species habitat.

In general, if impacts cannot be avoided, time-of-year restrictions for construction may be required and these restrictions would be determined through the permitting process. Also, habitat assessments and species surveys may be required to determine the presence of a threatened or endangered plant species. These species surveys must be completed by an agency certified or approved specialist, and may have restrictions on the time-of-year when the surveys can be conducted. Recommendations and practices for specific resources are detailed below.

All Build Alternatives cross Queen Creek near mile marker 239.5. However, the VDGIF has identified this system as a potential anadromous fish use area, and not a confirmed area. Through the permitting process, the VDGIF may recommend for anadromous fish use areas (or their tributaries which cross the study area corridor) the following time-of-year construction restrictions (meaning no in-stream work is permitted during these dates during a given year): 1) James River and tributaries time-of-year restriction from February 15th to June 30th; and 2) York River and tributaries time-of-year restriction of February 15th through June 15th. In addition to potential time-of-year construction restrictions to minimize impacts to anadromous fish resources, the VDGIF also typically recommends the following activities: using non-erodible cofferdams to isolate the construction area; blocking no more than 50% of the streamflow at any given time; stockpiling excavated material in a manner that prevents reentry into the stream; revegetating barren areas with native vegetation; and implementing strict erosion and sediment control measures. In regards to stream crossings, the agency recommends clear-span bridges. If, however, clear-span bridges are not feasible, they suggest that the culverts should be countersunk at least six inches below the stream bed or, alternatively, bottomless culverts should be installed to allow passage of aquatic organisms.

VDCR Natural Communities, including the Grafton Pond Natural Area Preserve are not anticipated to be impacted by any of the Build Alternatives to any measurable degree. The agency may require a survey of the area for the presence of Grafton ponds or species associated with these systems. The agency would likely recommend avoiding any direct impact to these resources, and if a pond is identified in the vicinity of the study area corridor, providing a buffer area from the resource. In addition, the agency would likely recommend the strict adherence to erosion and sediment control measures. These recommendations would be provided during the permitting phase of the project.

As noted above, several EFH and one HAPC are noted for the corridor. In order to minimize impacts to these resources, the NMFS may require specific time-of-year construction restrictions which would limit construction activities within a specific channel, the strict adherence to erosion and sediment control measures, the immediate stabilization and restoration of disturbed areas, and mitigation measures such as the use of bubble curtains to reduce sound/pressure waves which may potentially negatively impact a fish species. A formal consultation with the agency may also be required. The agency's formal recommendations would be made during the permitting process for the project.

No Build Alternative directly impacts any Colonial Water Bird resource. According to the VDGIF, line of sight distance is the primary factor in determining potential impacts of a construction project to Colonial Water Birds. One half mile is the standard line of sight distance reviewed by the agencies. As the distance decreases, noise may also become a factor. As noted above, six Great blue heron colonies are located within a half mile of the study area corridor, with one of these colonies located within 500 feet of the study area. In addition, a single Least tern colony is located within half mile of the corridor, south of the mainline. Through the permitting process, the VDCR and VDGIF may recommend a number of specific practices to minimize and mitigate for potential impacts to these resources. Typical requirements include the direct avoidance of a colony, shifting the alignment away from the resource to reduce the distance of the construction to the colony, and the strict adherence to erosion and sediment control measures. Surveys and time-of-year restrictions for construction practices may also be required. For a Great blue heron, VDGIF typically recommends a time-of-year restriction from February 15th through July 31st for construction within 0.25 mile of a rookery or within 0.5 mile of a rookery if the project involves high density activity. In addition, the agency typically recommends perpetually maintaining an undisturbed naturally vegetated buffer of at least 500 feet around the rookery.

Additional measures to prevent the colonization of invasive species are discussed in Section L.

L. Invasive Species

As defined by VDCR, an invasive species is a non-native (alien, exotic, or non-indigenous) plant, animal, or disease that causes or is likely to cause ecological and economic harm to the natural system. The threat of invasive species to Virginia's natural communities has greatly increased over the years due to a number of factors including rapid globalization, international trade activity, and increased travel between different states and regions within Virginia. Introduction of an invasive species to a natural habitat can either be intentional (such as ornamental plants for gardens, erosion control, food for both livestock and people, pets, etc.) or accidental (species in ship ballast water, shipping crates, mixed in with plant materials from other parts of the world, and attached to travelers' vehicles and personal belongings).

1. Invasive Plant Species

Methodology and Existing Conditions

The VDCR-DNH, in association with the Virginia Native Plant Society, have identified and listed invasive plant species that threaten Virginia's natural populations. To date, they have listed over 100 plant species that threaten or potentially threaten natural areas, parks, and other lands. Invasive species are also classified by levels of invasiveness, including High, Medium, and Occasional based on a number of factors including the cumulative impact on natural areas, the potential to disperse and invade natural areas, distribution and abundance, difficulty of management, and impacts on other species. Highly invasive plant species generally disrupt ecosystem processes and cause major alterations in plant community and overall structure. They can easily establish in undisturbed habitats and would colonize disturbed areas rapidly under the appropriate conditions. While plants with medium and low invasiveness can become management problems, they tend to have minor adverse effects to the natural system and are more easily managed.

Using the DCR-DNH information, **Table 28** includes plant species that are considered highly invasive and are common to the general area of the study corridor. These species have the potential to become established in the study area corridor, particularly in disturbed areas generated during roadway construction.

Table 28: Potential Highly Invasive Plant Species along the Study Area

Layer	Common Name	Scientific Name
Tree	Tree-of-heaven	*Ailanthus altissima*
Shrub	Autumn olive	*Elaegnus umbellate*
	Chinese privet	*Ligustrum sinense*
	Multiflora rose	*Rosa multiflora*
Vine	Japanese honeysuckle	*Lonicera japonica*
	Kudzu vine	*Pueraria montana*
	Oriental bittersweet	*Celastrus orbiculata*
Herbaceous	Aneilema	*Murdannia keisak*
	Wine berry	*Rubus phoenicolasius*
	Canada thistle	*Cirsium arvense*
	Chinese yam	*Dioscorea oppositifolia*
	Common reed	*Phragmites australis*
	Japanese knotweed	*Polygonum cuspidatume*
	Japanese stilt grass	*Microstegium vimineum*
	Johnson grass	*Sorghum halepense*
	Spotted knapweed	*Centaurea biebersteinii*
	Lesser celandine	*Ranunculus ficaria*
	Cogon Grass	*Imperata cylindrica*
	Purple Loosestrife	*Lythrum salicaria*
	Parrot feather	*Myriophyllum aquaticum*
	European water milfoil	*Myriophyllum spicatum*
	Alligator Weed	*Alternanthera philoxeroides*
	Hydrilla	*Hydrilla verticillata*

The highly disturbed nature of highway corridors, in addition to the easy mode of transport by the vehicles traveling the corridor, including vehicles from other regions (both local and national), allows for the establishment of exotic and invasive species. As summarized in **Table 29**, stands of several aquatic and terrestrial invasive, non-native, exotic, or "nuisance" plant species were identified within the study area including, Tree-of-heaven *(Ailanthus altissima)*, Japanese stiltgrass (*Microstegium vimineum)*, Common reed *(Phragmites australis)*, and Common dodder *(Cuscuta gronovii)*. The primary invasive species identified within the study area was Japanese stiltgrass *(Microstegium vimineum).*

Table 29: Invasive, Non-Native, Exotic, or Nuisance Plant Species Identified Along the Study Area

Location	Common Name	Scientific Name
West of Mile Marker 196; North of Mainline	Japanese stiltgrass	*Microstegium vimineum**
East of Mile Marker 204; South of Mainline	Japanese stiltgrass	*Microstegium vimineum**
East of Mile Marker 208; South of Mainline	Japanese stiltgrass	*Microstegium vimineum**
East of Mile Marker 212; South of Mainline	Japanese stiltgrass	*Microstegium vimineum**
East of Mile Marker 221; South of Mainline	Japanese stiltgrass	*Microstegium vimineum**

Location	Common Name	Scientific Name
West of Mile Marker 222; South of Mainline	Japanese stiltgrass	*Microstegium vimineum**
Exit 234; Southwest Cloverleaf	Tree-of-heaven	*Ailanthus altissima**
West of Mile Marker 247; North of Mainline	Common dodder	*Cuscuta gronovii*
East of Mile Marker 228; South of Mainline	Japanese stiltgrass	*Microstegium vimineum**
East of Mile Marker 229; South of Mainline	Japanese stiltgrass	*Microstegium vimineum**
West of Mile Marker 249; South of Mainline	Japanese stiltgrass	*Microstegium vimineum **
East of Mile Marker 257; South of Mainline	Japanese stiltgrass	*Microstegium vimineum**
Mile Marker 260.5;North of Mainline	Common reed	*Phragmites australis**
East of Mile Marker 260; North of Mainline	Common reed	*Phragmites australis**
East of Mile Marker 262; North of Mainline	Common reed	*Phragmites australis**
East of Mile Marker 264; North of Mainline	Common reed	*Phragmites australis **

* Species listed on the VDCR Invasive Alien Plant Species of Virginia List

Potential Impacts and Mitigation Measures

No-Build Alternative

The No-Build Alternative would not involve any project-related construction or changes to the natural environment. As a result, project-related environmental effects from the No-Build Alternative are not anticipated.

Build Alternatives

Because the majority of the additional roadway associated with all of the Build Alternatives would be located within the existing disturbed corridor, the likelihood of an increase in the prevalence of invasive species would be expected to be minimal. However, because the clearing of vegetated areas would be necessary for this project, there would be opportunity for invasive species to become established due to extra light penetrating the forest canopy in addition to disturbed soils. In order to minimize opportunities for invasive species to become established, steps would be taken to limit the removal of native species throughout the corridor during construction. Contract bid packages could include special provision for managing invasive species that are specific to the appropriate sections of VDOT *Road and Bridge Specifications*. While the newly established right of way is vulnerable to colonization by invasive plant species from the existing highway and adjacent property, implementing special construction provisions would reduce the potential for establishment. No specific mitigation measures are required.

2. Invasive Animal Species

Methodology and Existing Conditions

A number of both aquatic and terrestrial animal species threaten the native plant and animal communities in Virginia. The following listing includes common species that could affect the study area if encountered within construction limits. None of these species were directly observed during field investigations.

The Virginia Administrative Code 4VAC15-20-160 (VDGIF) designates the following as nuisance species in Virginia: House mouse (*Mus musculus*); Norway rat (*Rattus norvegicus*); Black rat (*Rattus rattus*); Coyote (Canis latrans); Nutria (*Myocastor coypus*); Woodchuck (*Marmota monax*); European starling (*Sturnus vulgaris*); English (house) sparrow (*Passer domesticus*); Pigeon (Rock Dove) (*Columba livia*); and other non-native species as defined in the Migratory Bird Treaty Reform Act of 2004 and

regulated under 50 CFR 10.13. In addition, the DCR-DNH has identified a number of invasive species which threaten Virginia's wildlife and plant systems such as the Emerald ash borer (*Agrilus planipennis***)**, Northern snakehead fish (*Channa argus*), Rapa welk (*Rapana venosa*), and the Imported fire ant (*Solenopsis invicta*). These species are listed as established in Virginia.

The DCR-DNH have also identified Zebra mussel (*Dreissena polymorpha*), Sirex woodwasp (*Sirex noctilio F.*), Rusty crayfish (*Orconectes rusticus*), and Chinese mitten crab (*Eriocheir sinensis*) as species that may threaten Virginia's wildlife and plant systems; however, they are not identified as well established in the Commonwealth.

Potential Impacts and Mitigation Measures

No-Build Alternative

The No-Build Alternative would not involve any project-related construction or changes to the natural environment. As a result, project-related environmental effects from the No-Build Alternative are not anticipated.

Build Alternatives

Because the Build Alternatives would involve limited widening along an existing disturbed corridor, the addition of invasive animal species is expected to be minimal due to the project. Contract bid packages should include special provision for managing invasive species that are specific to the appropriate sections of VDOT *Road and Bridge Specifications*. No specific mitigation measures are required.

M. Navigation

Methodology and Existing Conditions

Through the scoping process, the United States Coast Guard (USCG) identified two bridge crossings which may require a detailed review by their agency. These areas included the bridges over Queen Creek east of Exit 238 (Colonial Williamsburg) in York County and Newmarket Creek near the study termini in the City of Hampton. The agency requested information concerning the number and type of vessels that utilize these two waterways in the vicinity of the bridges.

According to the information provided from the VDGIF Boating Division, for the City of Hampton, there are 4,299 boats listed as being "primarily used" in the City and 421 Personal Water Crafts (PWCs) registered from the City. For York County, there are 3,064 boats listed as being "primarily used" in the County, and 468 PWCs registered from the County.

According to the NOAA Tide Chart No. 12243, the vertical clearance of the Queen Creek bridges is 15 feet and the horizontal clearance is 40 feet. Queen Creek is approximately 4.5 feet deep at this location. There is no NOAA tide information for Newmarket Creek based on the system's inland location. ` However, based on VDOT bridge inspection reports, the vertical clearance is less than 6 feet, with the water depth less than 4 feet at this location. The horizontal clearance is approximately 40 feet.

Through discussions with the local VDGIF Conservation Police Officer, local marina owners, and the staff of Bluebird Gap Farm in the City of Hampton (which is a park located just downstream of the I-64 Newmarket Creek bridge), the vessel traffic is minimal in both areas, consisting of small, flat-bottom vessels such as canoes and kayaks. Occasionally, there may be a small john boat utilizing the area but this occurrence is very infrequent.

For Queen Creek, this area is highly limited in use based on the tides and depth of the water, and the vertical clearance of the bridge. Most of the traffic stops downstream, at the docks/facilities at Queens Lake. The area at the bridge and upstream is primarily used by local citizens, in either canoes or kayaks

who are boating for sightseeing/fishing purposes. Small john boats are occasionally observed in the area, particularly during duck hunting season.

While many larger vessels utilize the Back River, these boats can not venture upstream to access Newmarket Creek. In comparison to Queen Creek, Newmarket Creek is even less utilized by vessels. Boats that do enter Newmarket Creek, including the smaller boats such as canoes and kayaks, tend to stop at Air Power Park near Mercury Boulevard. This limited use is not only due to the tides and the limited depth of water for the entire reach, but also due to the major impediments within the channel. These impediments include utility crossings and protective features at Armistead Avenue and a large weir that is located just downstream of I-64, at the confluence of Coliseum Lake. This weir spans nearly the entire channel.

Potential Impacts and Mitigation Measures

No-Build Alternative

The No-Build Alternative would not involve any project-related construction or changes to the natural environment. As a result, project-related environmental effects from the No-Build Alternative are not anticipated.

Build Alternatives

The USCG requires a bridge permit for the construction of a new bridge or causeway, or reconstruction or modification of an existing bridge or causeway across navigable waters of the United States. This authority is derived under the General Bridge Act of 1946, as amended, the Rivers and Harbors Act of 1899, as amended, and the Act of March 23, 1906, as amended, all require that the location and plans of bridges and causeways across the navigable waters of the United States be submitted to and approved by the Secretary of Transportation prior to construction. The purpose of the Bridge Permit is to preserve the public right of navigation and to prevent interference with interstate and foreign commerce.

For all of the Build Alternatives, the USCG would review the proposed bridges over Queen Creek in York County and Newmarket Creek in the City of Hampton. As outlined above, vessel use at these crossing is extremely low and limited to small vessels such as canoes and kayaks.

At this time, it is expected that the new bridges would be of the same elevation as the existing; however, this would be determined as part of the final design of the project. Based on the likely design and the limited use of small vessels, a bridge permit from the USCG is not anticipated; however, this determination would be made by the USCG during the permitting process.

III. Regulatory Anticipated Permits and Clearances

The construction of any of the Build Alternatives would require coordination with and approval/clearances from a number of different regulatory and advisory agencies during the final design and permitting phase of the project. Anticipated primary federal, state, and local, natural resources related permits, approvals, and clearances for any of the Build Alternatives are summarized below. These review and coordination efforts are also discussed in Section II of this memorandum.

A. Water Related Permits and Clearances

The USEPA has regulatory oversight of the Corps CWA permitting. In addition, under the NEPA regulations and CEQ Guidelines, the USEPA is also charged with review responsibilities of NEPA documents to ensure proposed activities utilizing federal funds are, in part, protecting water quality and special aquatic sites including sanctuaries and refuges, wetlands, mudflats, vegetated shallows, and riffle and pool complexes, as defined in the USEPA's 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material (33 U.S. Code Annotated §1344 *et seq.*; 40 CFR 230). The Corps applies the

USEPA Section 404(b) (1) Guidelines rather than deferring to the USEPA's review of their application. Therefore, the USEPA Guidelines establish a presumption against filling special aquatic sites by prohibiting the discharge of dredged or fill material into waters if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem. During permit coordination with regulatory agencies, an alternatives analysis is often required generally because the Guidelines contain a presumption that less damaging alternatives are presumed to be available.

The Corps administers regulations for activities affecting waters of the United States and navigable waters pursuant to Section 404 of the Clean Water Act of 1977, as amended, and Section 10 of the Rivers and Harbors Act of 1899, respectively. Section 9 of the Rivers and Harbor Act prohibits the construction of any obstruction, including dams, bridges, and causeways, across any navigable waterway without the approval of the Corps or USCG. Under the Corps regulations (33 CFR 329) as applied to the study area, navigable waters are determined by the District Engineer and are made for all waters that are "presently used or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce". The Corps general definition of navigable waters of the United States is "those waters subject to the ebb and flow of the tide shoreward to the mean high water mark and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. A determination of navigability, once made, applies laterally over the entire surface of the waterbody, and is not extinguished by later actions or events which impede or destroy navigable capacity." This includes, by definition, all tidal waterbodies including streams/rivers and wetlands.

In addition to the Corps regulatory oversight, several state agencies have jurisdiction over surface waters. The VDEQ administers the Virginia Water Protection Permit program (9 VAC 25-210), Section 401 of the CWA, and the State Water Control Law for activities affecting jurisdictional wetlands, streams, and other water bodies. In July 2000, the VDEQ authority was modified by the Virginia General Assembly to develop a non-tidal wetlands program and to provide regulations to protect fish and wildlife resources. Section 401 of the CWA requires any applicant for a federal license or permit for any activity that may result in a discharge into waters to obtain a certification that discharge will not adversely affect water quality from the state in which the discharge will occur. Section 401 requires certification by Virginia that prospective permits comply with the state's applicable effluent limitations and water quality standards. While waters that are considered "isolated" do not fall under federal CWA permitting, they are regulated under the VDEQ.

The VMRC is authorized to permit activities in, on or over state-owned subaqueous lands in Virginia (Code of Virginia Chapter 2, Title 62.1). Through this regulatory framework permitted activities include building, dumping, or otherwise trespassing upon or over, encroach upon, take or use any material from the beds of the bays, oceans, and jurisdictional rivers, streams, or creeks. In addition, the VMRC is responsible for managing and regulating the use of Virginia's tidal wetlands and coastal primary sand dunes in conjunction with Virginia's local wetlands boards, where established. The VMRC also protects and regulates those areas designated as non-vegetated and vegetated tidal wetlands and state-owned subaqueous bottom land.

Virginia's Waters of the United States, including wetlands, are also regulated under the Virginia Wetlands Act and through Subtitle III of Title 28.2 of the Code of Virginia. Through this framework, the County's Local Wetlands Board regulates activities in tidal wetlands within their Counties. However, because this project is a government project, the local wetlands boards do not have jurisdiction over impacts to tidal wetlands and has deferred all jurisdictions regarding this project to the state (VMRC).

The federal and state guidelines require that no discharge of dredged or fill material in waters of the United States be permitted unless appropriate and practicable steps have been taken to minimize adverse impacts associated with the discharge. Additional federal and state guidance and policy documentation

assist in defining the requirements for mitigation (which includes avoidance, minimization, and compensation). Compliance with these requirements is an essential environmental safeguard to ensure that CWA objectives for the protection of streams and wetlands are achieved.

Prior to the development of the final design, a jurisdictional determination must be obtained by the Corps. Once this determination is prepared, the type of and quantity of impacts to jurisdictional surface waters can be assessed and permitted. The mitigation measures for these stream and wetland impacts would be identified for any of the Build Alternatives during the final design. These measures would include avoidance and minimization efforts to the greatest extent practicable, including but not limited to the following practices:

- The use and appropriate placement of erosion and sediment control measures and best management practices.
- The use of upgraded erosion and sediment controls in environmentally sensitive areas.
- Bridging/spanning of streams and wetlands.
- Alignment shifts around specific systems.
- The use of cofferdams; steepening of slopes and the use of retaining walls on steeper slopes.
- Bottomless arch culverts and properly countersunk culverts.
- Stream relocation to improve skew angle and shorten culverts if new culverts are necessary.
- Ensuring groundwater recharge/wetland hydrology maintenance through the location of outfalls and infiltration trenches.

Following construction practices, any additional stormwater generated through new impervious surfaces would be treated through improved stormwater management systems.

The federal and state permit programs rely on the use of compensated mitigation to offset unavoidable aquatic impacts by replacing lost functions with replicated functions elsewhere. Appropriate mitigation is determined by the agencies and is conducted on a case-by-case basis; however, the process is based on established policies, guidelines, and regulations.

Compensatory mitigation would likely be required for permanent impacts to stream and wetlands resulting from the project activities. Compensatory mitigation is typically required in the same or adjacent HUC within the same watershed and physiographic province as the impact. As part of the permitting process, mitigation options would be investigated using the various agency resources including the July 2004 Joint Corps and the VDEQ *Recommendations for Wetland Compensatory Mitigation: Including Site Design, Permit Conditions, Performance Criteria, and Monitoring Criteria* and the associated *Mitigation Checklist*, as well as the March 2008 Offsite Mitigation Guidelines. Of greatest significance, on April 10, 2008, new regulations providing guidance for compensatory mitigation was jointly issued by the Corps and the USEPA. The new mitigation rule, which became effective June 9, 2008, changed the federal permitting preference regarding how compensatory mitigation is accomplished for project impacts to jurisdictional surface waters. This rule does not change when compensation is required.

The new rule provides the following preference for compensatory mitigation options:

1. Purchase of compensatory mitigation bank credits.
2. Purchase of an approved in-lieu fee fund credits.
3. Watershed approach based mitigation by the permittee.
4. On-site mitigation/in-kind mitigation by the permittee.
5. Off-site mitigation/out-of-kind mitigation by the permittee.

Both the Corps and the VDEQ have currently adopted this hierarchy of compensatory mitigation options for permanent impacts to jurisdictional surface waters. There are currently a number of compensatory mitigation banks that have the appropriate available credits for the potential impacts. The final compensatory mitigation option would be determined during the project's permitting process.

The compensatory mitigation requirements for both streams and wetlands would be determined for the selected Build Alternative during the permitting phase. The current typical compensatory mitigation to impact ratios for non-tidal forested, scrub-shrub, and emergent wetlands are 2:1, 1.5:1, and 1:1, respectively. The compensatory mitigation to impact ratio for tidal emergent wetlands is determined on a case-by-case basis; however, 2:1 is typical for these systems.

Compensatory mitigation is not typically required for open water impacts (e.g., piers in open waters) but this requirement would be reviewed on a case-by-case basis. In addition, compensatory mitigation is typically required for unavoidable stream impacts to greater than 300 linear feet of stream at a crossing. However, this determination would be made on a project-by-project basis and due to the scale of this specific project, this threshold may be waived. The approved assessment methodology to determine the required stream compensation would be completed as part of the compensatory mitigation plan. As detailed above, at the time of this document, the approved assessment methodology is the USM. All potentially impacted channels would need to be assessed and the USM methodology completed in full to determine the compensatory mitigation requirements for the project. Compensatory mitigation for tidal stream systems would be determined on a case-by-case basis. At this time, compensatory mitigation is not typically required for impacts to jurisdictional ditches. The requirements for compensation for jurisdictional ditch impacts would be determined during the permitting process.

In accordance with the existing regulations and standard permit conditions, all temporary impacts would also be required to be restored to their original contours and re-vegetated with the same or similar species. Additional compensatory mitigation other than previously stated for temporary impacts is typically not required through the permitting process.

To continue the permitting process detailed above, the Joint Permit Application (JPA) must be prepared and submitted for agency review. It is important to have the defined construction limits finalized prior to completing the permit application to ensure that the appropriate impacts are addressed, thus avoiding the need to change either the permit application or the actual issued permit in the future if changes occur. Any changes after the initial JPA submittal would increase the agencies' review times and may require a modification to a permit if the permit is already issued. This is of particular importance since the actual amount of land disturbance and/or impacts determines the type of permit(s), and subsequent requirements, necessary. The VMRC serves as the "clearinghouse" for the JPAs, distributing the applications to the appropriate regulatory and advisory agencies.

The study team contacted the federal and state permitting agencies to discuss this project and the permits necessary for any potential impacts or activities. Coordination with the Corps, VDEQ, and VMRC would be required during the permitting phase of the project to determine the jurisdictional limits of surface waters and to make a final determination of the need for and type of permits. Both temporary and permanent impacts to jurisdictional wetland and stream systems from any of the Build Alternatives would require a permitting decision from these agencies. While the permit type(s) and requirements can not be determined until the JPA is submitted and reviewed, based on the scale of the project, the multiple individual impact area crossings and the potential for tidal impacts, it is anticipated that the permits to be issued for this project include a Section 404 Individual Permit from the Corps, a Virginia Water Protection Individual Permit from the VDEQ (which serves as the Section 401 certification), and a subaqueous bottomland permit from the VMRC (Virginia General Permit #1 if project is pursued by the VDOT) for any impacts to systems with drainage areas greater than five square miles. Wetland impacts

are exempted for the state led projects by this agency. If impacts occur to navigable waters (including channels and wetlands associated with Queen Creek and Newmarket Creek) permitting would require compliance with Section 10 of the Rivers and Harbors Act. These permits can typically take between three to nine months to obtain from the date of the completed application. This timeframe is dependant on the complexity of the project, the extent of the impacts, the type of actual permit required, and, often, the schedules of the regulators.

There are nine surface waters intersecting the study area corridor that have been listed as VDEQ impaired waters (Categories 4 and/or 5) on the VDEQ 2010 303(d) list. A number of additional listed stream channels are located in the vicinity of the study area. Appropriate regulations and requirements including the strict adherence to appropriate erosion and sediment control measures, the appropriate use of fertilizers, limiting clearing practices, and the implementation of stormwater management plans designed specifically to address the particular condition, as appropriate, would need to be followed as part of construction.

While the potential impacts to any groundwater well resulting from any of the Build Alternatives are likely non-existent, as noted by the VDH, potential impacts to public water distribution systems or sanitary sewage collection systems must be verified by the local utility prior to construction practices. Further investigations to determine the presence, operational status, and location of individual wells would be performed as part of property acquisition and right of way management for the construction project. Closures and/or relocation of any well, if required, would be completed by following the Virginia Waterworks Regulation and other applicable VDOT or locality standard. Closures and relocations of private wells, if required, would be completed by using the Virginia Private Well Regulation and other applicable VDOT standard or locality standard.

B. Habitat and Species Permits and Clearances

Additional federal and state agencies have statutory responsibility by serving as resource and commenting entities in the permit review process. Their involvement, for the most part, is established through the JPA process. Their general involvement in the regulatory and permitting process is summarized in the following sections.

As detailed below, a number of federal and state agencies regulate and protect listed threatened and endangered species. Due to the presence of federal and state listed threatened and endangered species and/or habitat documented within the vicinity of the study area, construction time-of-year restrictions may be required. These restrictions would be determined through the permitting process. Also, habitat assessments and species surveys may be required to determine the presence of a threatened or endangered species or habitat. These species surveys must be completed by an agency certified or approved specialist, and may have restrictions on time-of-year when the surveys can be conducted. Additional design or construction considerations, such as the use of bubble curtains, maintaining construction buffer widths, etc., may also be requested or required by the agencies.

The USFWS and the NMFS regulate and protect federally listed threatened and endangered species under the ESA of 1973 with the primary goal of conserving and recovering listed species. The ESA, with few exceptions, prohibits activities affecting threatened and endangered species unless authorized by a permit. The legal federal status of a species is determined by the USFWS and the NMFS. In addition to threatened and endangered species coordination, the NMFS would also provide comments regarding EFH for the study area corridor. Coordination with both federal agencies would continue as the project moves forward to the design phase.

In addition to the federal oversight, threatened and endangered species are also regulated at the state level by a number of different agencies and organizations. The agencies have adopted the federal list as well as

a state list of endangered and threatened species, with the primary focus of managing Virginia's wildlife to maintain optimum populations of all species and conserve biodiversity. Coordination with these agencies is conducted through the JPA process.

The VDGIF implements regulations to protect the game and freshwater fisheries of the Commonwealth, and during permit coordination, determines likely impacts on game, and fish and wildlife resources and habitats, and state-listed threatened and endangered animal species (exclusive of insects). The VDGIF also issues recommendations for mitigation measures for projects in order to avoid, minimize, and mitigate for impacts to natural resources. The VDGIF has the authority to limit construction in and around trout streams and other streams used by anadromous fish or threatened and endangered species by recommending certain time-of-year restrictions to protect spawning, fry dispersal, and or fish stocking activities, and has special powers to prevent and control aquatic invasive species.

The VDACS is charged with the conservation, protection, and management of endangered and threatened species of plants and insects (*Endangered Plant and Insect Species Act, Va. Code, Chapter 39 §3.1-1020 through 1030*, as amended). The Virginia Endangered Plant and Insect Species Program cooperates with the USFWS, the VDCR, and other agencies and organizations on the recovery, protection, or conservation of listed threatened or endangered species and designated plant and insect species that are rare throughout their worldwide ranges. In those instances where recovery plans are available, adherence to the plans is followed to the extent possible. Under a Memorandum of Agreement established between the VDACS and the VDCR, the VDCR represents the VDACS in comments regarding potential impacts on state-listed and endangered plant and insect species.

The VDCR is charged with conserving Virginia's natural and recreational resources. The Department has five programmatic divisions which manage state parks, soil and water conservation, natural heritage, recreation planning, dam safety, and floodplain management. Also included are oversight regulations by advisory bodies including the Board of Conservation and Recreation, Virginia Cave Board, Board on Conservation and Development of Public Beaches, and the Virginia Soil and Water Conservation Board. Within this agency, the Natural Heritage Program's mission is to conserve Virginia's biodiversity through inventory, protection, and stewardship, as enacted in the 1989 Virginia Natural Area Preserves Act (Va. Code §10.1-209 through 217). The VDCR's DNH is designated to conduct a statewide biological inventory, maintain a statewide database for conservation planning and project review to enhance land protection for the conservation of biodiversity, and the protection and ecological management of natural heritage resources (the habitats of rare, threatened, and endangered species, significant natural communities, geologic sites, and other natural features). This mission is carried out through implementation of four major programs: Inventory, Natural Area Protection (includes project review), and Ecological Management.

Both the VDGIF and the VDCR recommends contacting the CCB at the College of William and Mary to obtain the updated information regarding Bald eagle (*Haliaeetus leucocephalus*) issues. Although Bald eagles are currently de-listed under the federal ESA, they are still recognized as a threatened species at the state level and are protected by the federal Bald and Golden Eagle Protection Act (Eagle Act) (16 U.S.C. §668-668d) and the Migratory Bird Treaty Act (MBT Act) (16 U.S.C. §703-712).

While VIMS can provide technical advisory services to other federal and state agencies for tidal and non-tidal wetlands and marine fisheries issues, they would specifically provide comments regarding SAV issues.

C. Erosion and Sediment Control

Virginia is an authorized state under the federal National Pollutant Discharge Elimination stormwater permitting programs. The VDCR administers the Virginia Pollutant Discharge Elimination System

permitting program for the control of stormwater discharges from municipal separate storm sewer systems and land disturbing activities under the Virginia Stormwater Management Regulations (4VAC3-20). Assuming the project is pursued by the VDOT, the land-disturbing activities of greater than 2,500 square feet must comply with the most current version of the VDOT erosion and sediment control annual specifications approved by the VDCR Control Law (VESCL) and Regulations (VESCR) and the most current version of the *Virginia Erosion & Sediment Control Handbook*. All regulated land-disturbing activities must have a project specific erosion and sediment control plan developed in accordance with the VDCR approved VDOT erosion and sediment control annual specifications. All regulated land-disturbing activities associated with the project, including on and off site access roads, staging areas, borrow areas, stockpiles, and soil intentionally transported from the project must be covered by the project specific erosion and sediment control plan.

If the project is not VDOT pursued, the operator or owner of construction activities involving land disturbing activities equal to or greater than 2,500 square feet in areas designated as subject to the Chesapeake Bay Preservation Area Designation and Management Regulations adopted pursuant to the Chesapeake Bay Preservation Act are required to register for coverage under the VDCR General Permit for Discharges of Stormwater from Construction Activities and develop a project specific stormwater pollution prevention plan (SWPPP). The SWPPP must be prepared prior to submission of the registration statement for coverage under the general permit and the SWPPP must address water quality and quantity in accordance with the Virginia Stormwater Management Program Permit Regulations. Any additional coordination with the counties would be required to ensure compliance with their individual regulations, including the obtainment of a County land disturbance permit, if necessary.

Although the study area corridor is located within the Chesapeake Bay Watershed, since this is a roadway project it is exempt from the commitments of the Chesapeake Bay Preservation Act regarding construction activities within the RPAs and RMAs. This exemption is contingent upon the adherence to the appropriate erosion and sediment control standards.

D. Navigation

As noted above, the USCG requires a bridge permit for the construction of a new bridge or causeway, or reconstruction or maintenance of an existing bridge or causeway across navigable waters of the United States. This authority is derived under the General Bridge Act of 1946, as amended, the Rivers and Harbors Act of 1899, as amended, and the Act of March 23, 1906, as amended, all require that the location and plans of bridges and causeways across the navigable waters of the United States be submitted to and approved by the Secretary of Transportation prior to construction. The purpose of the Bridge Permit is to preserve the public right of navigation and to prevent interference with interstate and foreign commerce. The USCG will likely review the proposed bridges associated with all of the Build Alternatives over Queen Creek in York County and Newmarket Creek in the City of Hampton. As outlined in Section M above, vessel use at these crossing is extremely low and limited to small vessels such as canoes and kayaks.

As part of the review process, and if deemed necessary, the USCG would notify all property owners a half mile up and down stream of each bridge site to issue a public notice. The agency would then assess the public's responses and then may do an Advance Approval or possibly a permit for the potential bridge site if required. At this time, it is expected that the new bridges would be of the same elevation as the existing; however, this would be determined as part of the final design of the project.

E. Coastal Zone Management Act

The Coastal Zone Management Act of 1972 enabled the Commonwealth of Virginia to develop the Virginia Coastal Zone Management Program (VCZMP) in 1986. The focus of the CZMP is to create more vital and sustainable coastal communities and ecosystems by using a network of state laws and

policies. Because the study area is located east of the fall line, all localities located within the study area are covered under Virginia's CZMP.

The Virginia CZMP is known as a "networked program", which means that to manage Virginia's coastal resources, the program relies on a network of state agencies and local governments to administer the enforceable laws and regulations that protect our wetlands, dunes, subaqueous lands, fisheries, and air and water quality – within the Virginia Coastal Zone area. The agencies involved in the CZMP include: VDEQ, VDCR, VMRC, VDGIF, VDH, VDACS, Virginia Department of Forestry, Virginia Department of Historic Resources, Virginia Department of Mines, Minerals, and Energy, VDOT, Virginia Economic Development Partnership, and VIMS.

These agencies administer the enforceable laws, regulations and advisory policies that protect coastal resources including, in part, tidal and non-tidal wetlands, fisheries, subaqueous lands, dunes and beaches, point source air pollution, point source and non-point source water pollution, shoreline sanitation, coastal lands, spawning/nursery/feeding grounds, coastal primary sand dunes, barrier islands, significant wildlife habitat areas, significant public recreation areas, significant sand and gravel resource deposits, underwater historic resources, highly erodible/high hazard areas, and waterfront development area. Several of this project's relevant coastal zone management resources are addressed in detail in other sections of this document.

Projects that are located within the Coastal Zone Management Area (CZMA) in Virginia which are, at least in part, federally-funded or require federal approval must undergo a federal consistency certification process. The goal of this process is to ensure that projects are designed to avoid and/or minimize impacts to specific coastal resources as identified by several enforceable policies related to fisheries, subaqueous lands, tidal and non-tidal wetlands, dunes, non-point and point source pollution control, shoreline sanitation, air pollution, and land management. In Virginia, the VDEQ is responsible for coordinating the Commonwealth's review of federal consistency determination and certification with the cooperating agencies and responding to the appropriate federal agency or applicant. All member agencies of the VCZMP would be notified of the proposed project through the JPA permitting process and the document review. While the JPA process required for the Sections 401 and 404 of the CWA and VMRC permits (described above) would address all resources and requirements associated with the CZMA Program, the completion of the CZMA checklist may also be required.

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INTERSTATE 64 PENINSULA STUDY

APPENDIX A

Soil Summary Tables

Table A1: City of Richmond Soils along the Project Corridor

Map Symbol	Map Unit Name	Drainage Class	Erosion Factor (K)	Water Table Depth (cm)	Hydric Soil
39	Udorthents, loamy, borrow pits	Not Rated	Not Rated	Not Rated	No
40	Udorthents-Dumps complex, pits	Not Rated	Not Rated	Not Rated	No
41	Urban land	Not Rated	Not Rated	Not Rated	No
16B	Edgehill-Urban land complex, 2 to 6 percent slopes	Well drained	.20	Not Rated	No
21A	Johnston mucky loam, 0 to 3 percent slopes, frequently flooded	Very poorly drained	.17	0	Yes
44E	Wateree-Wedowee complex, 20 to 45 percent slopes	Well drained	.24	Not Rated	No
5A	Atlee-Urban land complex, 0 to 4 percent slopes	Moderately well drained	.37	61	No
CaD2	Caroline very fine sandy loam, 10 to 15 percent slopes, eroded	Well drained	.43	120	No
GP	Gravel pit	Not Rated	Not Rated	Not Rated	No
KeA	Kempsville fine sandy loam, 0 to 2 percent slopes	Well drained	.32	Not Rated	No
Kn	Kinston and Mantachie soils	Somewhat poorly drained	.37	15	Yes
Ly	Lynchburg fine sandy loam	Somewhat poorly drained	.24	31	Yes
UE	Udorthents, loamy	Not Rated	Not Rated	Not Rated	No
UR	Urban land	Not Rated	Not Rated	Not Rated	No

Table A2: Henrico County Soils along the Project Corridor

Map Symbol	Map Unit Name	Drainage Class	Erosion Factor	Water Table Depth (cm)	Hydric Soil
40	Udorthents-Dumps complex, pits	Not Rated	Not Rated	Not Rated	No
41	Urban land	Not Rated	Not Rated	Not Rated	No
24A	Nawney silt loam, 0 to 2 percent slopes, frequently flooded	Very poorly drained	.32	8	Yes
5A	Atlee-Urban land complex, 0 to 4 percent slopes	Moderately well drained	.37	61	No
At	Atlee very fine sandy loam	Moderately well drained	.37	61	No
Be	Bertie fine sandy loam	Somewhat poorly drained	.28	38	Yes
CaB2	Caroline very fine sandy loam, 2 to 6 percent slopes, eroded	Well drained	.43	120	No
CaC2	Caroline very fine sandy loam, 6 to 10 percent slopes, eroded	Well drained	.43	120	No
CaD2	Caroline very fine sandy loam, 10 to 15 percent slopes, eroded	Well drained	.43	120	No
CbC3	Caroline clay loam, 2 to 10 percent slopes, severely eroded	Well drained	.24	120	No
Ck	Chewacla silt loam, clayey substratum	Somewhat poorly drained	.37	60	Yes
Cm	Chewacla and Riverview soils	Somewhat poorly drained	.37	60	Yes
Cp	Coxville silt loam	Poorly drained	.37	15	Yes
DuB2	Duplin very fine sandy loam, 2 to 6 percent slopes, eroded	Moderately well drained	.49	60	No
DuC2	Duplin very fine sandy loam, 6 to 10 percent slopes, eroded	Moderately well drained	.49	60	No

Map Symbol	Map Unit Name	Drainage Class	Erosion Factor	Water Table Depth (cm)	Hydric Soil
DuD2	Duplin very fine sandy loam, 10 to 15 percent slopes, eroded	Moderately well drained	.49	60	No
DwC3	Duplin clay loam, 2 to 10 percent slopes, severely eroded	Moderately well drained	.24	60	No
Fo	Forestdale silt loam	Poorly drained	.43	15	Yes
GP	Gravel pit	Not Rated	Not Rated	Not Rated	No
KaA	Kalmia fine sandy loam, 0 to 2 percent slopes	Well drained	.32	175	No
KeA	Kempsville fine sandy loam, 0 to 2 percent slopes	Well drained	.32	Not Rated	No
KeB	Kempsville fine sandy loam, 2 to 6 percent slopes	Well drained	.32	Not Rated	No
KeC2	Kempsville fine sandy loam, 2 to 10 percent slopes, eroded	Well drained	.32	Not Rated	No
KfB	Kempsville fine sandy loam, flooded, 2 to 6 percent slopes	Well drained	.32	153	No
KgA	Kempsville very fine sandy loam, clayey substratum, 0 to 2 percent slopes	Well drained	.49	Not Rated	No
KgB	Kempsville very fine sandy loam, clayey substratum, 2 to 6 percent slopes	Well drained	.49	Not Rated	No
KgC2	Kempsville very fine sandy loam, clayey substratum, 6 to 10 percent slopes, eroded	Well drained	.49	Not Rated	No
Km	Kinston silt loam	Poorly drained	.37	15	Yes
Kn	Kinston and Mantachie soils	Somewhat poorly drained	.37	15	Yes
Ly	Lynchburg fine sandy loam	Somewhat poorly drained	.24	31	Yes

Map Symbol	Map Unit Name	Drainage Class	Erosion Factor	Water Table Depth (cm)	Hydric Soil
Mc	Mantachie-Chastain complex	Somewhat poorly drained	.28	15	No
NoA	Norfolk fine sandy loam, 0 to 2 percent slopes	Well drained	.32	153	No
NoB	Norfolk fine sandy loam, 2 to 6 percent slopes	Well drained	.32	153	No
NoC	Norfolk fine sandy loam, 6 to 10 percent slopes	Well drained	.32	153	No
OUD	Ochrepts and Udults, sloping	Moderately well drained	.32	76	No
OUF	Ochrepts and Udults, steep	Moderately well drained	.32	76	No
Ra	Rains very fine sandy loam	Poorly drained	.37	15	No
RuA	Ruston fine sandy loam, 0 to 2 percent slopes	Well drained	.28	Not Rated	No
Td	Tetotum loam, flooded	Moderately well drained	.32	38	No
Te	Tetotum fine sandy loam	Moderately well drained	.32	38	No
UD	Udorthents, clayey	Not Rated	Not Rated	Not Rated	No
UE	Udorthents, loamy	Not Rated	Not Rated	Not Rated	No
UR	Urban land	Not Rated	Not Rated	Not Rated	No
W	Water	Not Rated	Not Rated	Not Rated	No

Table A3: New Kent County Soils along the Project Corridor

Map Symbol	Map Unit Name	Drainage Class	Erosion Factor	Water Table Depth (cm)	Hydric Soil
17	Johnston complex	Very poorly drained	.17	0	Yes
10B	Craven loam, 2 to 6 percent slopes	Moderately well drained	.32	76	No
10C	Craven loam, 6 to 10 percent slopes	Moderately well drained	.32	76	No
11B	Craven-Caroline complex, 2 to 6 percent slopes	Moderately well drained	.32	76	No
12B	Craven-Uchee complex, 2 to 6 percent slopes	Moderately well drained	.32	76	No
14A	Dragston fine sandy loam, 0 to 2 percent slopes	Somewhat poorly drained	.20	53	Yes
15B	Emporia fine sandy loam, 2 to 6 percent slopes	Well drained	.28	114	No
15F	Emporia complex, 25 to 50 percent slopes	Well drained	.28	114	Yes
16A	Johnston mucky loam, 0 to 2 percent slopes, frequently flooded	Very poorly drained	.17	0	Yes
17B	Kempsville fine sandy loam, 2 to 6 percent slopes	Well drained	.28	Not Rated	No
18B	Kempsville gravelly fine sandy loam, 2 to 6 percent slopes	Well drained	.28	Not Rated	No
19B	Kempsville-Emporia complex, 2 to 6 percent slopes	Well drained	.28	114	No
19C	Kempsville-Emporia complex, 6 to 10 percent slopes	Well drained	.28	114	No
1A	Altavista fine sandy loam, 0 to 2 percent slopes	Moderately well drained	.24	61	No

Map Symbol	Map Unit Name	Drainage Class	Erosion Factor	Water Table Depth (cm)	Hydric Soil
20B	Kempsville-Suffolk complex, 2 to 6 percent slopes	Well drained	.28	Not Rated	No
21A	Lanexa mucky silty clay, 0 to 1 percent slopes, frequently flooded	Very poorly drained	.32	0	Yes
23A	Munden sandy loam, 0 to 2 percent slopes	Moderately well drained	.20	61	No
24A	Nawney silt loam, 0 to 2 percent slopes, frequently flooded	Very poorly drained	.32	8	Yes
25A	Nawney silt loam, 0 to 2 percent slopes, ponded	Very poorly drained	.32	0	Yes
26D	Nevarc-Remlik complex, 6 to 15 percent slopes	Moderately well drained	.37	69	No
26E	Nevarc-Remlik complex, 15 to 25 percent slopes	Moderately well drained	.37	69	No
26F	Nevarc-Remlik complex, 25 to 60 percent slopes	Moderately well drained	.37	69	No
29B	Orangeburg fine sandy loam, 2 to 6 percent slopes	Well drained	.20	Not Rated	No
31A	Roanoke silt loam, 0 to 2 percent slopes	Poorly drained	.37	15	Yes
33A	Slagle fine sandy loam, 0 to 2 percent slopes	Moderately well drained	.28	69	No
34B	Slagle-Emporia complex, 2 to 6 percent slopes	Moderately well drained	.28	69	No
36B	Suffolk fine sandy loam, 2 to 6 percent slopes	Well drained	.20	Not Rated	No
39A	Tomotley loam, 0 to 2 percent slopes	Poorly drained	.24	15	Yes

Map Symbol	Map Unit Name	Drainage Class	Erosion Factor	Water Table Depth (cm)	Hydric Soil
3A	Augusta fine sandy loam, 0 to 2 percent slopes	Somewhat poorly drained	.20	46	Yes
41B	Udorthents, loamy, gently sloping	Not Rated	Not Rated	Not Rated	No
6B	Caroline loam, 2 to 6 percent slopes	Well drained	.43	91	No
7B	Caroline-Emporia complex, 2 to 6 percent slopes	Well drained	.43	91	No
7C	Caroline-Emporia complex, 6 to 10 percent slopes	Well drained	.43	91	No
8A	Catpoint fine sand, 0 to 4 percent slopes	Somewhat excessively drained	.10	153	No
Km	Kinston silt loam	Poorly drained	.37	15	Yes
W	Water	Not Rated	Not Rated	Not Rated	No

Table A4: James City County Soils along the Project Corridor

Map Symbol	Map Unit Name	Drainage Class	Erosion Factor	Water Table Depth (cm)	Hydric Soil
5	Bethera silt loam	Poorly drained	.28	0	Yes
17	Johnston complex	Very poorly drained	.17	0	Yes
35	Udorthents, loamy	Not Rated	Not Rated	Not Rated	No
11B	Craven-Uchee complex, 2 to 6 percent slopes	Moderately well drained	.32	76	No
11C	Craven-Uchee complex, 6 to 10 percent slopes	Moderately well drained	.32	76	No
14B	Emporia fine sandy loam, 2 to 6 percent slopes	Well drained	.28	114	No
15D	Emporia complex, 10 to 15 percent slopes	Well drained	.28	114	Yes
15E	Emporia complex, 15 to 25 percent slopes	Well drained	.28	114	Yes
15F	Emporia complex, 25 to 50 percent slopes	Well drained	.28	114	Yes
16A	Johnston mucky loam, 0 to 2 percent slopes, frequently flooded	Very poorly drained	.17	0	Yes
16D	Nevarc-Uchee complex, 15 to 50 percent slopes	Moderately well drained	.10	61	No
19B	Kempsville-Emporia fine sandy loams, 2 to 6 percent slopes	Well drained	.28	114	No
20B	Kenansville loamy fine sand, 2 to 6 percent slopes	Well drained	.15	150	No
21B	Slagle-Urban land complex, 2 to 6 percent slopes	Moderately well drained	.28	61	No
25B	Norfolk fine sandy loam, 2 to 6 percent slopes	Well drained	.28	153	No

Map Symbol	Map Unit Name	Drainage Class	Erosion Factor	Water Table Depth (cm)	Hydric Soil
26F	Nevarc-Remlik complex, 25 to 60 percent slopes	Moderately well drained	.37	69	No
29A	Slagle fine sandy loam, 0 to 2 percent slopes	Moderately well drained	.28	69	No
29B	Slagle fine sandy loam, 2 to 6 percent slopes	Moderately well drained	.28	69	No
31B	Suffolk fine sandy loam, 2 to 6 percent slopes	Well drained	.20	Not Rated	No
34B	Uchee loamy fine sand, 2 to 6 percent slopes	Well drained	.10	130	No
8B	Caroline fine sandy loam, 2 to 6 percent slopes	Well drained	.43	120	No
DAM	Dam	Not Rated	Not Rated	Not Rated	No
NOTCOM	Not Complete	Not Rated	Not Rated	Not Rated	No
W	Water	Not Rated	Not Rated	Not Rated	No

Table A5: York County Soils along the Project Corridor

Map Symbol	Map Unit Name	Drainage Class	Erosion Factor	Water Table Depth (cm)	Hydric Soil
6	Bohicket muck	Very poorly drained	.28	0	Yes
8	Chickahominy-Urban land complex, 0 to 2 percent slopes	Poorly drained	.37	8	No
17	Johnston complex	Very poorly drained	.17	0	Yes
26	Udorthents-Dumps complex	Not Rated	Not Rated	Not Rated	No
28	Yemassee-Urban land complex, 0 to 2 percent slopes	Somewhat poorly drained	.24	30	No
35	Udorthents, loamy	Not Rated	Not Rated	Not Rated	No
11B	Craven-Uchee complex, 2 to 6 percent slopes	Moderately well drained	.32	76	No
11C	Craven-Uchee complex, 6 to 10 percent slopes	Moderately well drained	.32	76	No
14B	Emporia fine sandy loam, 2 to 6 percent slopes	Well drained	.28	114	No
14C	Emporia fine sandy loam, 6 to 10 percent slopes	Well drained	.28	114	No
15D	Emporia complex, 10 to 15 percent slopes	Well drained	.28	114	Yes
15E	Emporia complex, 15 to 25 percent slopes	Well drained	.28	114	Yes
15F	Emporia complex, 25 to 50 percent slopes	Well drained	.28	114	Yes
16D	Nevarc-Uchee complex, 15 to 50 percent slopes	Moderately well drained	.10	61	No
18B	Kempsville fine sandy loam, 2 to 6 percent slopes	Well drained	.28	Not Rated	No
19B	Kempsville-Emporia fine sandy	Well	.28	114	No

Map Symbol	Map Unit Name	Drainage Class	Erosion Factor	Water Table Depth (cm)	Hydric Soil
	loams, 2 to 6 percent slopes	drained			
21B	Slagle-Urban land complex, 2 to 6 percent slopes	Moderately well drained	.28	61	No
29A	Slagle fine sandy loam, 0 to 2 percent slopes	Moderately well drained	.28	69	No
29B	Slagle fine sandy loam, 2 to 6 percent slopes	Moderately well drained	.28	69	No
31B	Suffolk fine sandy loam, 2 to 6 percent slopes	Well drained	.20	Not Rated	No
34B	Uchee loamy fine sand, 2 to 6 percent slopes	Well drained	.10	130	No
34C	Uchee loamy fine sand, 6 to 10 percent slopes	Well drained	.10	130	No
8B	Caroline fine sandy loam, 2 to 6 percent slopes	Well drained	.43	120	No
NOTCOM	Not Complete	Not Rated	Not Rated	Not Rated	No
W	Water	Not Rated	Not Rated	Not Rated	No

Table A6: City of Newport News Soils along the Project Corridor

Map Symbol	Map Unit Name	Drainage Class	Erosion Factor	Water Table Depth (cm)	Hydric Soil
1	Altavista-Urban land complex, 0 to 3 percent slopes	Moderately well drained	.24	61	No
2	Augusta-Urban land complex, 0 to 2 percent slopes	Somewhat poorly drained	.20	46	No
5	Bethera-Urban land complex, 0 to 2 percent slopes	Poorly drained	.28	0	No
8	Chickahominy-Urban land complex, 0 to 2 percent slopes	Poorly drained	.37	8	No
10	Dragston-Urban land complex, 0 to 2 percent slopes	Somewhat poorly drained	.20	53	No
12	Johnston silt loam, 0 to 2 percent slopes, frequently flooded	Very poorly drained	.17	0	No
17	Newflat-Urban land complex, 0 to 2 percent slopes	Somewhat poorly drained	.37	31	No
22	State-Urban land complex, 0 to 3 percent slopes	Well drained	.28	150	No
23	Suffolk fine sandy loam, 2 to 6 percent slopes	Well drained	.10	Not Rated	No
24	Tomotley-Urban land complex, 0 to 2 percent slopes	Poorly drained	.20	15	No
25	Uchee loamy fine sand, 2 to 6 percent slopes	Well drained	.10	122	No
26	Udorthents-Dumps complex	Not Rated	Not Rated	Not Rated	No
27	Urban land	Not Rated	Not Rated	150	No
28	Yemassee-Urban land complex, 0 to 2 percent slopes	Somewhat poorly drained	.24	30	No
16C	Nevarc-Uchee complex, 6 to 15 percent slopes	Moderately well drained	.10	61	No

Map Symbol	Map Unit Name	Drainage Class	Erosion Factor	Water Table Depth (cm)	Hydric Soil
16D	Nevarc-Uchee complex, 15 to 50 percent slopes	Moderately well drained	.10	61	No
21A	Slagle-Urban land complex, 0 to 2 percent slopes	Moderately well drained	.28	61	Yes
21B	Slagle-Urban land complex, 2 to 6 percent slopes	Moderately well drained	.28	61	No
9A	Craven-Urban land complex, 0 to 2 percent slopes	Moderately well drained	.32	76	Yes
9B	Craven-Urban land complex, 2 to 6 percent slopes	Moderately well drained	.32	76	No
NOTCOM	Not Complete	Not Rated	Not Rated	Not Rated	No
W	Water	Not Rated	Not Rated	Not Rated	No

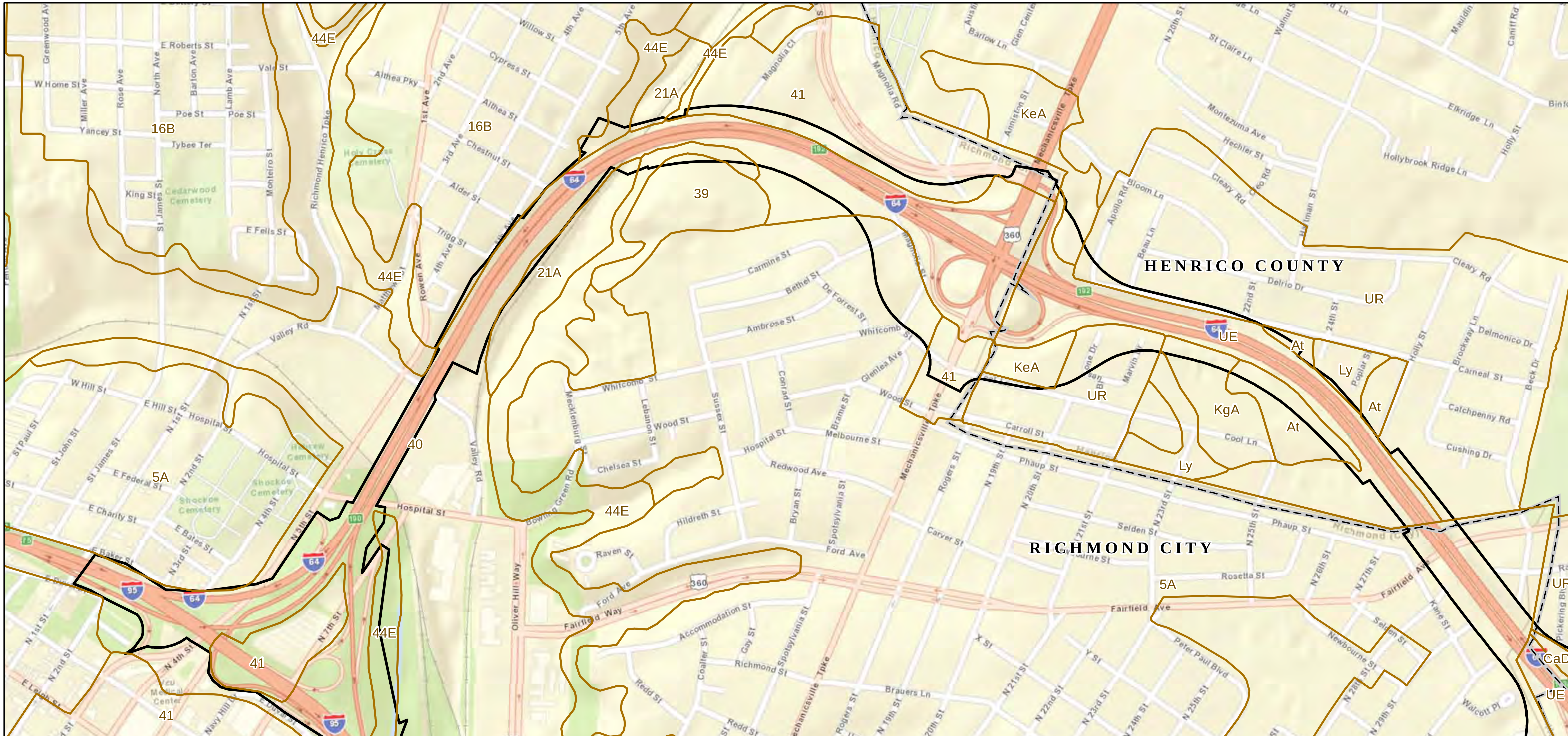
Table A7: City of Hampton Soils along the Project Corridor

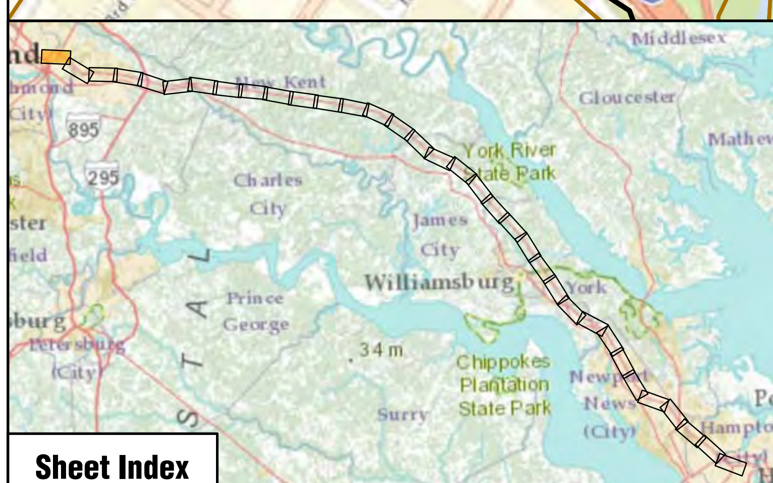
Map Symbol	Map Unit Name	Drainage Class	Erosion Factor	Water Table Depth (cm)	Hydric Soil
1	Altavista-Urban land complex, 0 to 3 percent slopes	Moderately well drained	.24	61	No
6	Bohicket muck, 0 to 1 percent slopes, very frequently flooded	Very poorly drained	.28	0	No
8	Chickahominy-Urban land complex, 0 to 2 percent slopes	Poorly drained	.37	8	No
10	Dragston-Urban land complex, 0 to 2 percent slopes	Somewhat poorly drained	.20	53	No
15	Munden-Urban land complex, 0 to 3 percent slopes	Moderately well drained	.17	61	No
18	Nimmo-Urban land complex, 0 to 2 percent slopes	Poorly drained	.20	15	No
20	Seabrook-Urban land complex, 0 to 2 percent slopes	Moderately well drained	.10	76	No
24	Tomotley-Urban land complex, 0 to 2 percent slopes	Poorly drained	.20	15	No
26	Udorthents-Dumps complex	Not Rated	Not Rated	Not Rated	No
27	Urban land	Not Rated	Not Rated	150	No
W	Water	Not Rated	Not Rated	Not Rated	No

INTERSTATE 64 PENINSULA STUDY

APPENDIX B

Soil Mapping





Sheet Index

Legend

- Soils
- Study Area
- County Lines

N

1 inch = 800 feet

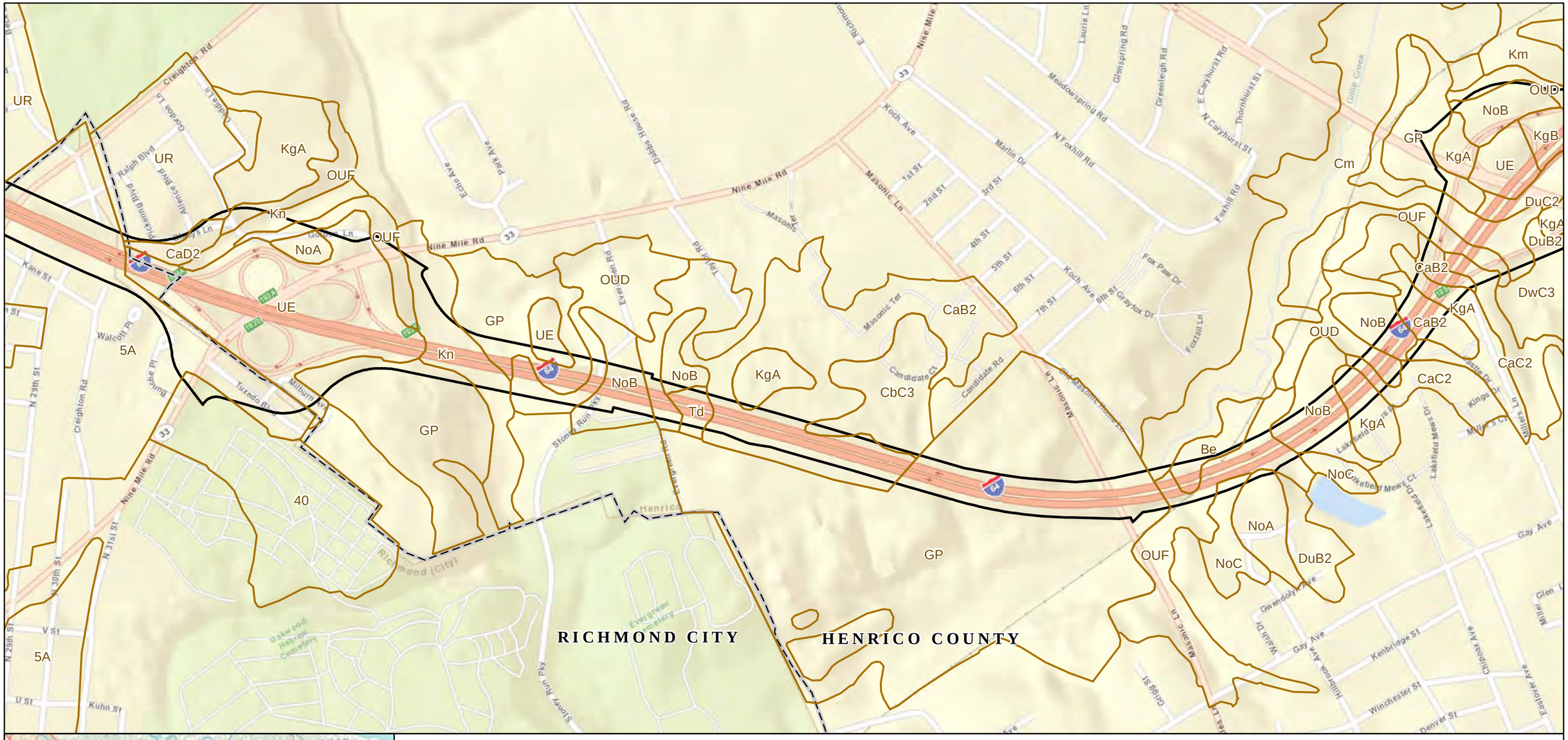
0 — 1,600 Feet

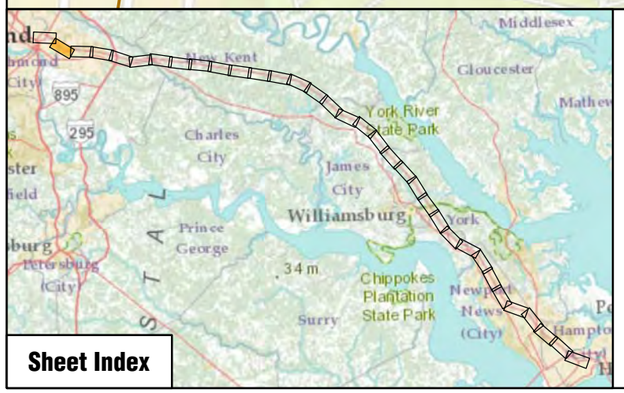
Source:
Soil Survey Geographic (SSURGO) Database (2010-2011)
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping

Map 1 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT





Legend

- Soils
- Study Area
- County Lines

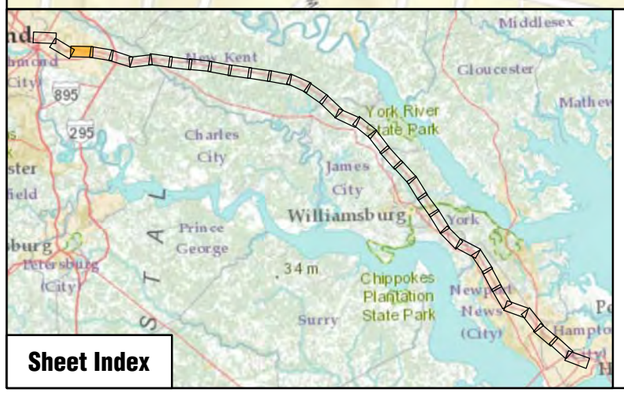
1 inch = 800 feet

0 1,600 Feet

Source:
Soil Survey Geographic (SSURGO) Database (2010-2011)
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping
Map 2 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT



Sheet Index

Legend

- **Soils**
- **Study Area**
- **County Lines**

N

1 inch = 800 feet

0 1,600 Feet

Source:
Soil Survey Geographic (SSURGO) Database (2010-2011)
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping

Map 3 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT

HENRICO COUNTY

Te
Cp
NoA
UE
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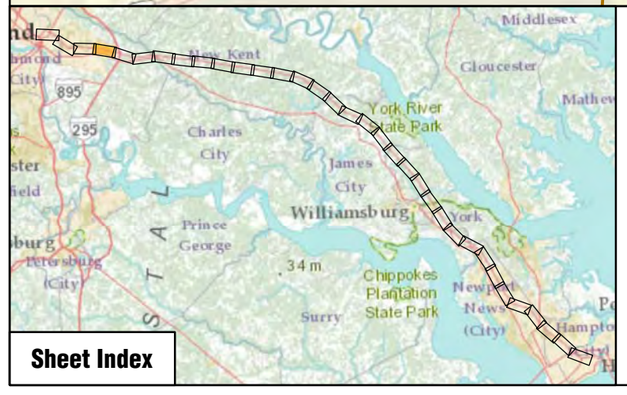
Ck
KgA
DuB2
DwC3
CaB2
OUD
DuC2
Km
Ra
UR
Mc
UD
DuD2

Sandston



Sheet Index

Legend

- Soils
- Study Area
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N

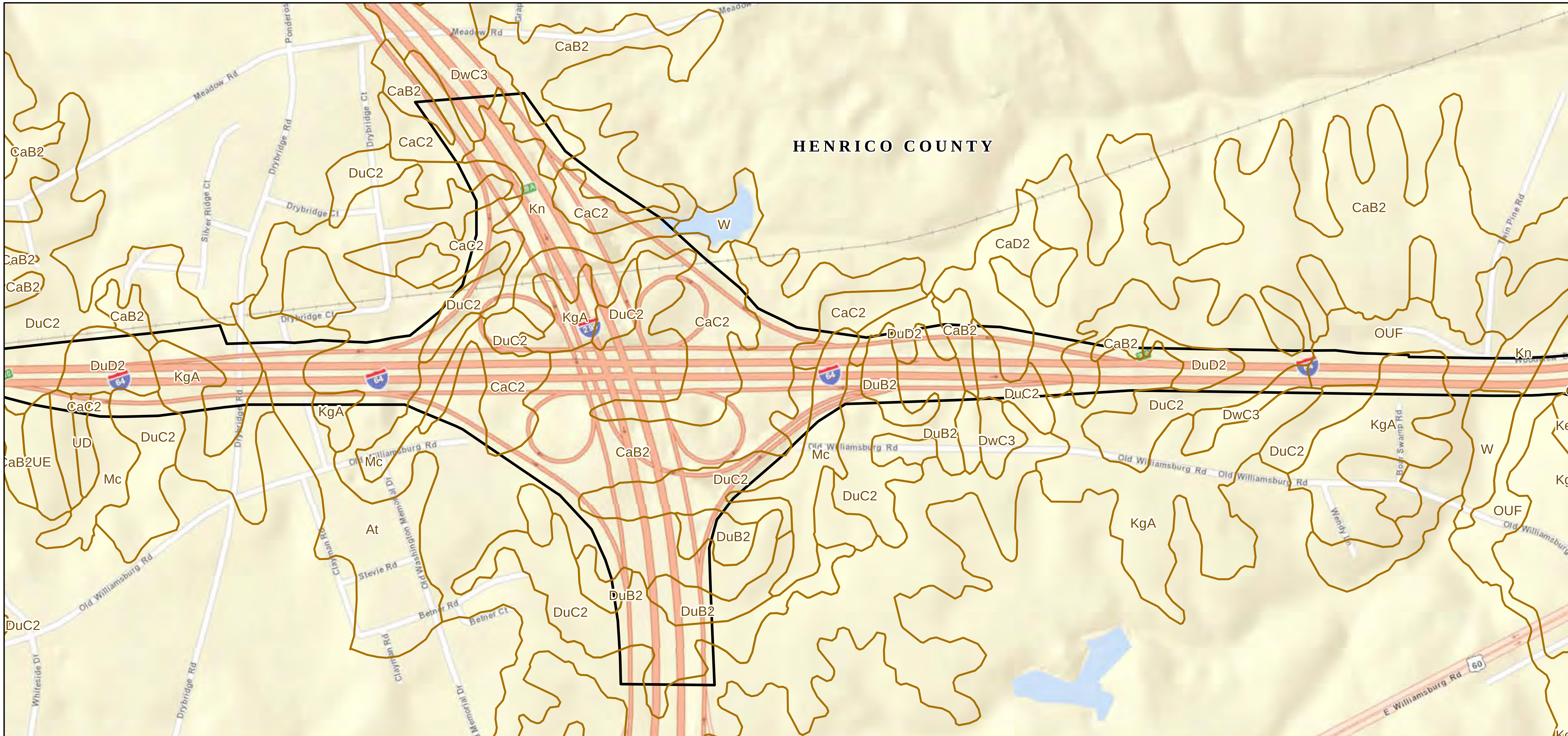
1 inch = 800 feet

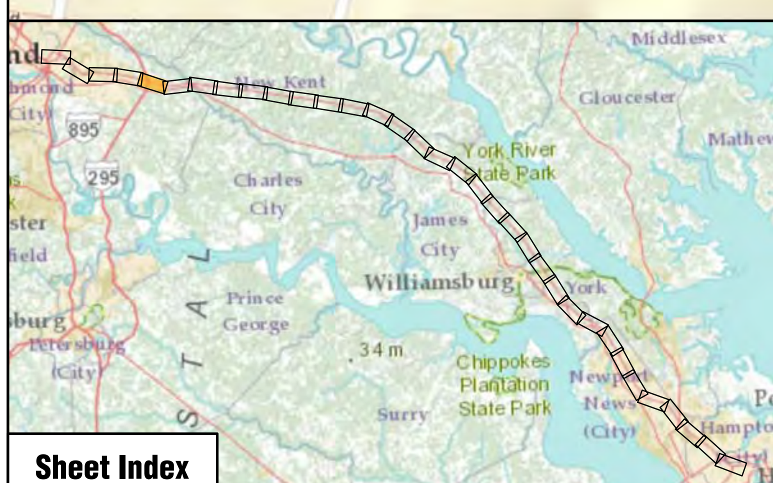
0 1,600 Feet

Source:
Soil Survey Geographic (SSURGO) Database (2010-2011)
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping
Map 4 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT





Legend

- Soils
- Study Area
- County Lines

N

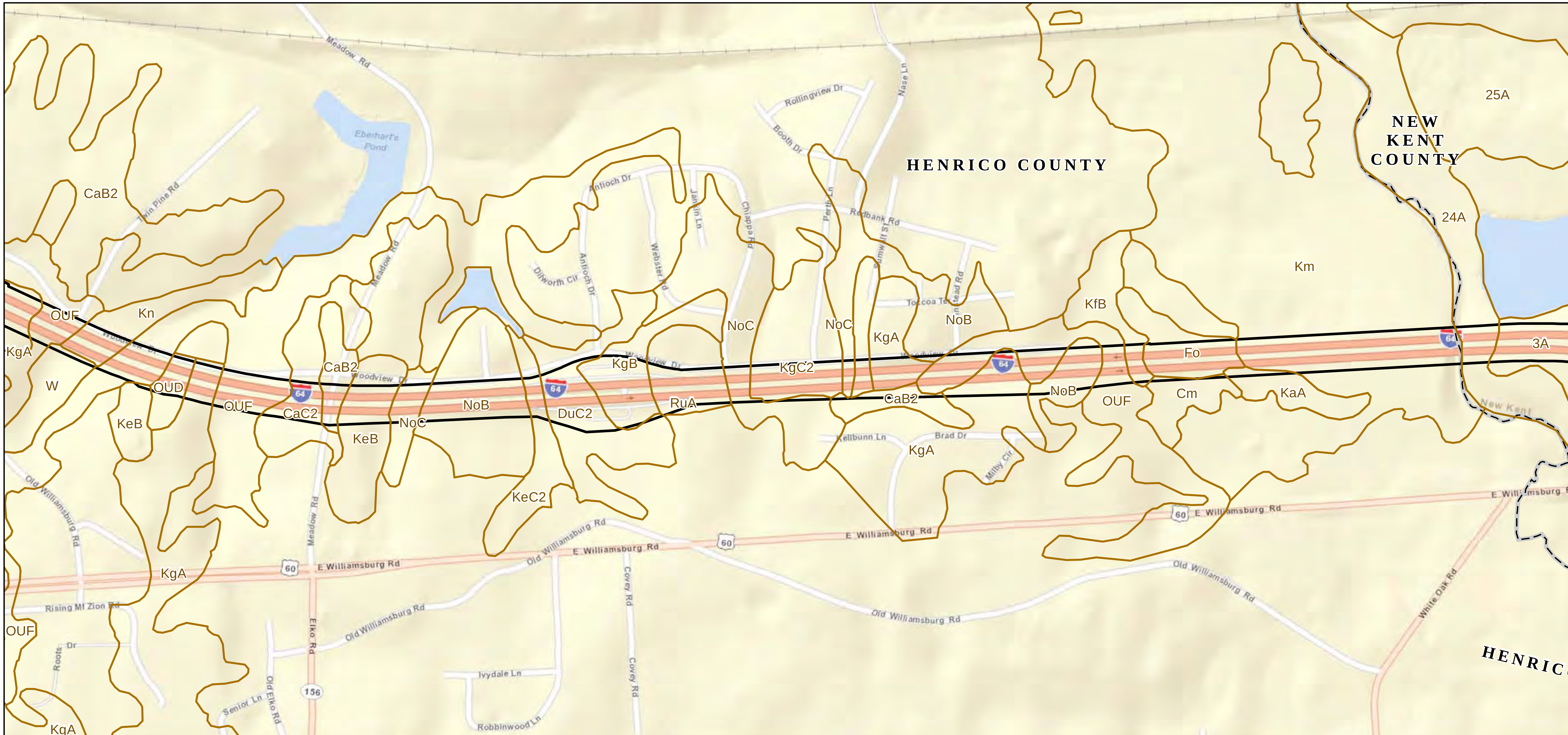
1 inch = 800 feet

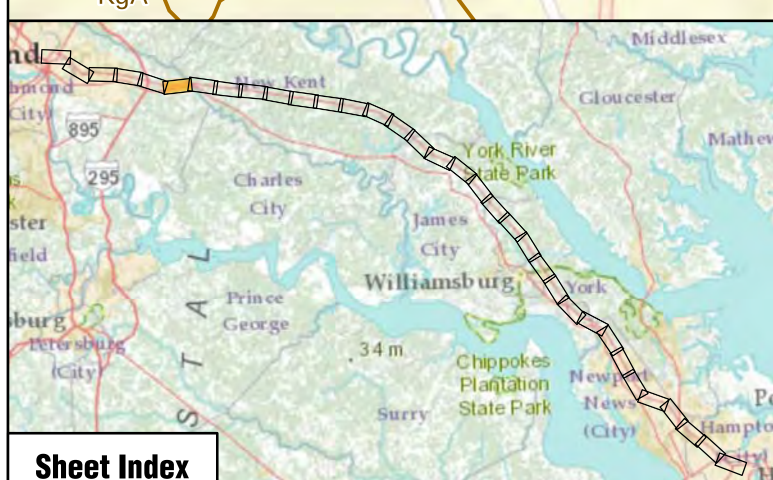
0 — 1,600 Feet

Source:
Soil Survey Geographic (SSURGO) Database (2010-2011)
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping
Map 5 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT


HENRICO COUNTY
NEW KENT COUNTY
HENRICO
Meadow Rd
Eberhart's Pond
Twin Pine Rd
Antioch Dr
Rollingview Dr
Booth Dr
Woodview Dr
Redbank Rd
E Williamsburg Rd
Old Williamsburg Rd
White Oak Rd
Elko Rd
Old Elko Rd
Covey Rd
Ivydale Ln
Robbinwood Ln
Rising Mt Zion Rd
Senior Ln
Brad Dr
Kellbunn Ln
Toccoa Ter
Dilworth Cir
Webster Rd
New Kent
CaB2
Kn
OUF
KgA
W
OUD
KeB
CaC2
CaB2
NoC
NoB
KeB
DuC2
KgB
RuA
KeC2
NoC
KgC2
KgA
NoB
CaB2
KgA
KfB
Fo
OUF
Cm
KaA
Km
25A
24A
3A



Sheet Index

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- Study Area
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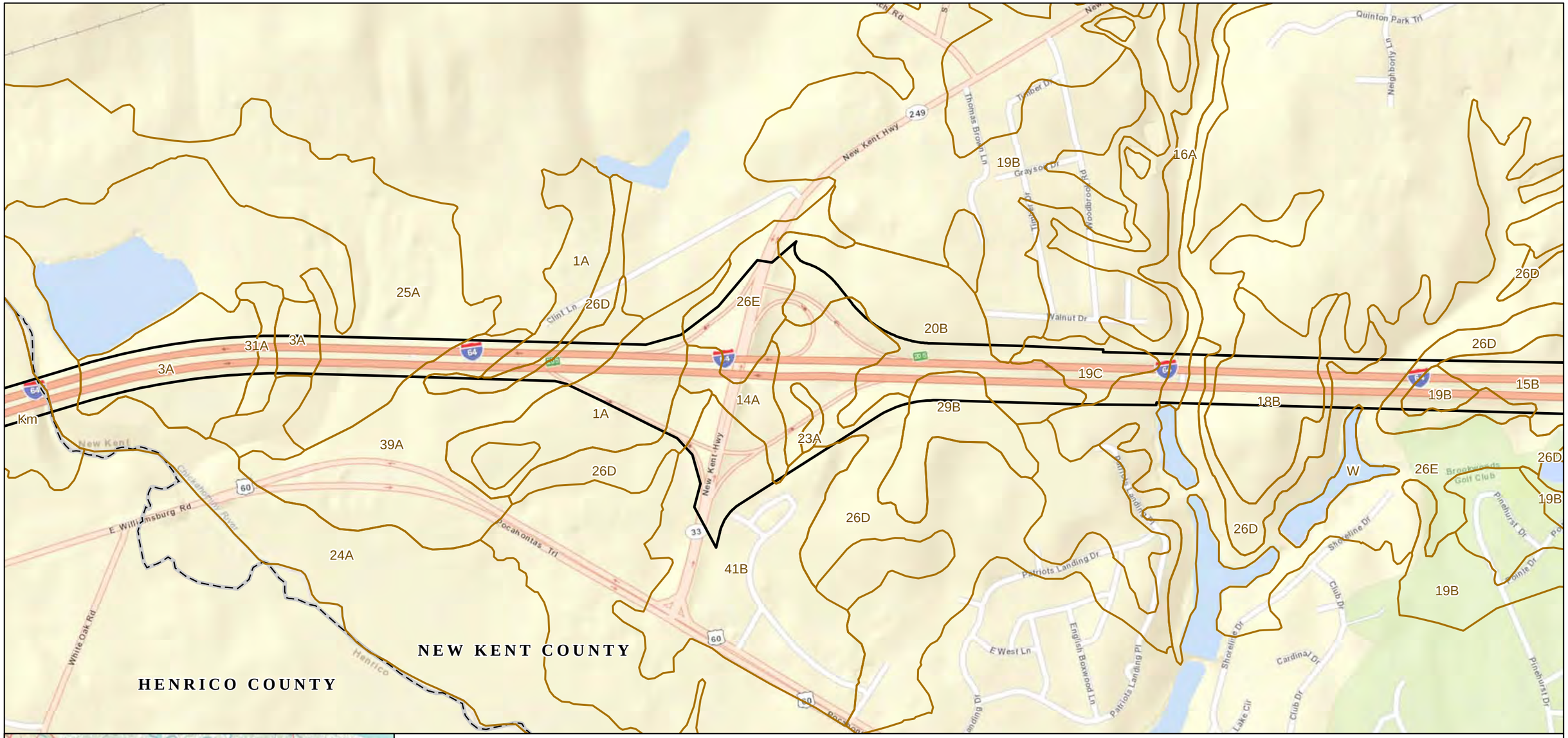
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping
Map 6 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT



Legend

- Soils
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- County Lines

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1 inch = 800 feet

0 1,600 Feet

Source:
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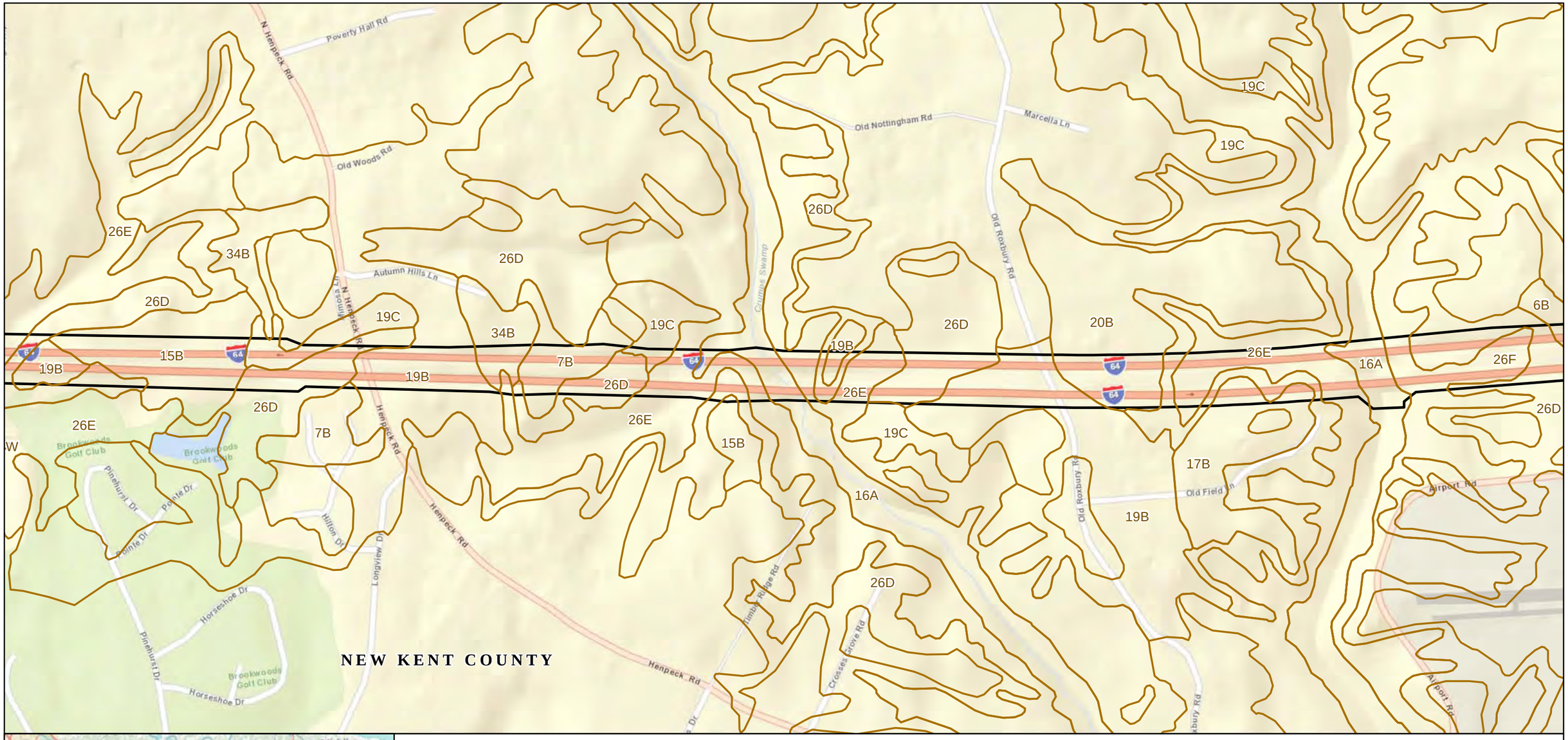
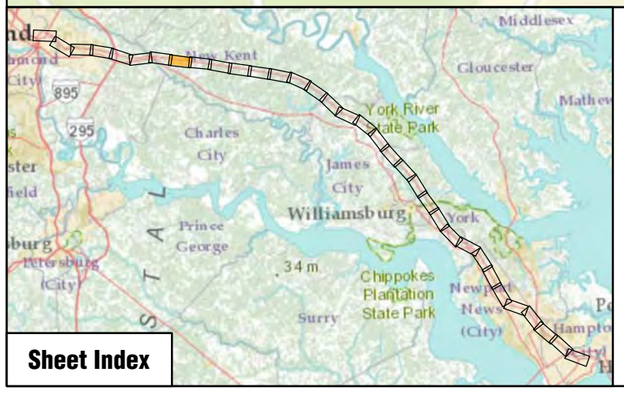
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping
Map 7 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT





Sheet Index

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Source:
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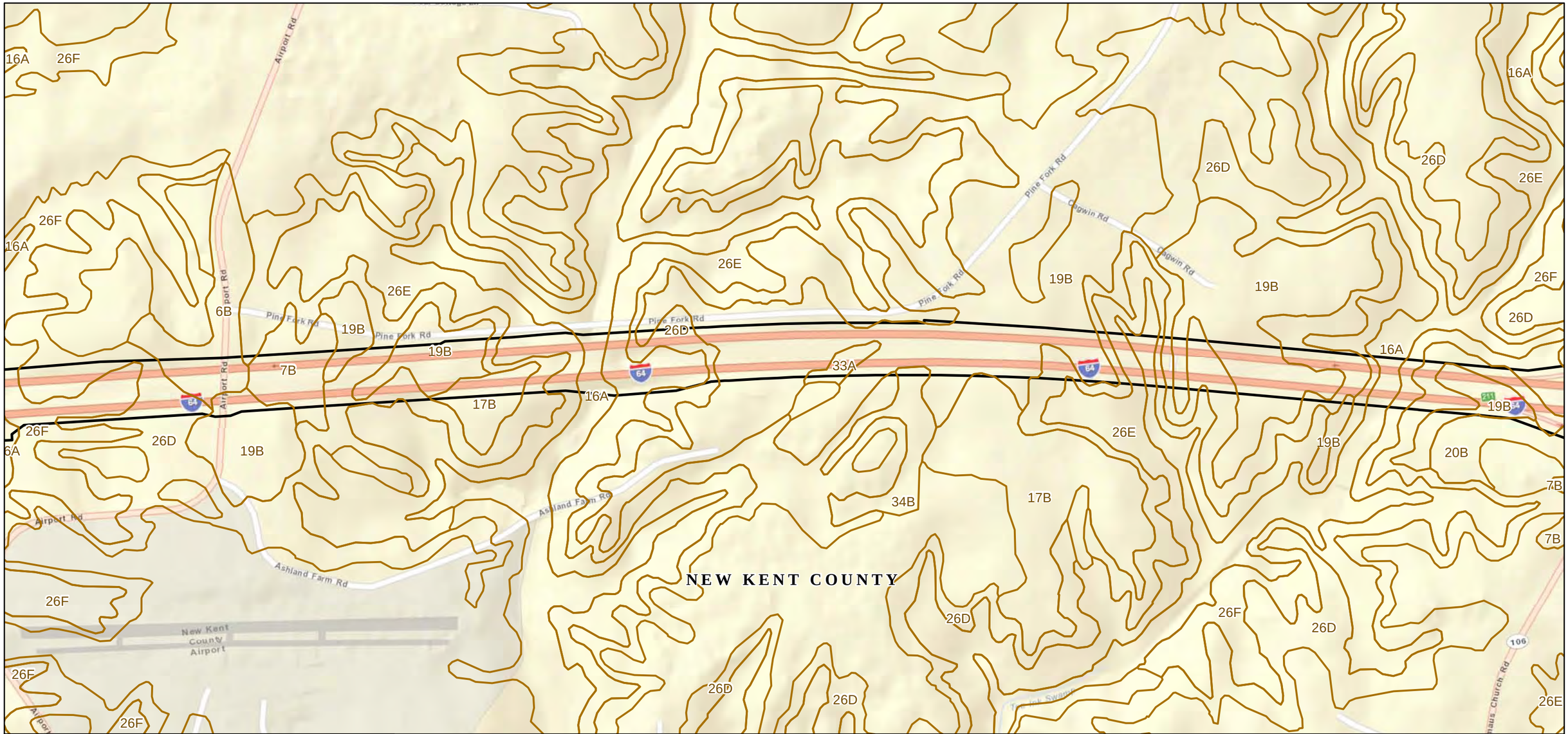
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping
Map 8 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT



Legend

- Soils
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- County Lines

N

1 inch = 800 feet

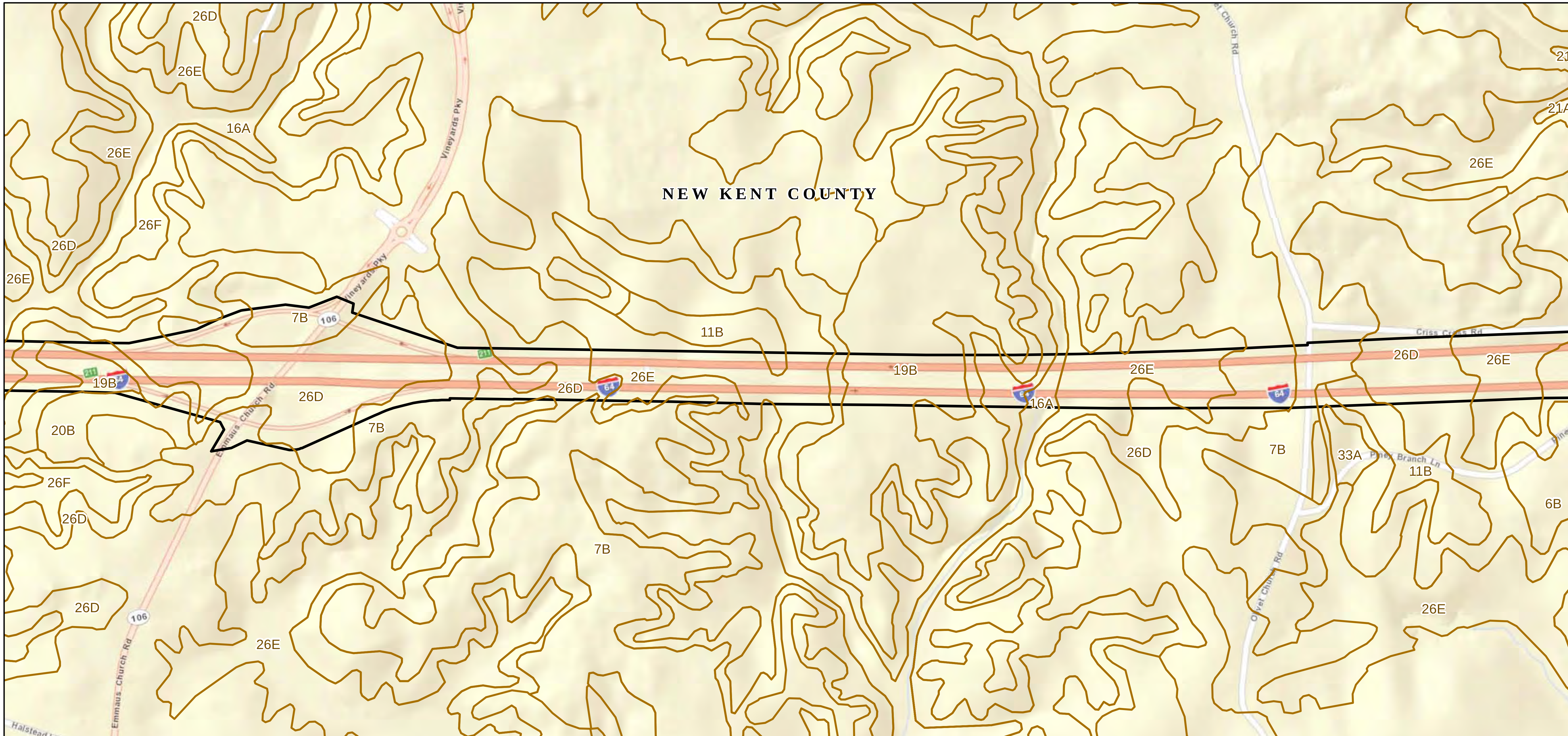
0 1,600 Feet

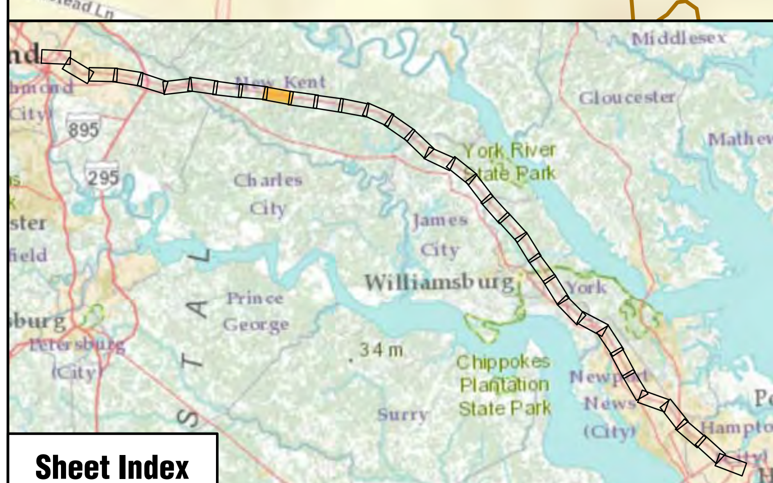
Source:
Soil Survey Geographic (SSURGO) Database (2010-2011)
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping

Map 9 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT





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Legend

- Soils
- Study Area
- County Lines

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0 — 1,600 Feet

Source:
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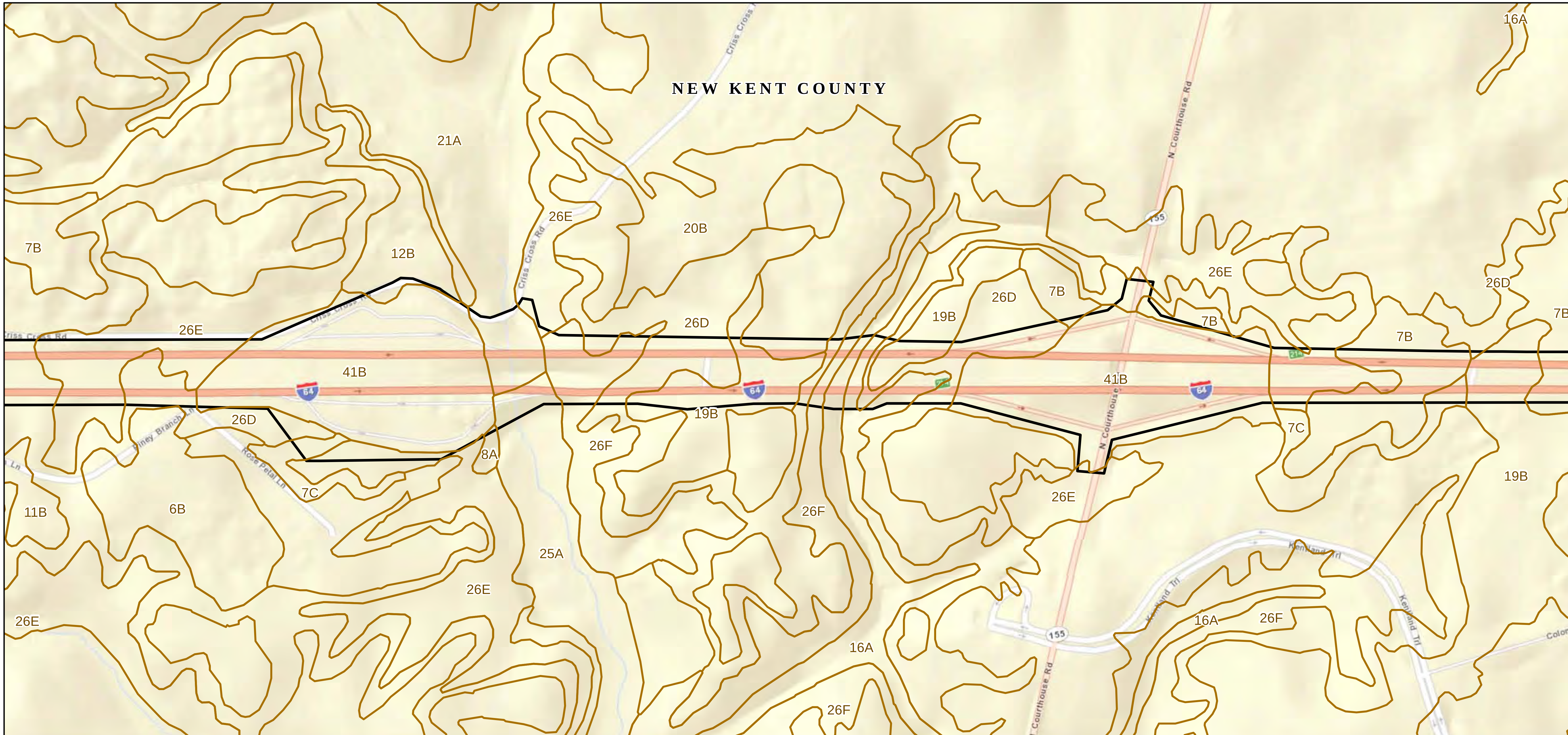
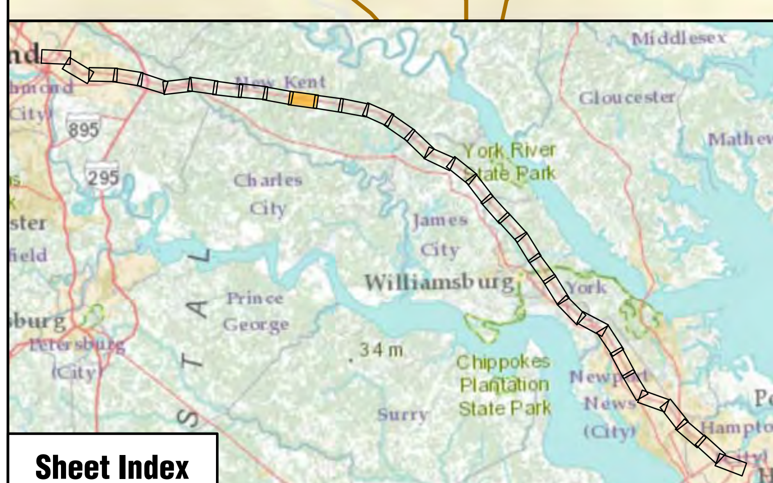
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping
Map 10 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT





Legend

- Soils
- Study Area
- County Lines

N

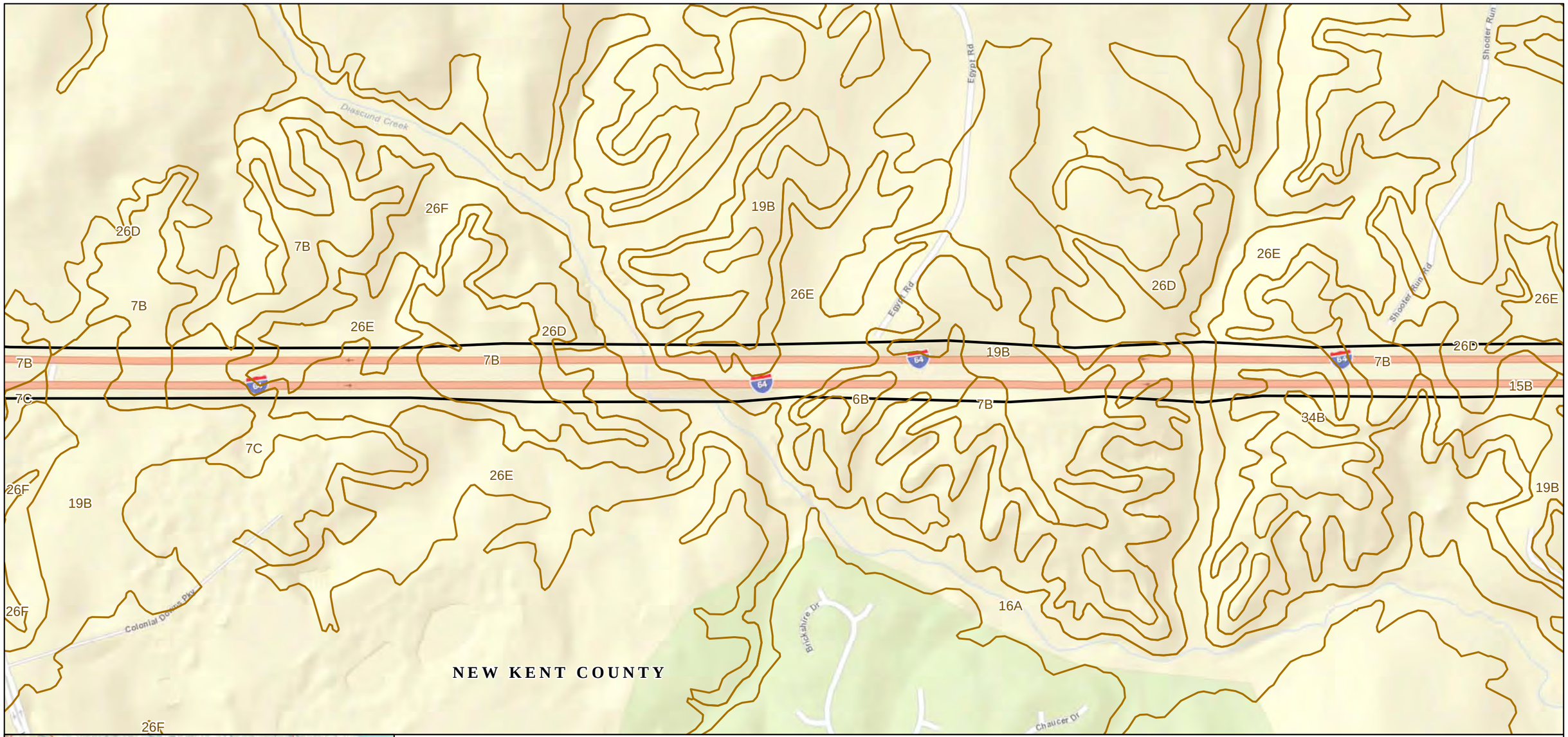
1 inch = 800 feet

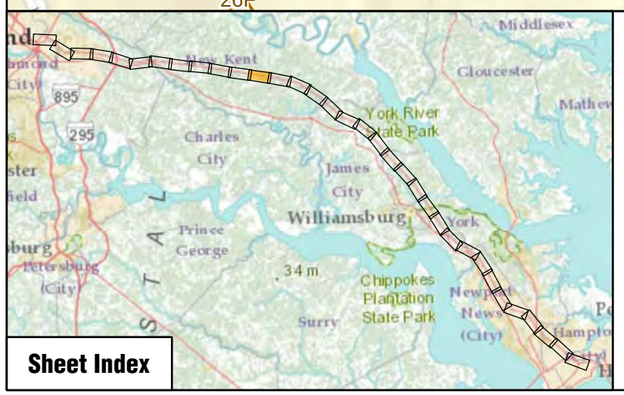
0 1,600 Feet

Source:
Soil Survey Geographic (SSURGO) Database (2010-2011)
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping
Map 11 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT





Sheet Index

Legend

- Soils
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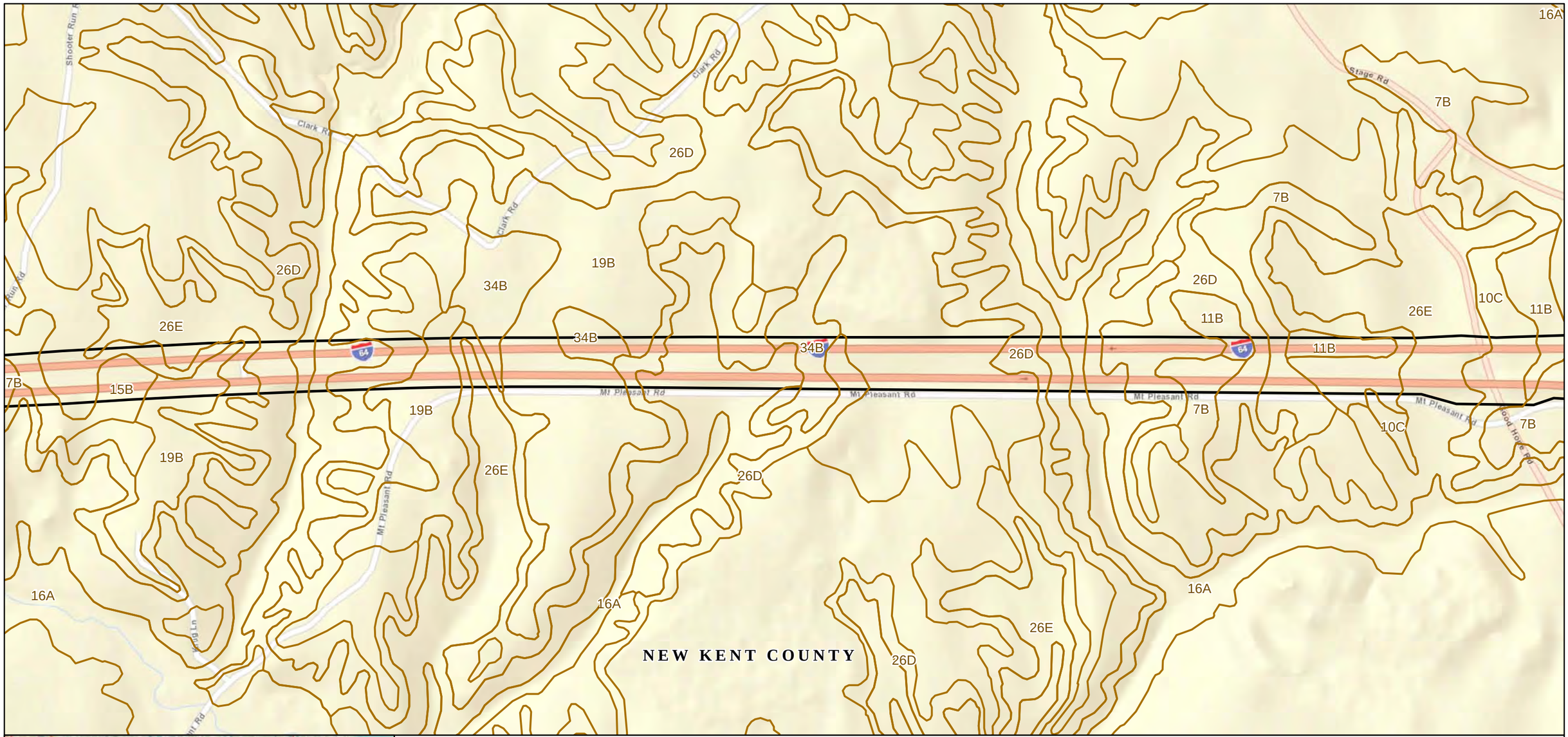
1 inch = 800 feet

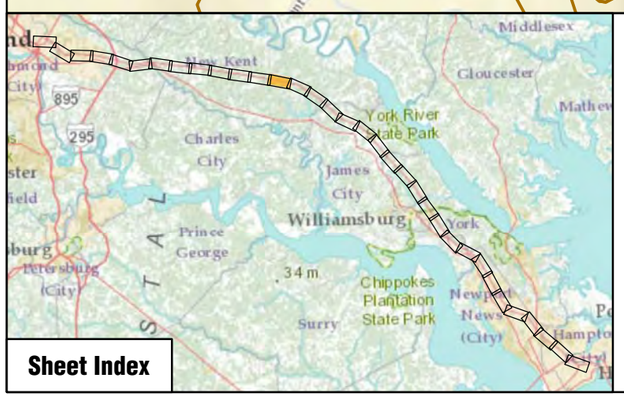
0 1,600 Feet

Source:
Soil Survey Geographic (SSURGO) Database (2010-2011)
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping
Map 12 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT





Legend

- Soils
- Study Area
- County Lines

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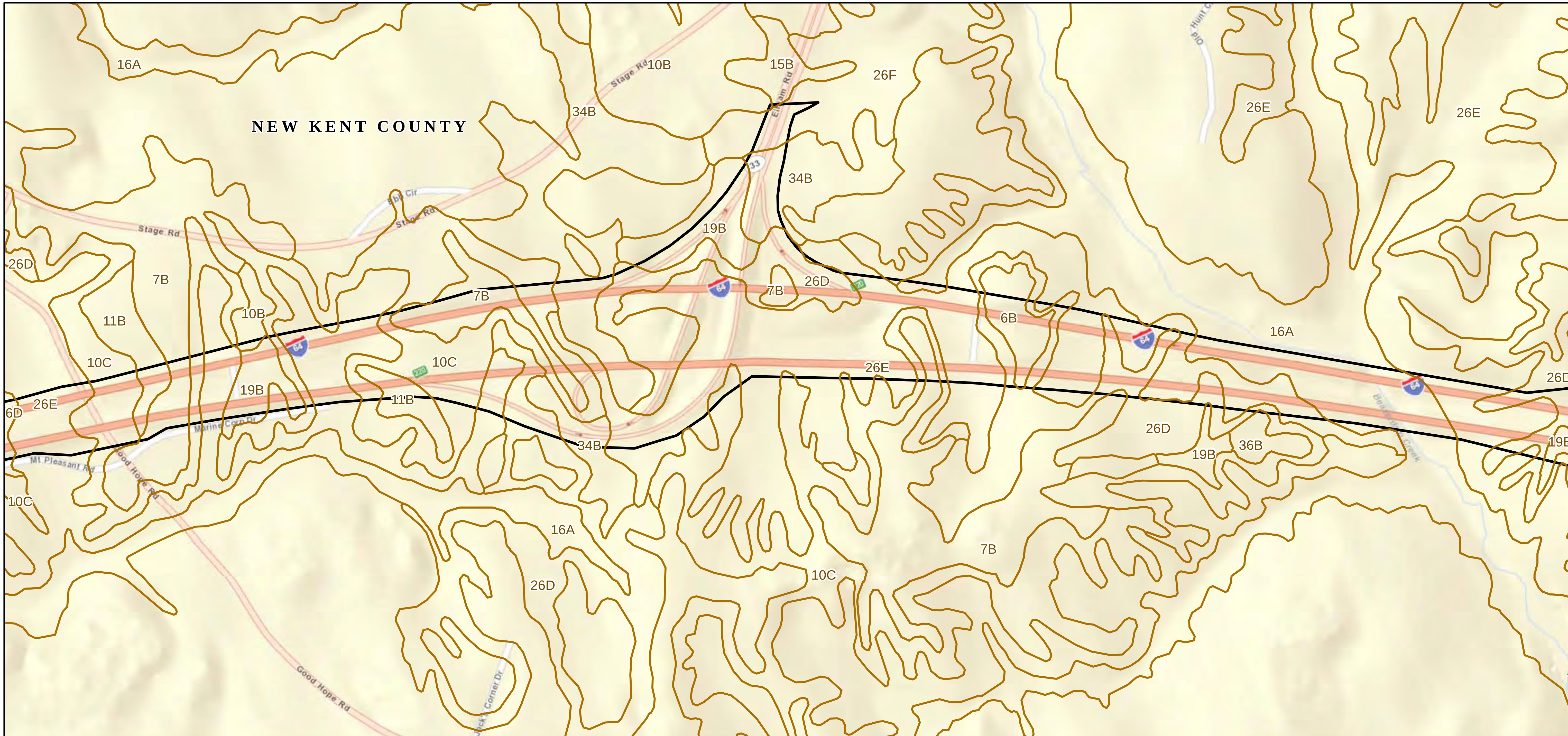
1 inch = 800 feet

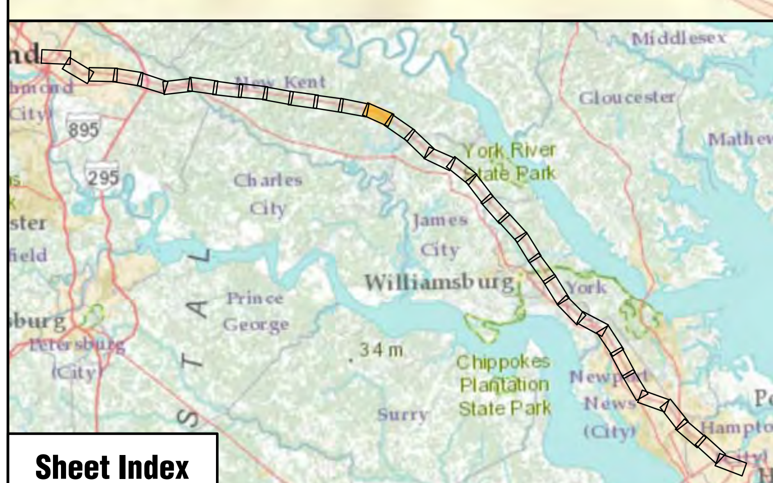
0 1,600 Feet

Source:
Soil Survey Geographic (SSURGO) Database (2010-2011)
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping
Map 13 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT





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Legend

- Soils
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N

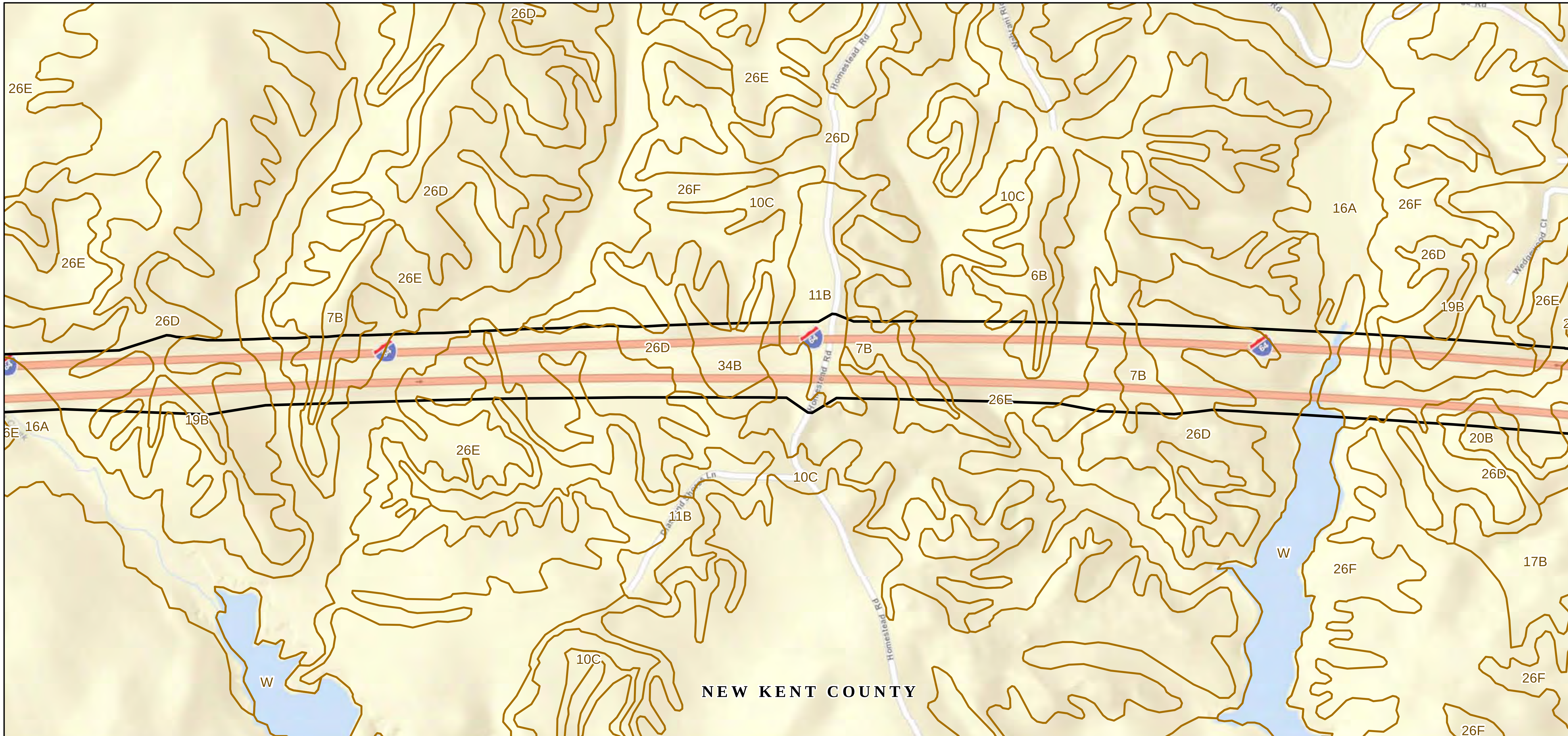
1 inch = 800 feet

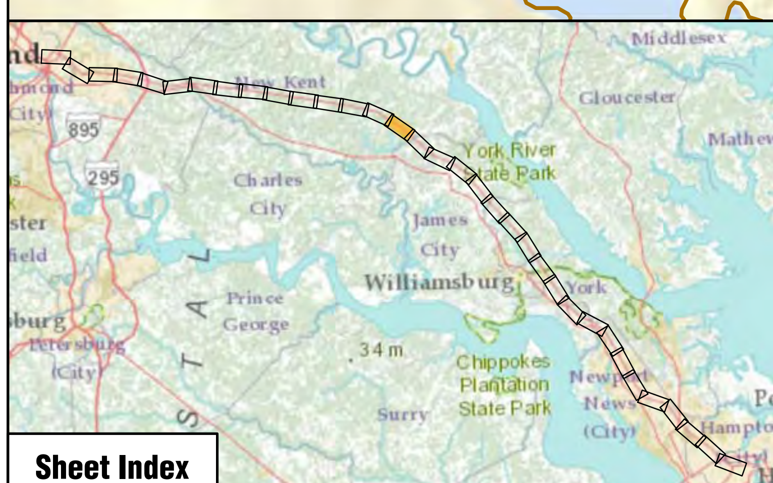
0 1,600 Feet

Source:
Soil Survey Geographic (SSURGO) Database (2010-2011)
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping
Map 14 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT





Sheet Index

Legend

- Soils
- Study Area
- County Lines

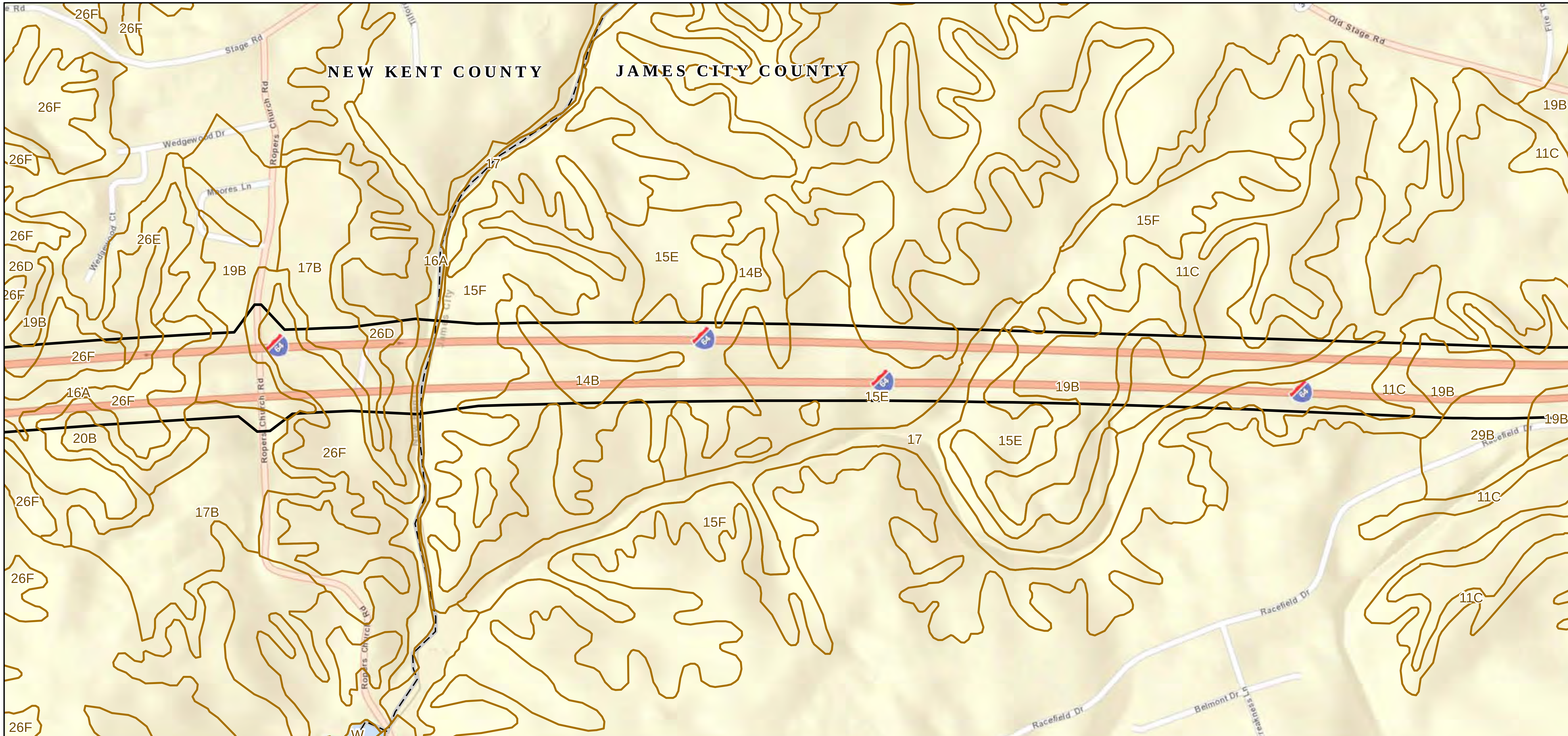
1 inch = 800 feet

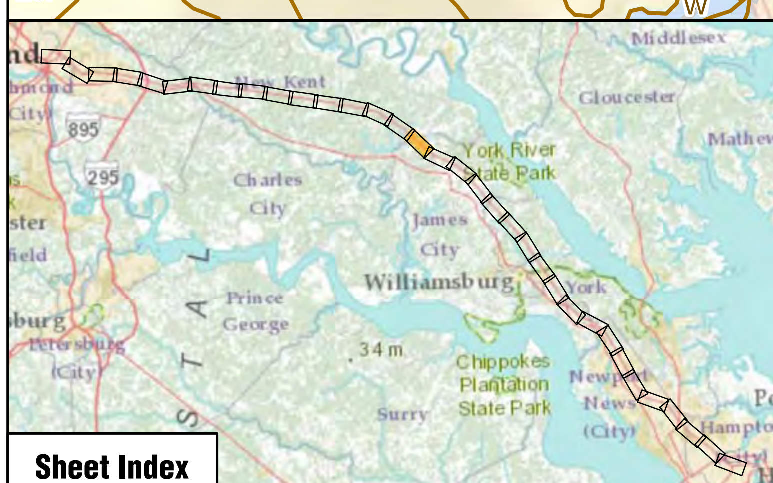
0 1,600 Feet

Source:
Soil Survey Geographic (SSURGO) Database (2010-2011)
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping
Map 15 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT





Sheet Index

Legend

- Soils
- Study Area
- County Lines

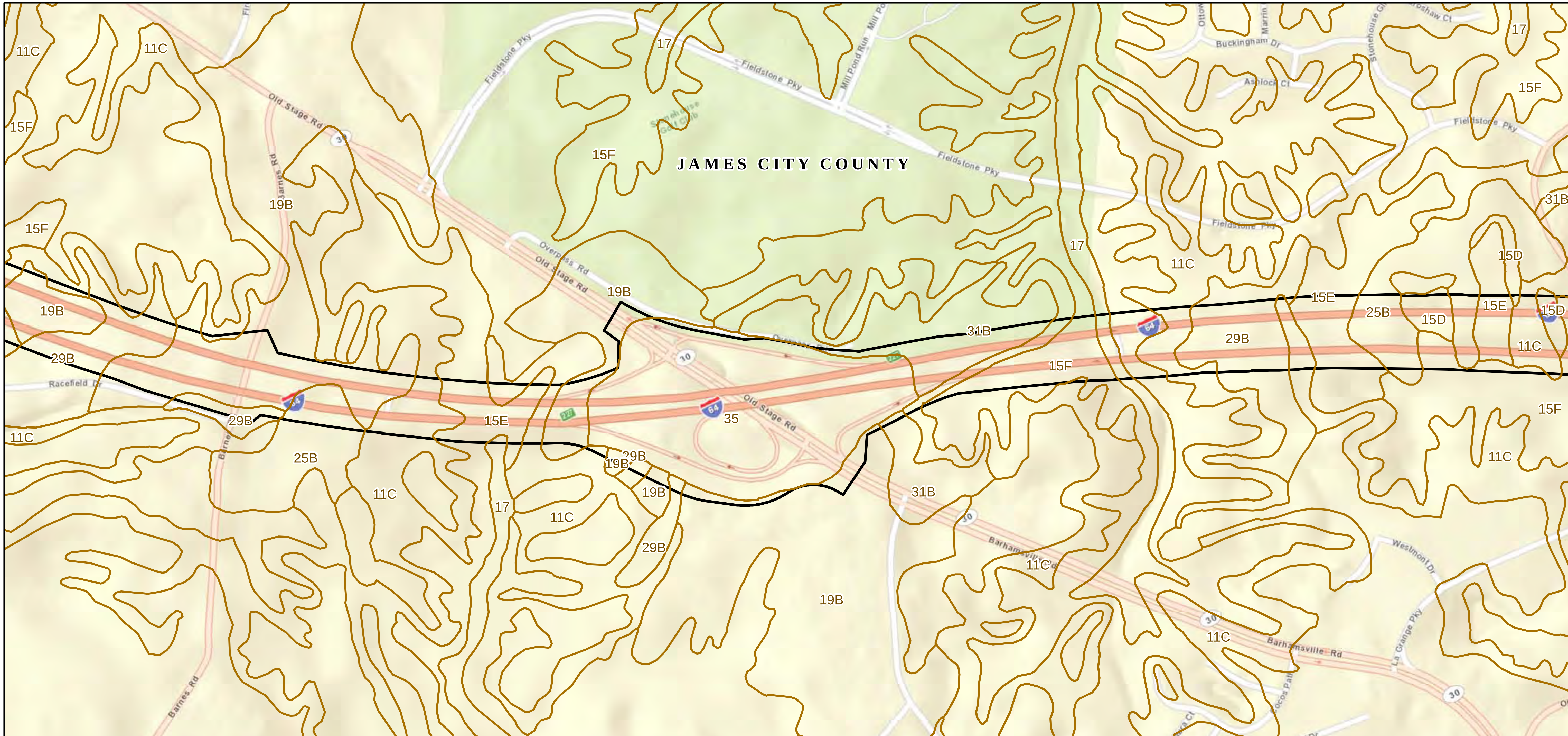
1 inch = 800 feet

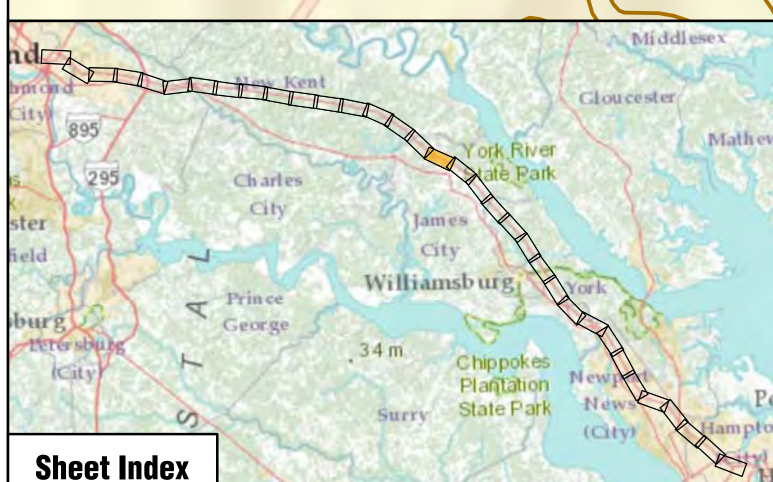
0 — 1,600 Feet

Source:
Soil Survey Geographic (SSURGO) Database (2010-2011)
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping
Map 16 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT





Sheet Index

Legend

- Soils
- Study Area
- County Lines

N

1 inch = 800 feet

0 1,600 Feet

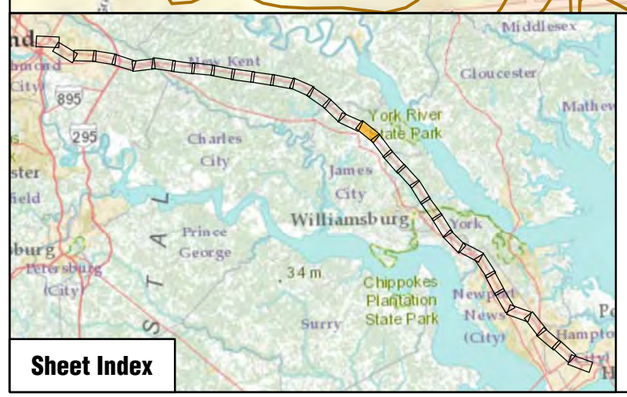
Source:
Soil Survey Geographic (SSURGO) Database (2010-2011)
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping

Map 17 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT

JAMES CITY COUNTY



Legend

- Soils
- Study Area
- County Lines

1 inch = 800 feet

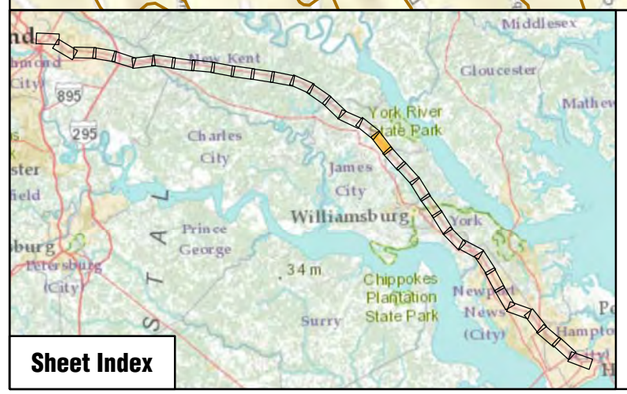
0 1,600 Feet

Source:
Soil Survey Geographic (SSURGO) Database (2010-2011)
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping
Map 18 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT

JAMES CITY COUNTY



Legend

- Soils
- Study Area
- County Lines

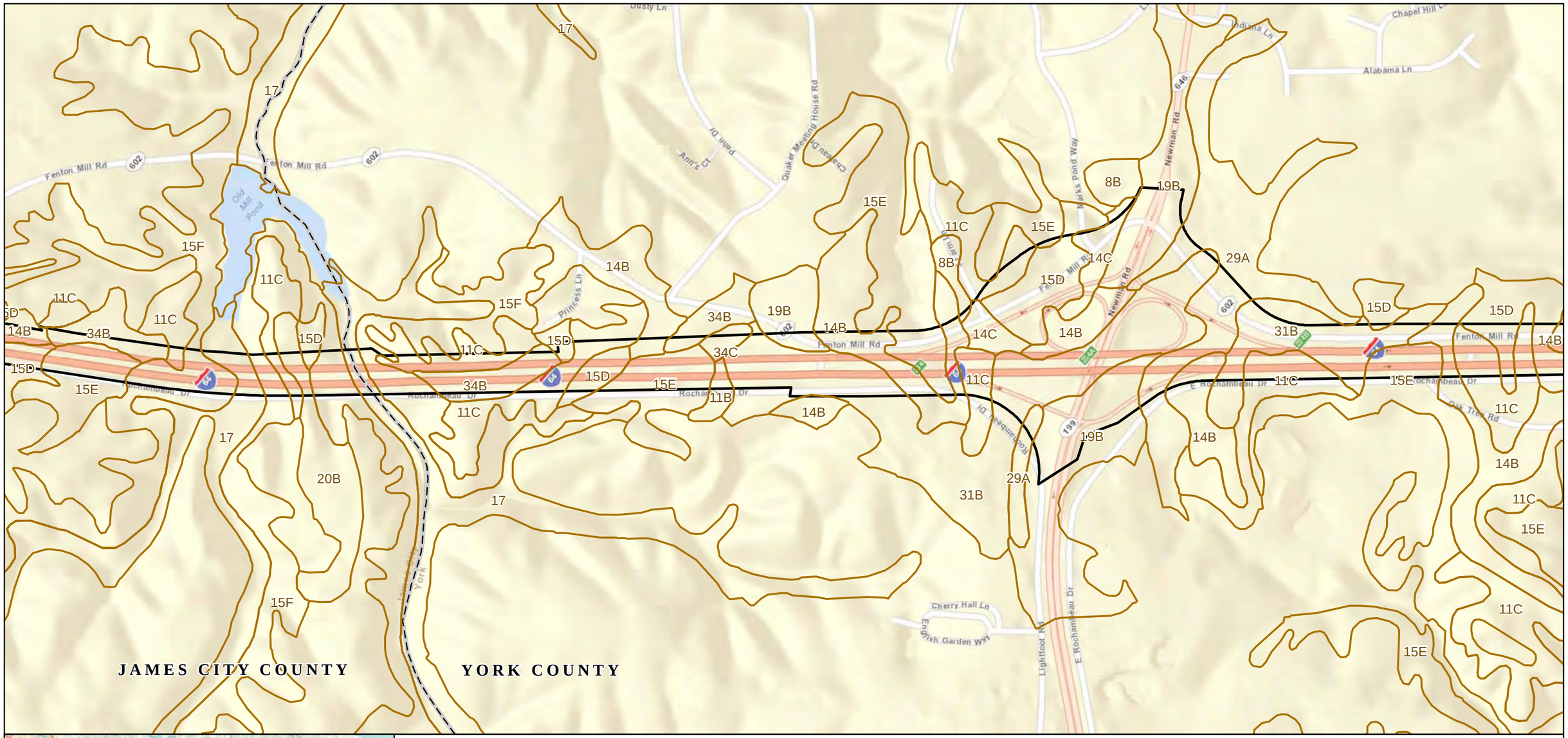
1 inch = 800 feet

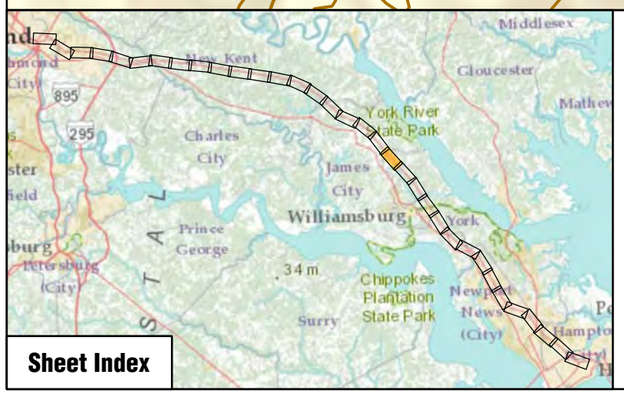
0 1,600 Feet

Source:
Soil Survey Geographic (SSURGO) Database (2010-2011)
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping
Map 19 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT





Legend

- Soils
- Study Area
- County Lines

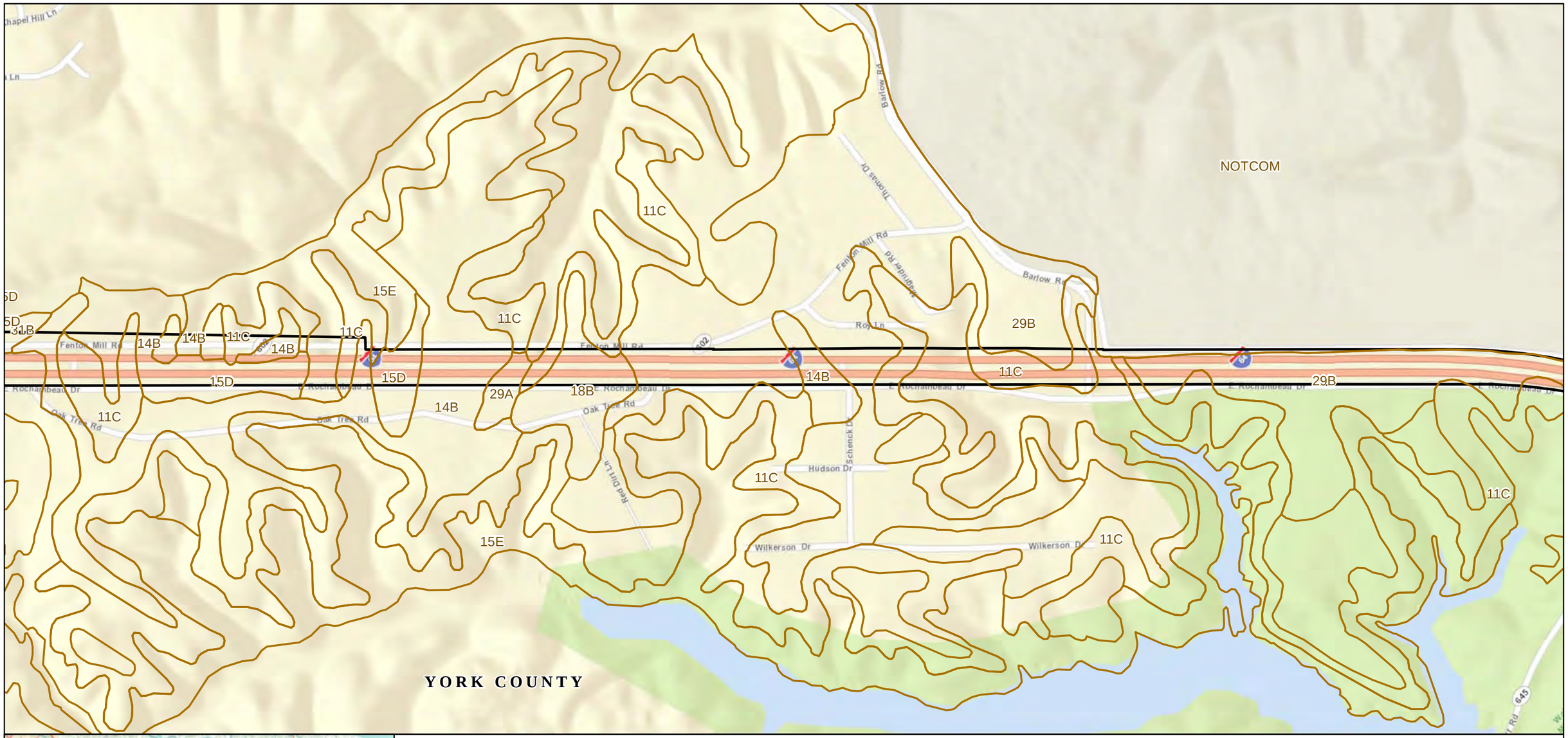
1 inch = 800 feet

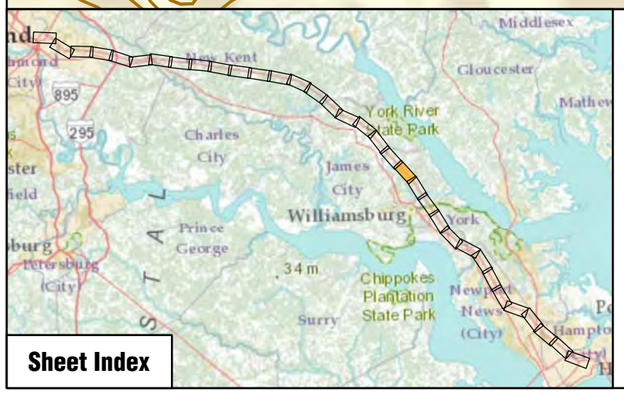
0 1,600 Feet

Source:
Soil Survey Geographic (SSURGO) Database (2010-2011)
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping
Map 20 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT





Sheet Index

Legend

- Soils
- Study Area
- County Lines

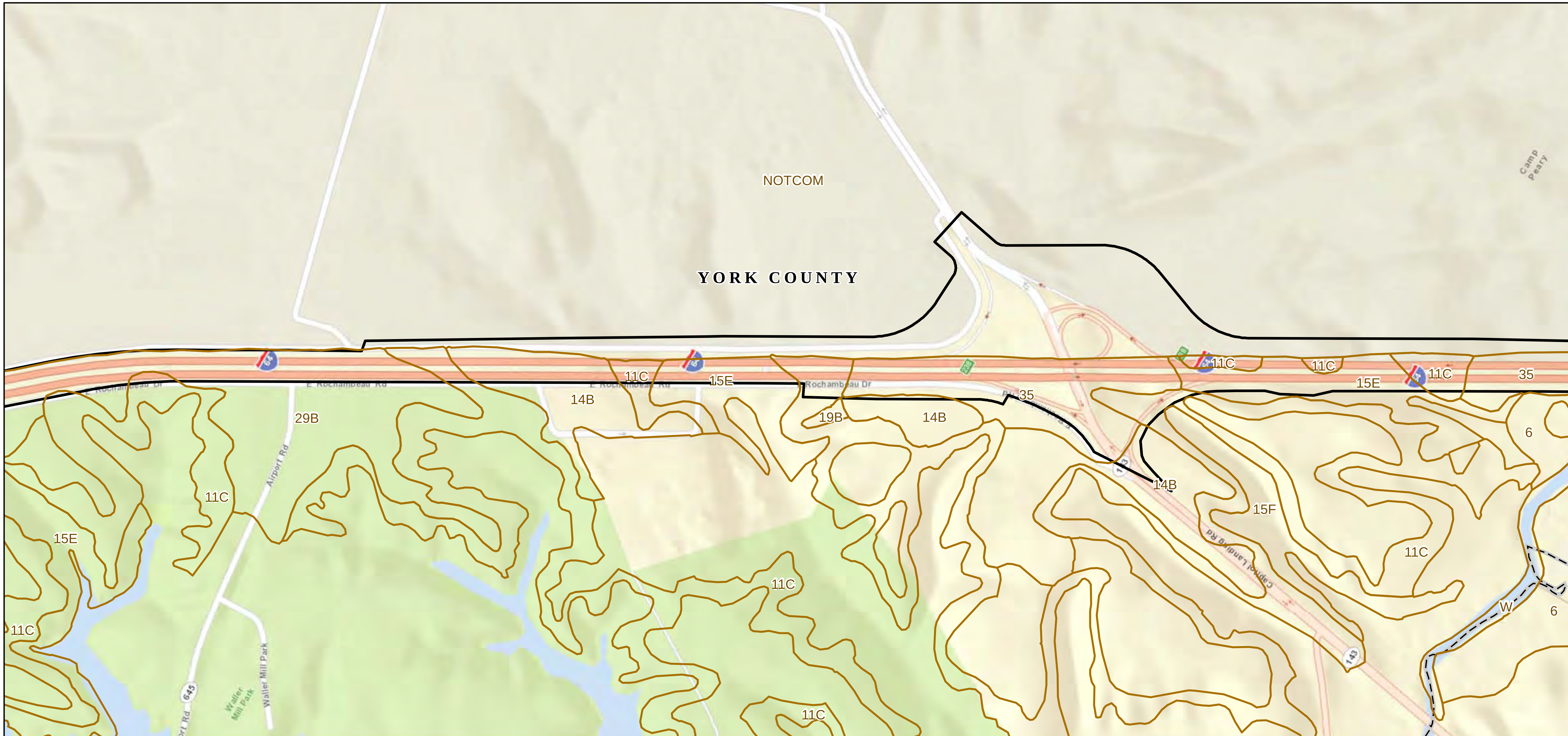
1 inch = 800 feet

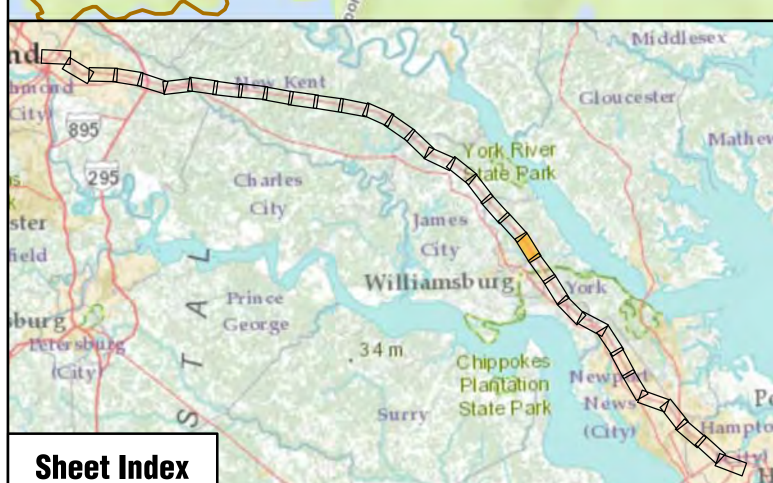
0 1,600 Feet

Source:
Soil Survey Geographic (SSURGO) Database (2010-2011)
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping
Map 21 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT





Sheet Index

Legend

- Soils
- Study Area
- County Lines

1 inch = 800 feet

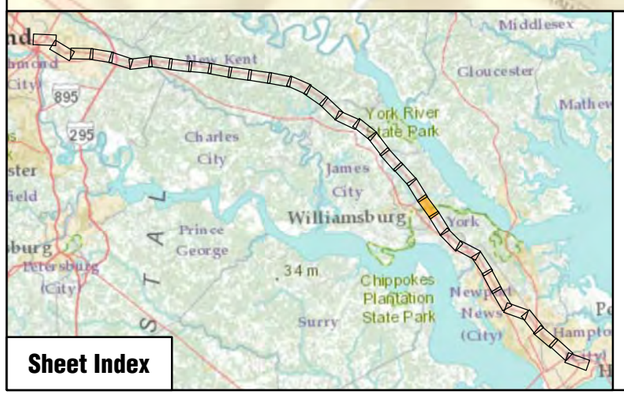
0 — 1,600 Feet

Source:
Soil Survey Geographic (SSURGO) Database (2010-2011)
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping

Map 22 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT



Sheet Index

Legend

- Soils
- Study Area
- County Lines

N

1 inch = 800 feet

0 1,600 Feet

Source:
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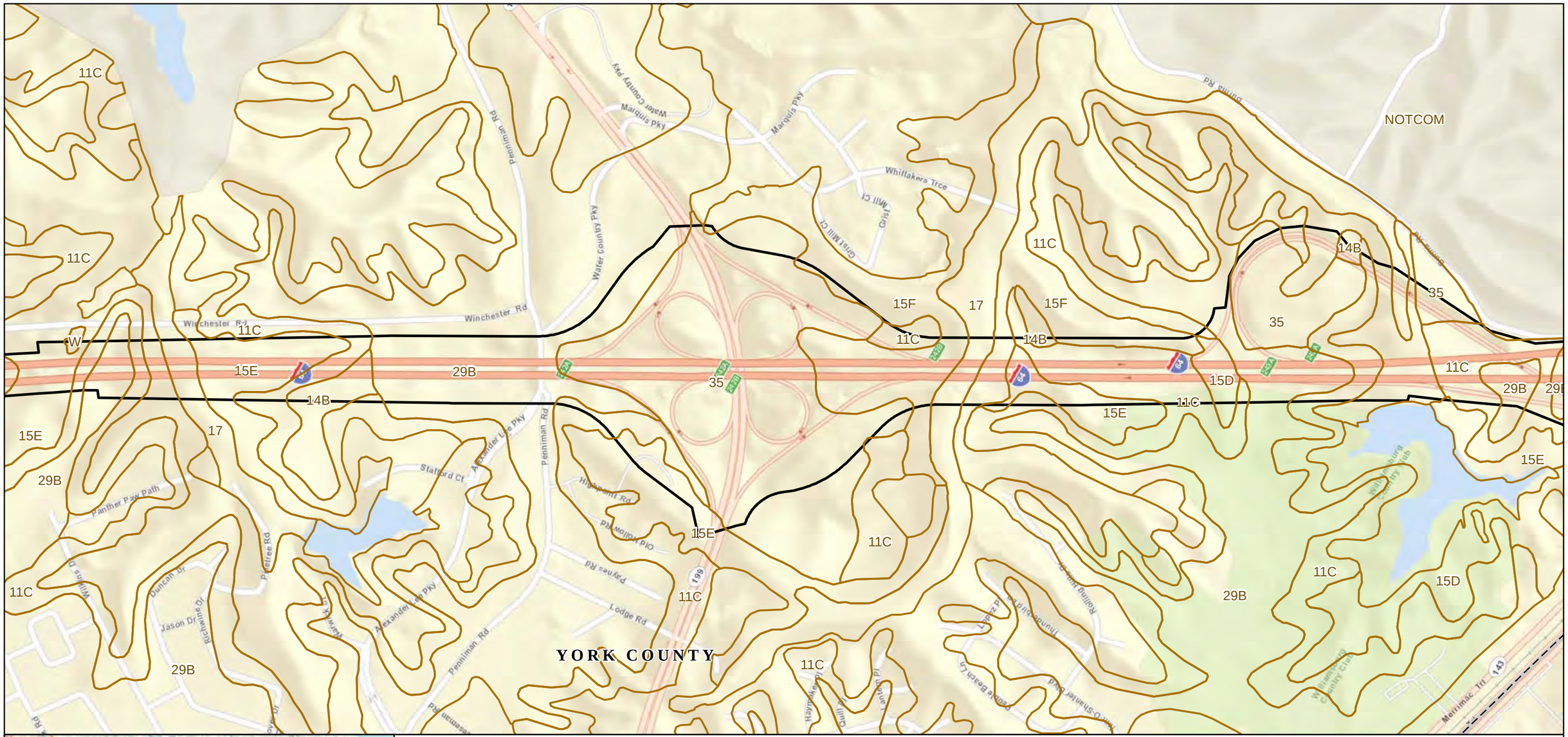
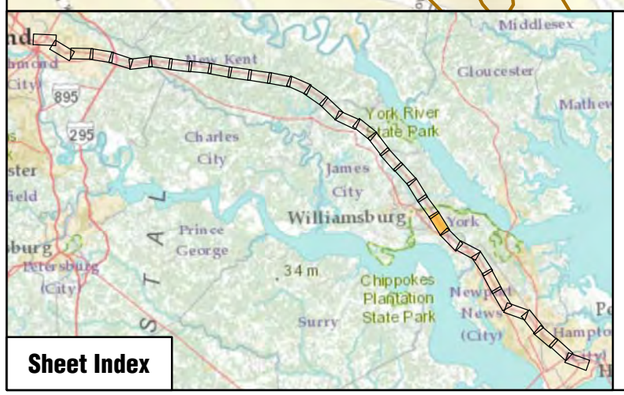
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping
Map 23 of 34

I-64 PENINSULA STUDY
ENVIRONMENTAL IMPACT STATEMENT





Sheet Index

Legend

- Soils
- Study Area
- County Lines

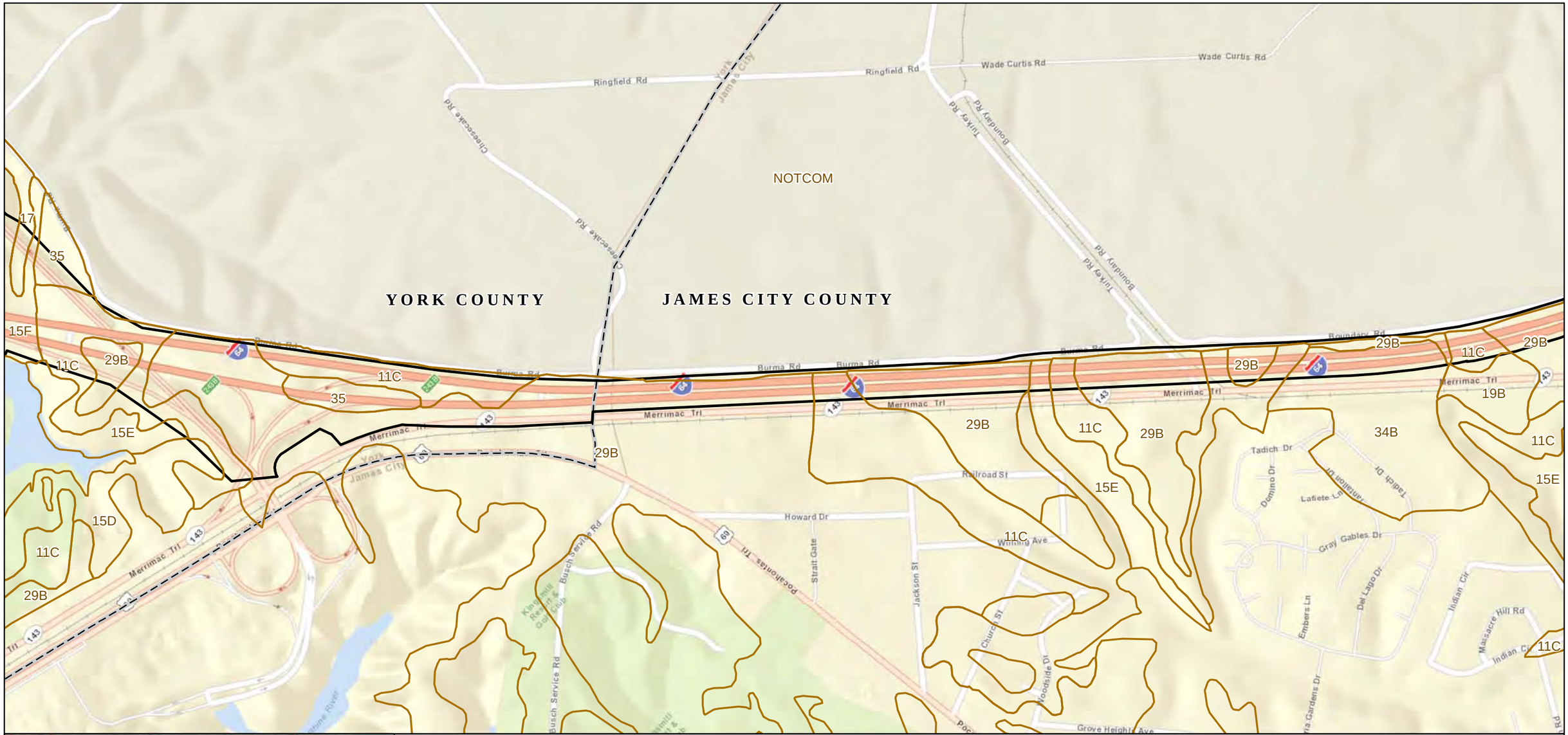
1 inch = 800 feet

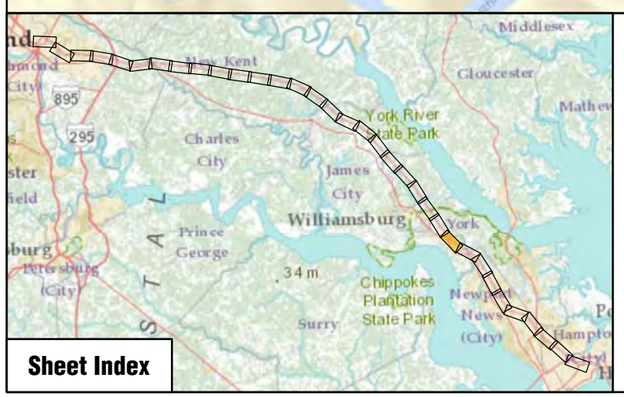
0 1,600 Feet

Source:
Soil Survey Geographic (SSURGO) Database (2010-2011)
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping
Map 24 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT





Sheet Index

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- Study Area
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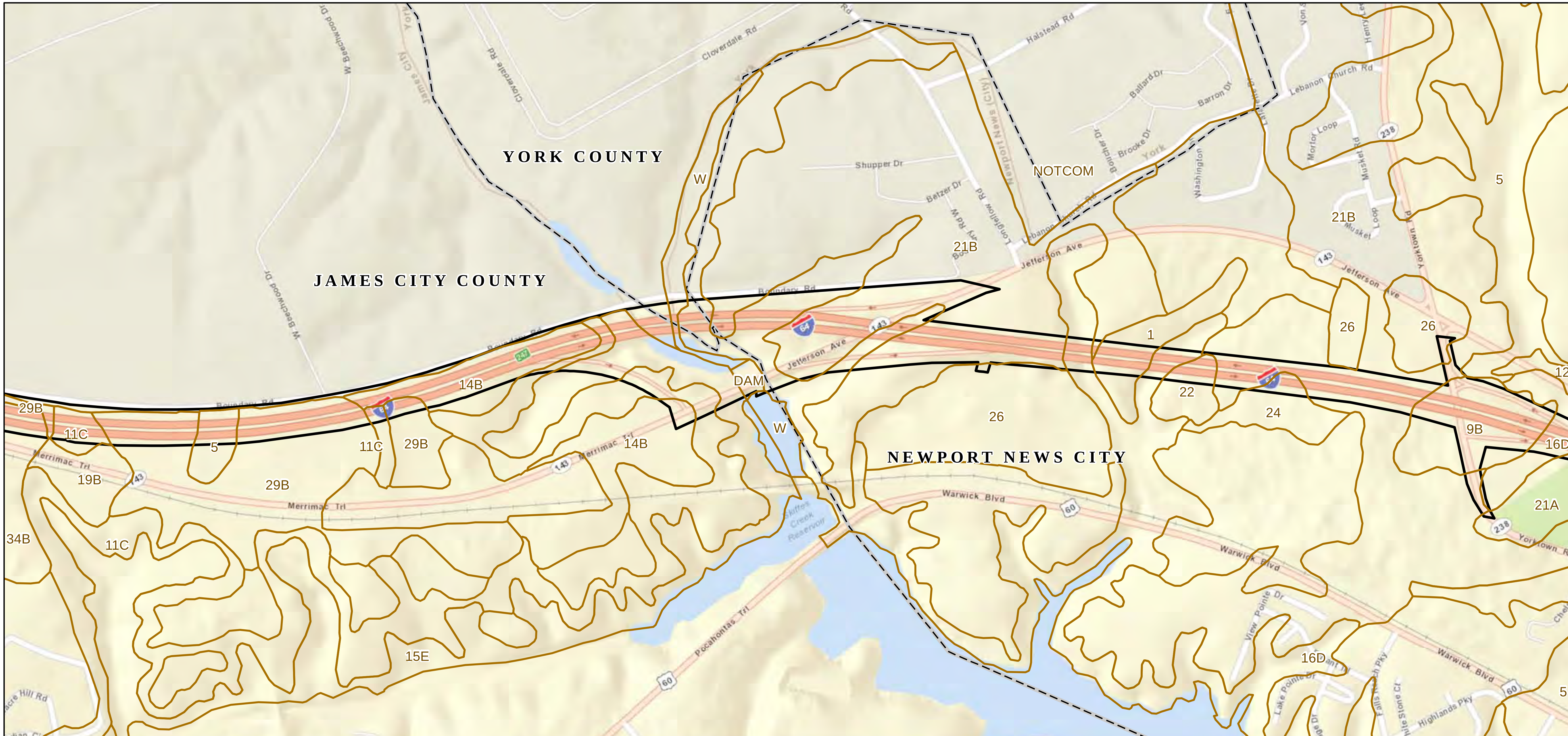
1 inch = 800 feet

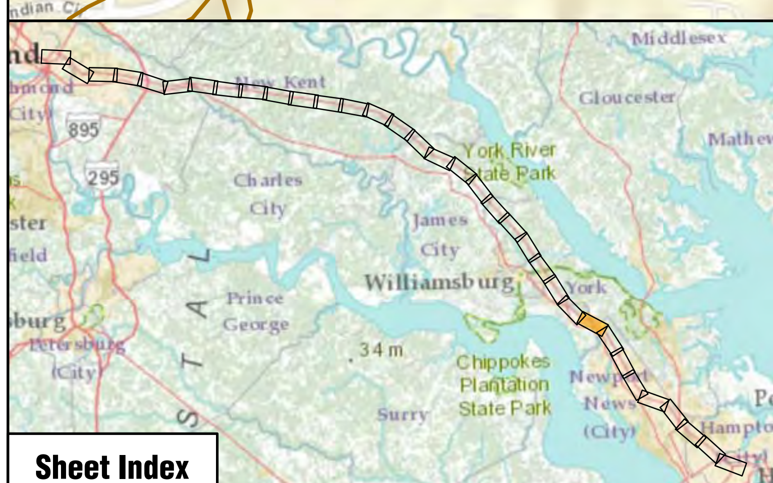
0 1,600 Feet

Source:
Soil Survey Geographic (SSURGO) Database (2010-2011)
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping
Map 25 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT





Sheet Index

Legend

- Soils
- Study Area
- County Lines

N

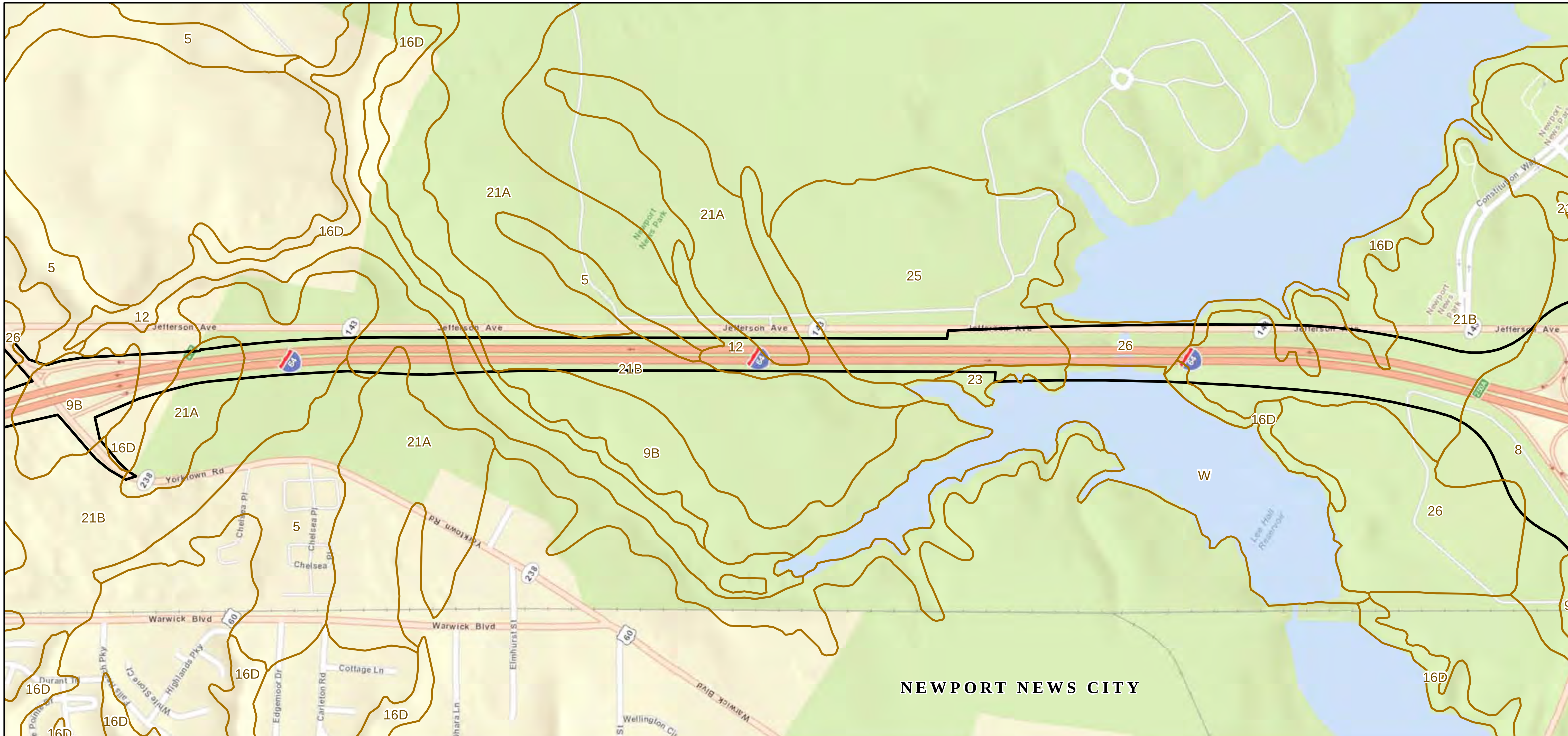
1 inch = 800 feet

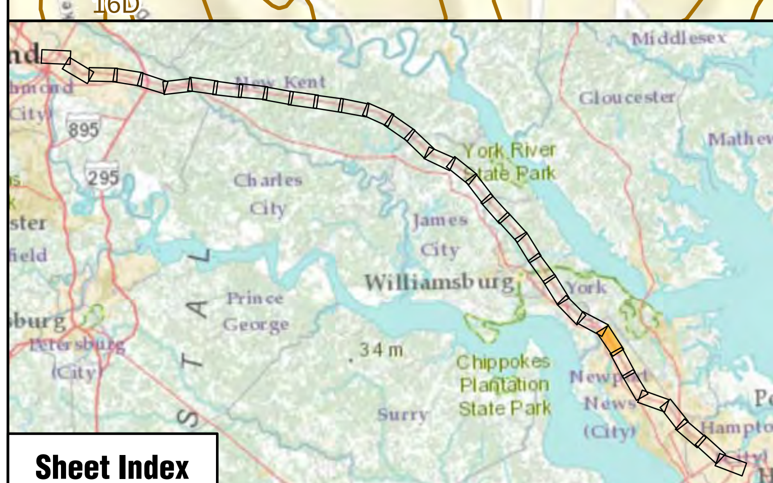
0 — 1,600 Feet

Source:
Soil Survey Geographic (SSURGO) Database (2010-2011)
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping
Map 26 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT





Sheet Index

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- Soils
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1 inch = 800 feet

0 1,600 Feet

Source:
Soil Survey Geographic (SSURGO) Database (2010-2011)
U.S. Department of Agriculture, Natural Resources Conservation Service

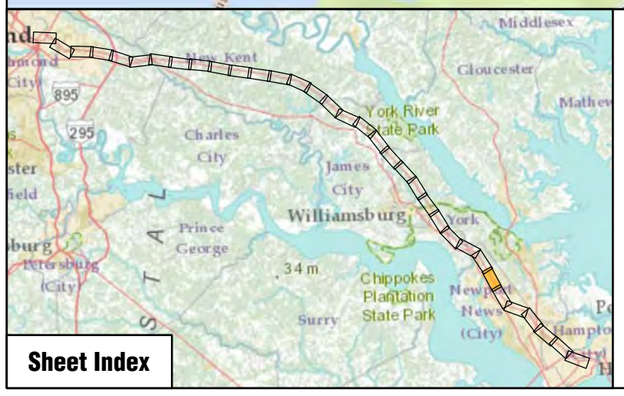
Soil Mapping

Map 27 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT

NEWPORT NEWS CITY

16D
21B
21A
9A
8
12
26
9B
W
2



Sheet Index

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1 inch = 800 feet

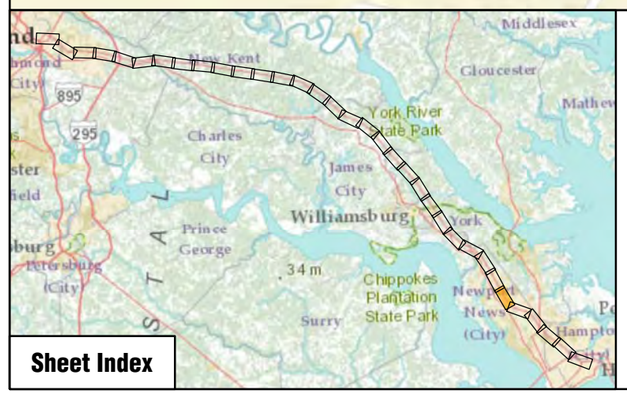
0 — 1,600 Feet

Source:
Soil Survey Geographic (SSURGO) Database (2010-2011)
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping
Map 28 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT

NEWPORT NEWS CITY



Legend

- Soils
- Study Area
- County Lines

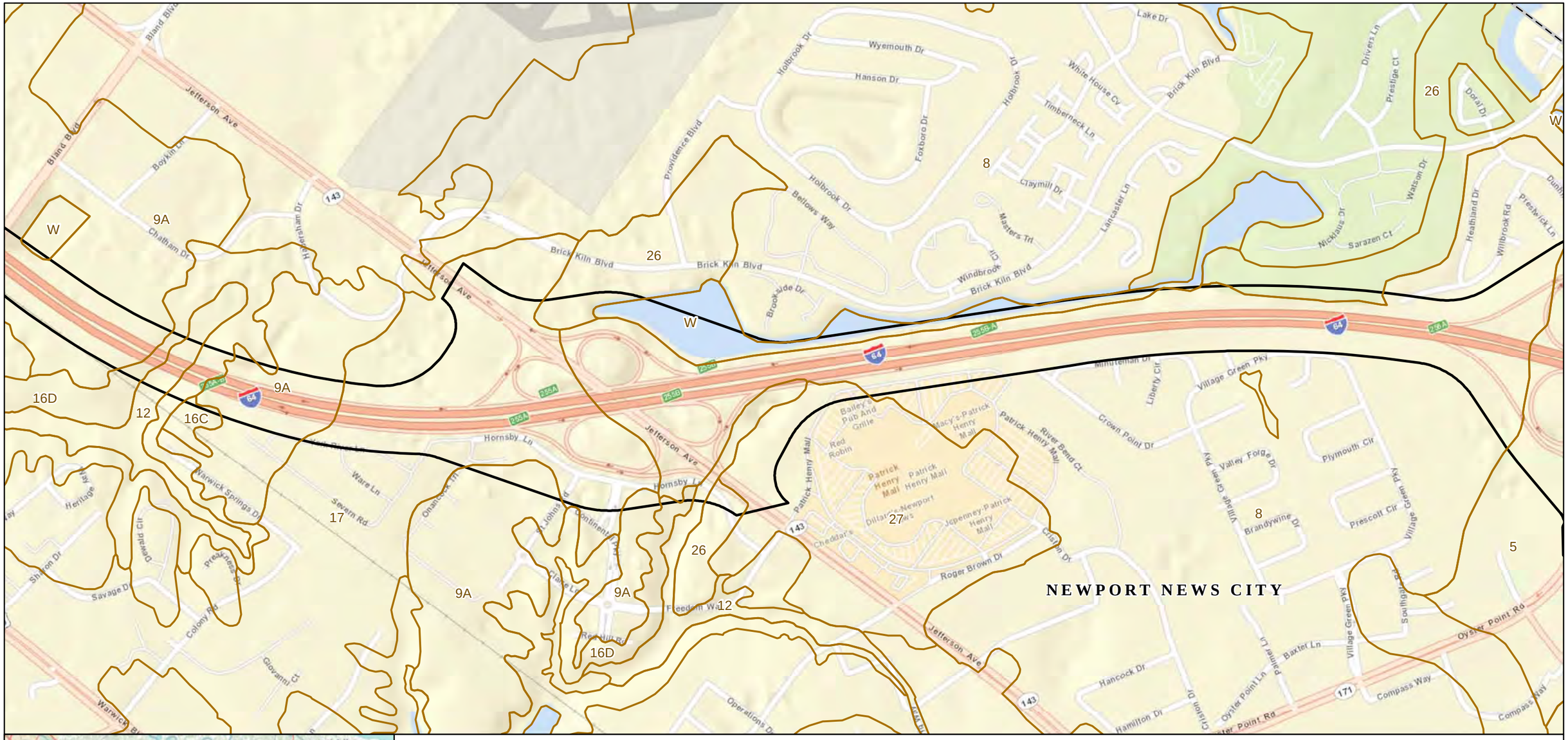
1 inch = 800 feet

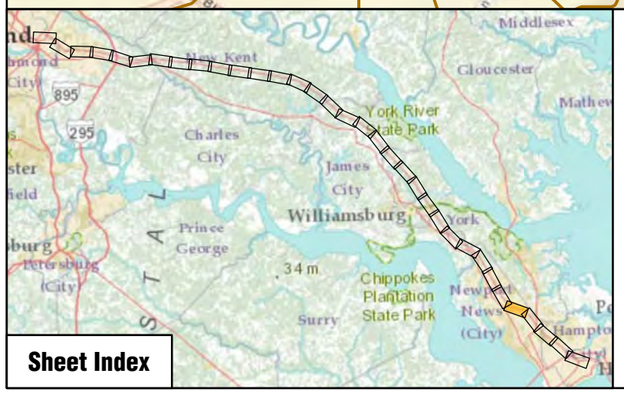
0 1,600 Feet

Source:
Soil Survey Geographic (SSURGO) Database (2010-2011)
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping
Map 29 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT





Legend

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0 1,600 Feet

Source:
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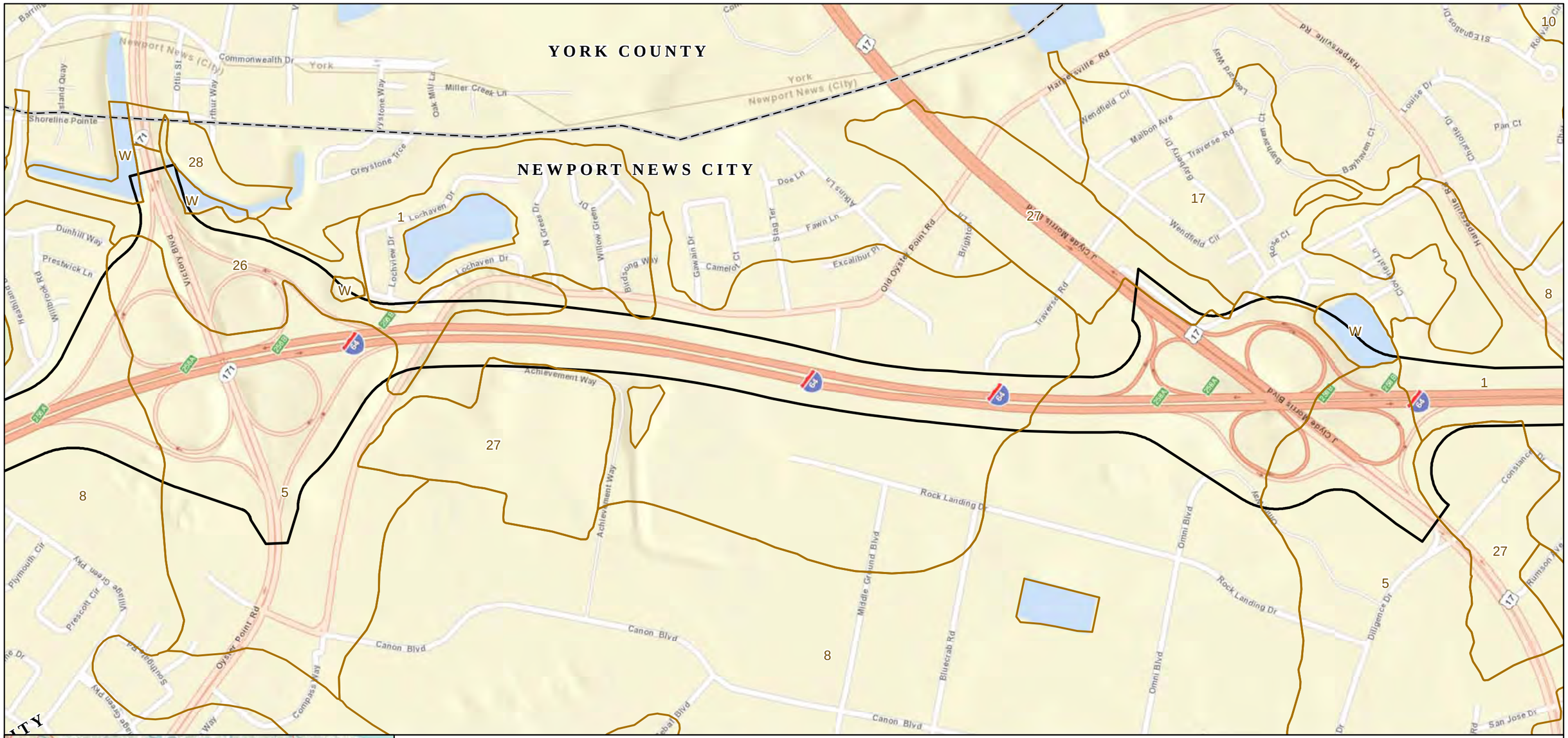
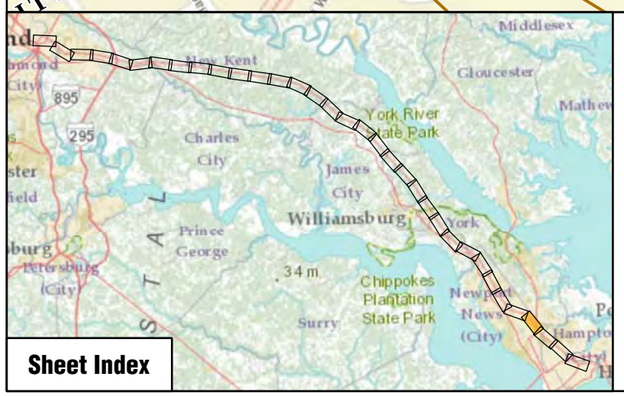
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping
Map 30 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT





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1 inch = 800 feet

0 — 1,600 Feet

Source:
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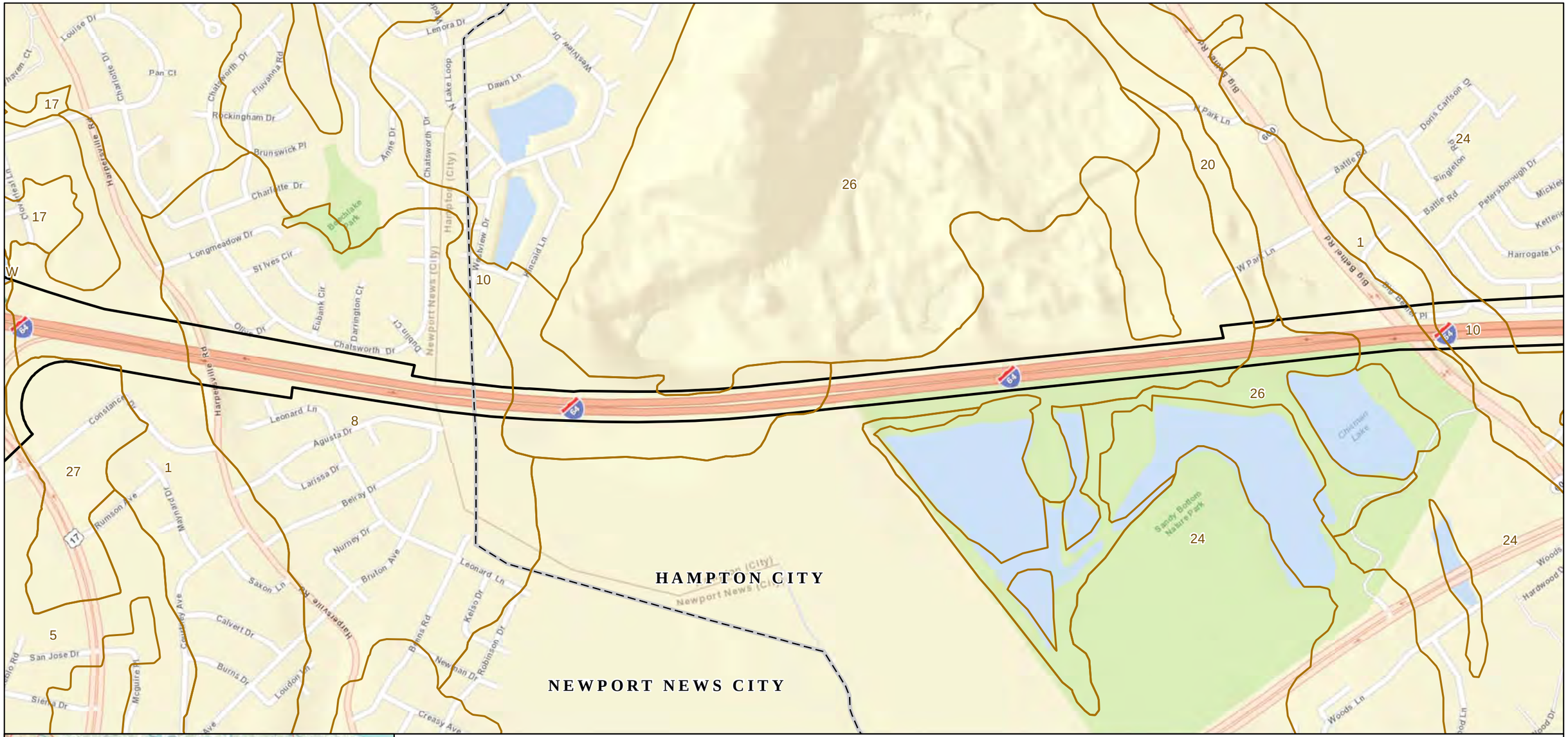
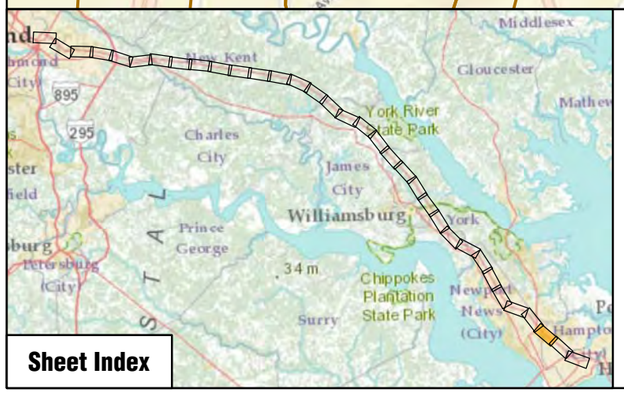
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping
Map 31 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT





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- Soils
- Study Area
- County Lines

1 inch = 800 feet

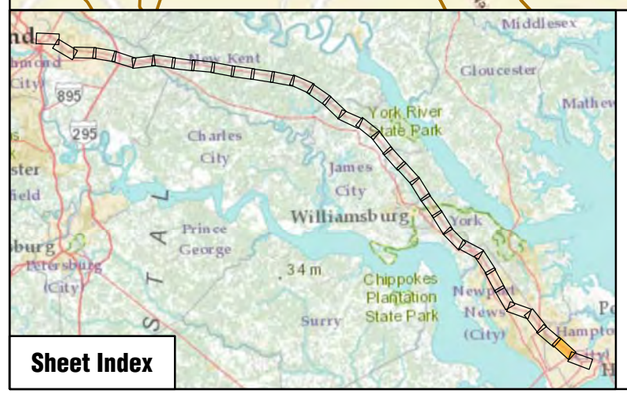
0 — 1,600 Feet

Source:
Soil Survey Geographic (SSURGO) Database (2010-2011)
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping
Map 32 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT

HAMPTON CITY



Sheet Index

Legend

- Soils
- Study Area
- County Lines

1 inch = 800 feet

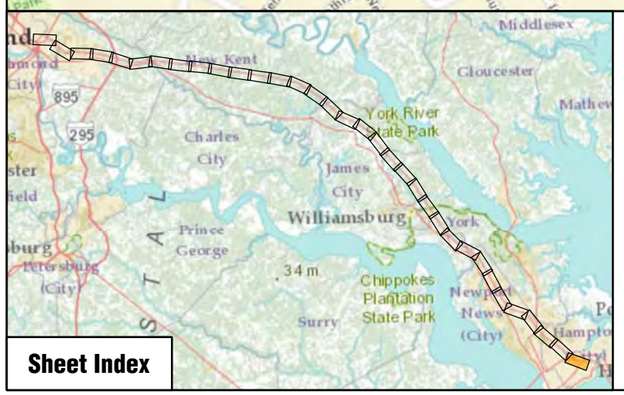
0 — 1,600 Feet

Source:
Soil Survey Geographic (SSURGO) Database (2010-2011)
U.S. Department of Agriculture, Natural Resources Conservation Service

Soil Mapping
Map 33 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT

HAMPTON CITY



Sheet Index

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- Soils
- Study Area
- County Lines

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1 inch = 800 feet

0 1,600 Feet

Source:
Soil Survey Geographic (SSURGO) Database (2010-2011)
U.S. Department of Agriculture, Natural Resources Conservation Service

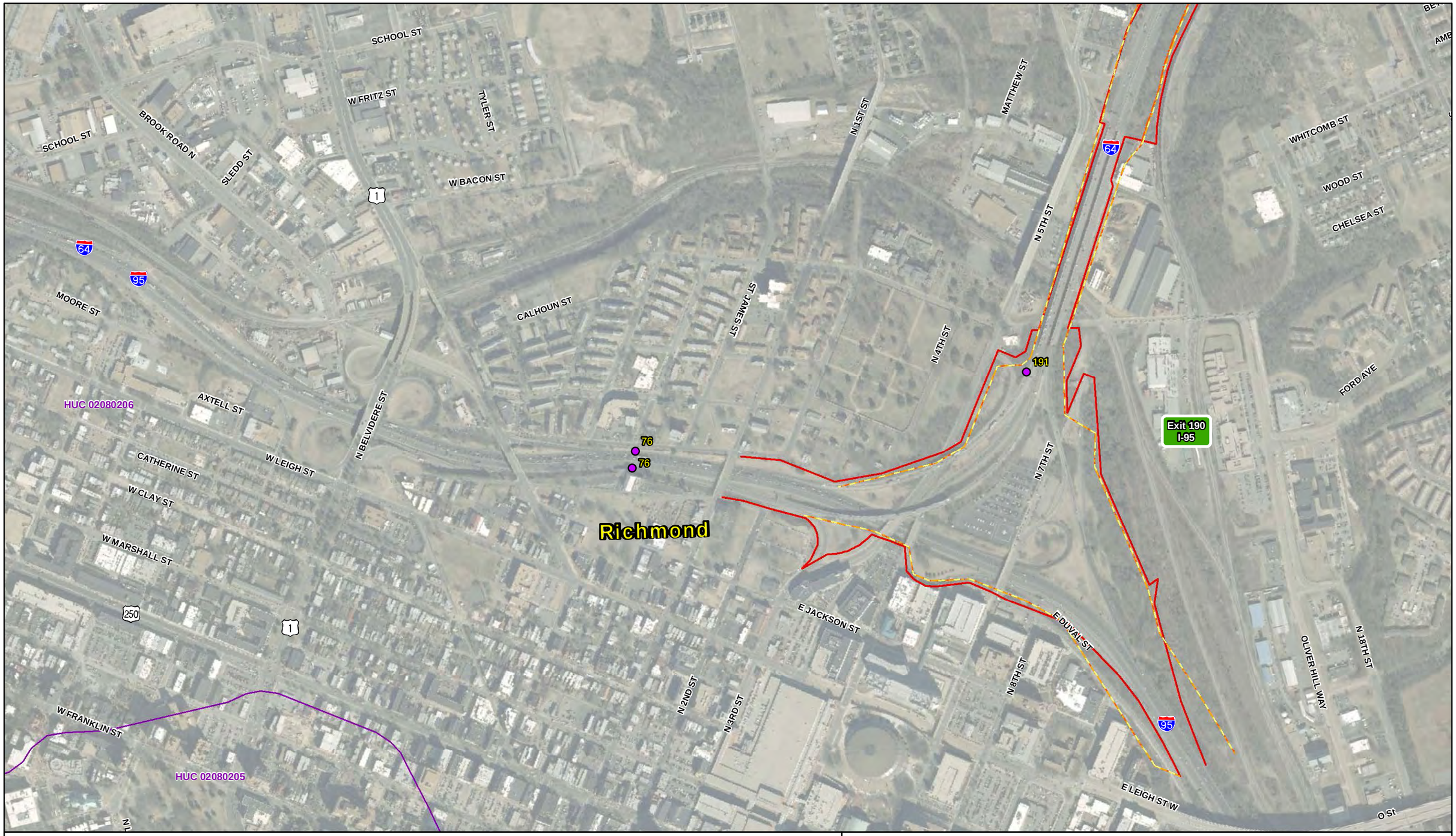
Soil Mapping
Map 34 of 34

I-64 PENINSULA STUDY ENVIRONMENTAL IMPACT STATEMENT

INTERSTATE 64 PENINSULA STUDY

APPENDIX C

Wetland and Other Waters of the United States Mapping



INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
- 210 Mile Marker
- Existing Right of Way
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Assessed Streams and Waterbodies
- Assessed Wetlands
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 1 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet

INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
- 210 Mile Marker
- Existing Right of Way
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Waters of the United States Including Wetlands

Map 2 of 43

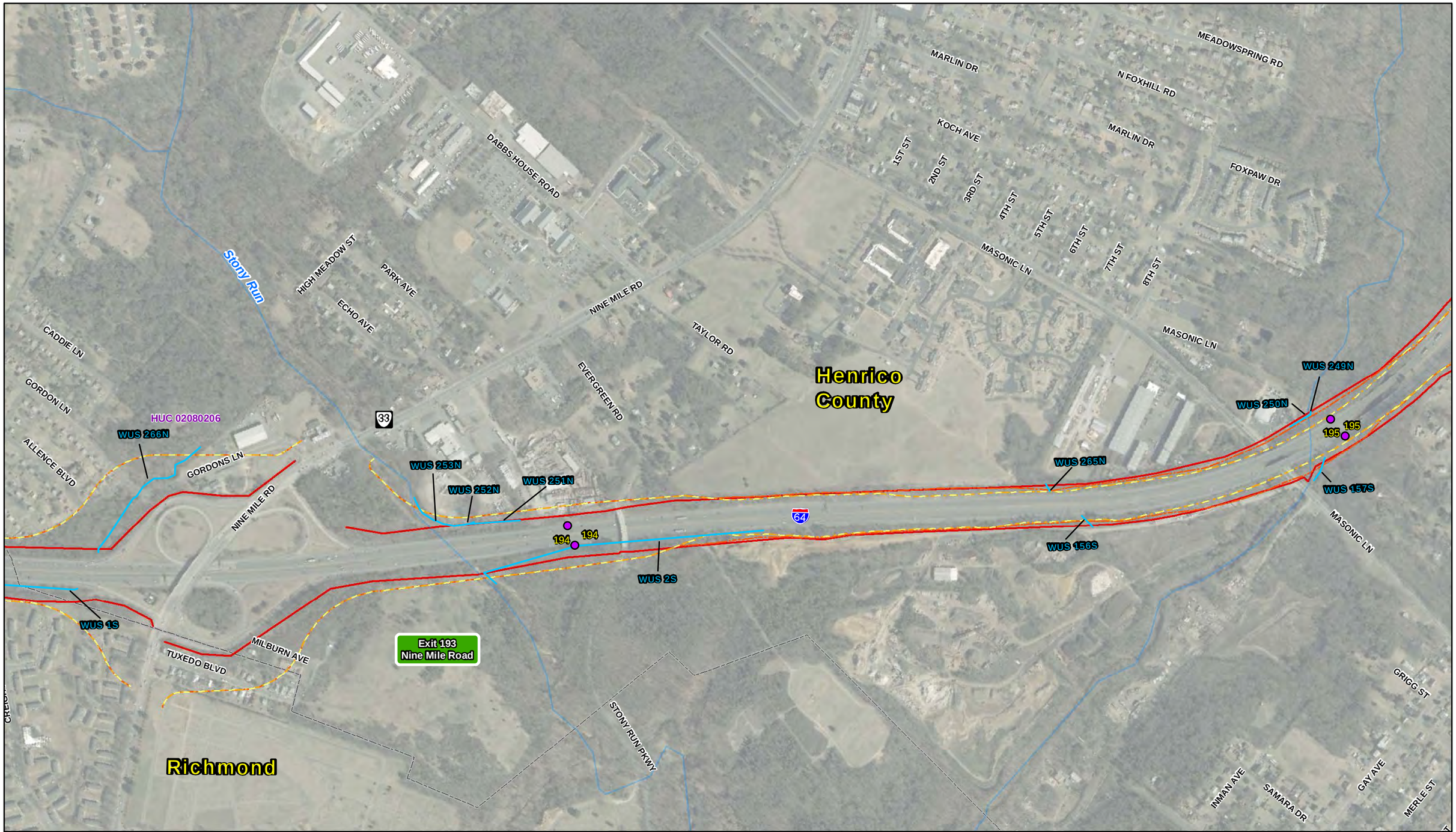
Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet



INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
- 210 Mile Marker
- Existing Right of Way
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
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Waters of the United States Including Wetlands

Map 3 of 43

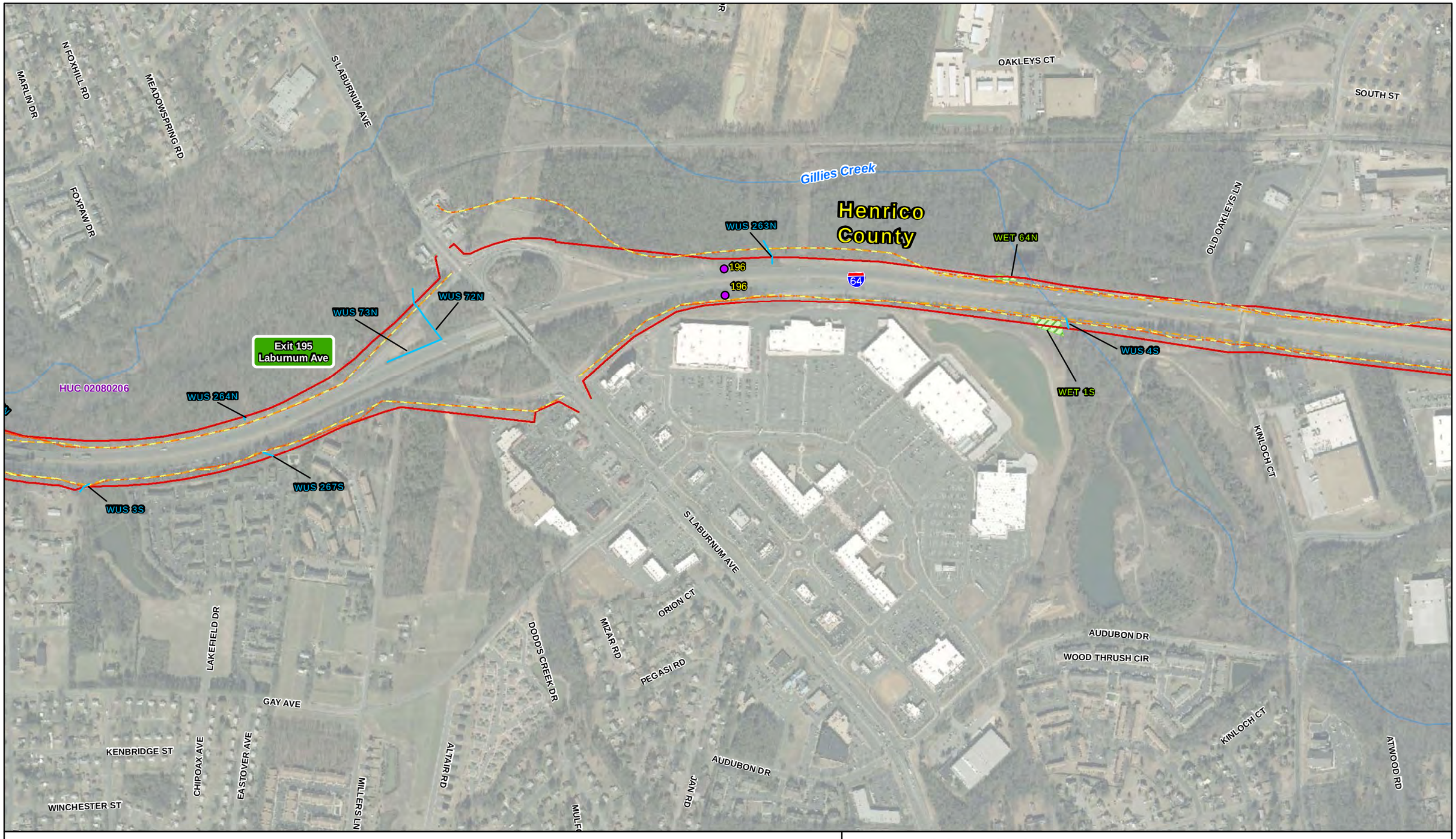
Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet



INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
- 210 Mile Marker
- Existing Right of Way
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Waters of the United States Including Wetlands

Map 4 of 43

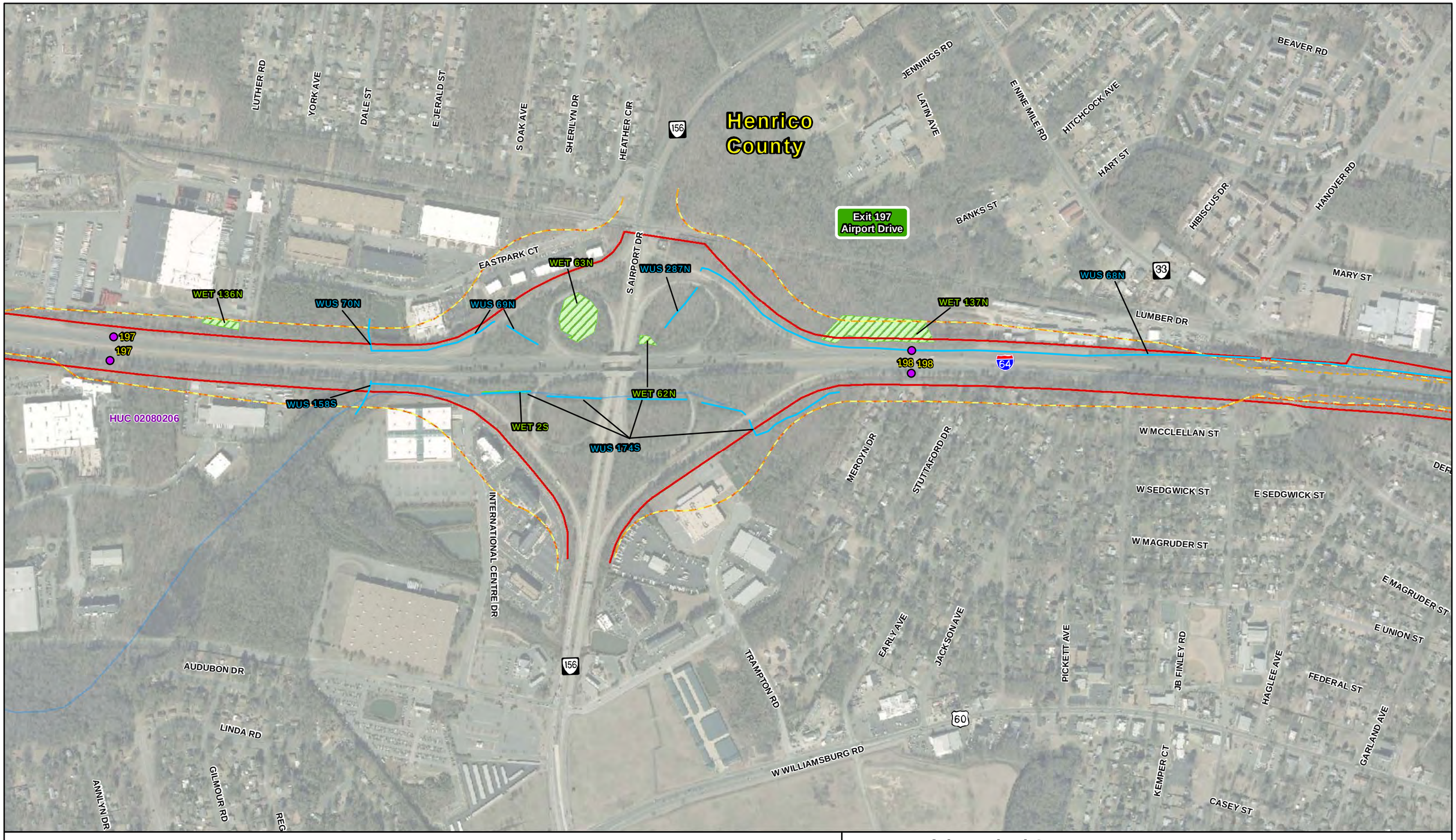
Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet



INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
- 210 Mile Marker
- Existing Right of Way
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
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Waters of the United States Including Wetlands

Map 5 of 43

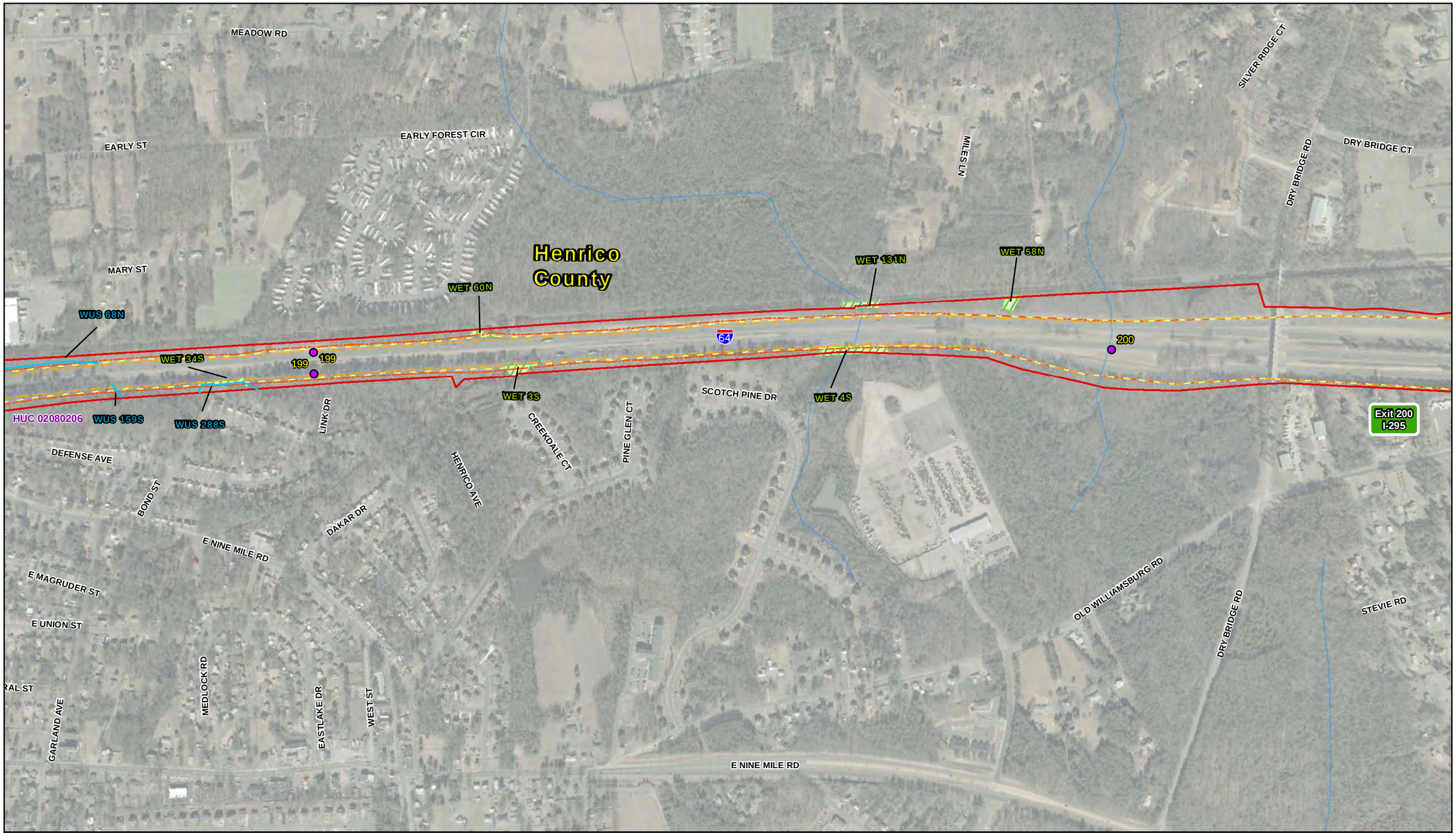
Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet



INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
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- Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 6 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800

Feet

INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
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Waters of the United States Including Wetlands

Map 7 of 43

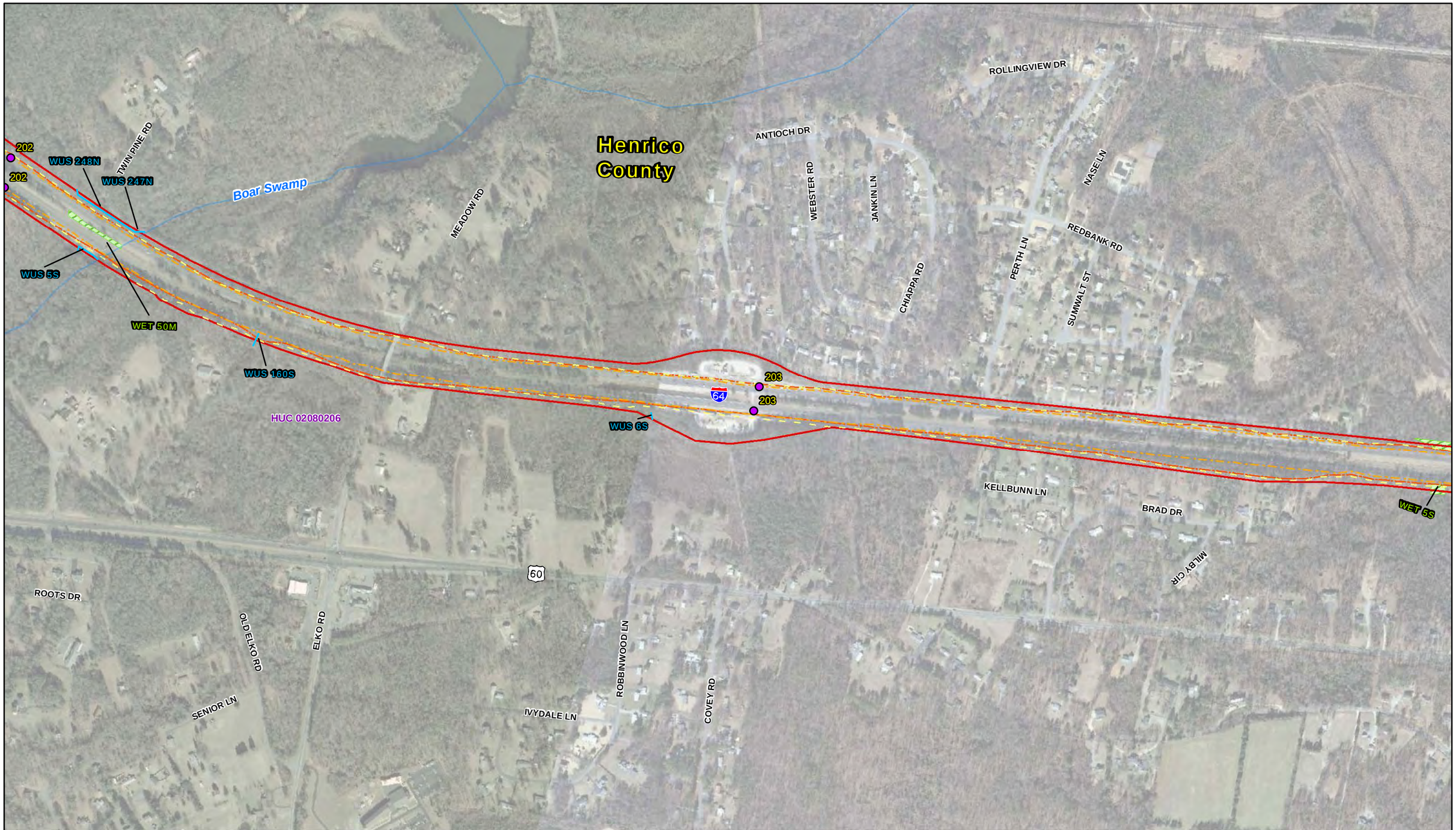
Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet



INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
- 210 Mile Marker
- Existing Right of Way
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Waters of the United States Including Wetlands

Map 8 of 43

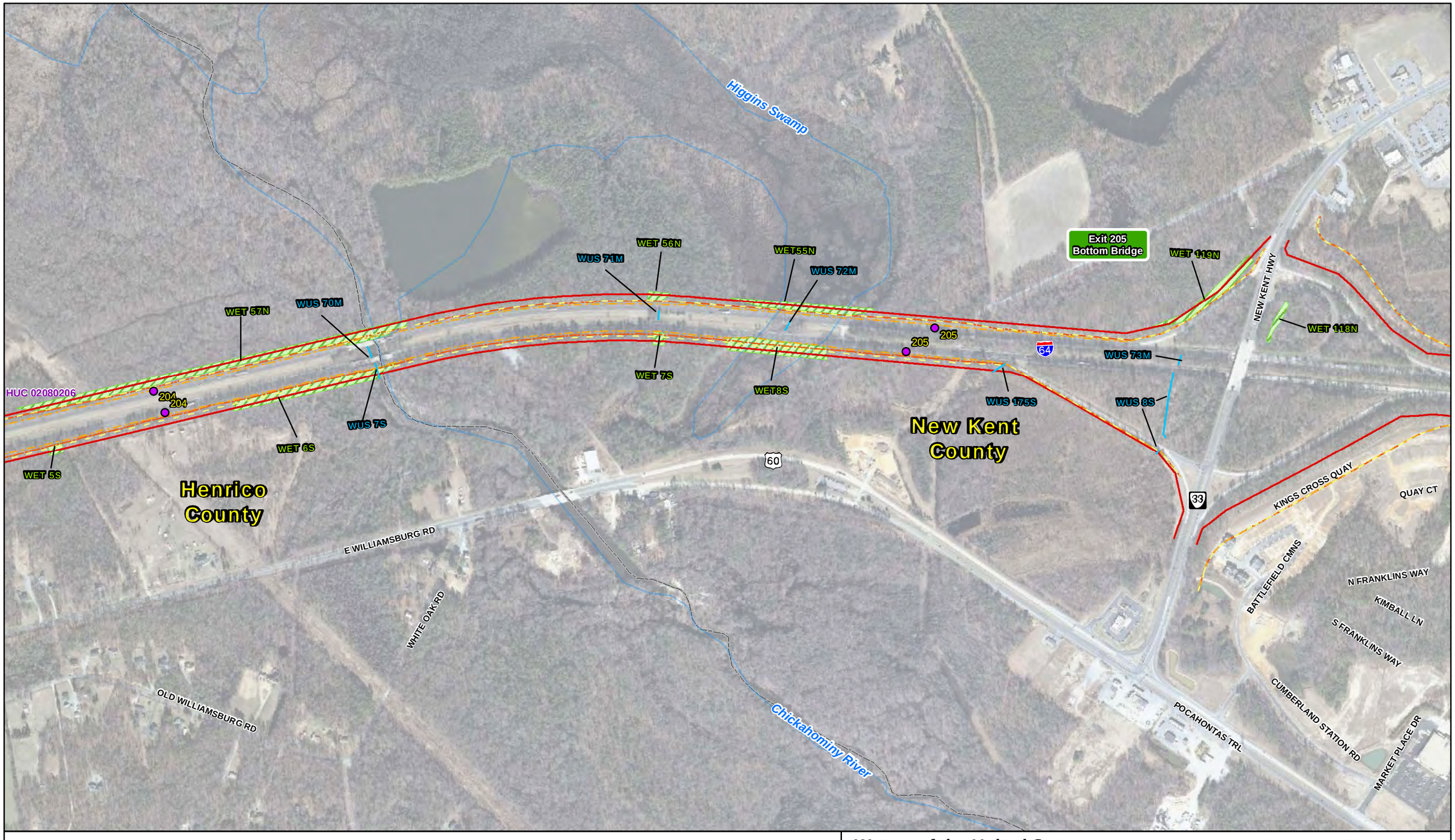
Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet



INTERSTATE 64 PENINSULA STUDY

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Waters of the United States Including Wetlands

Map 9 of 43

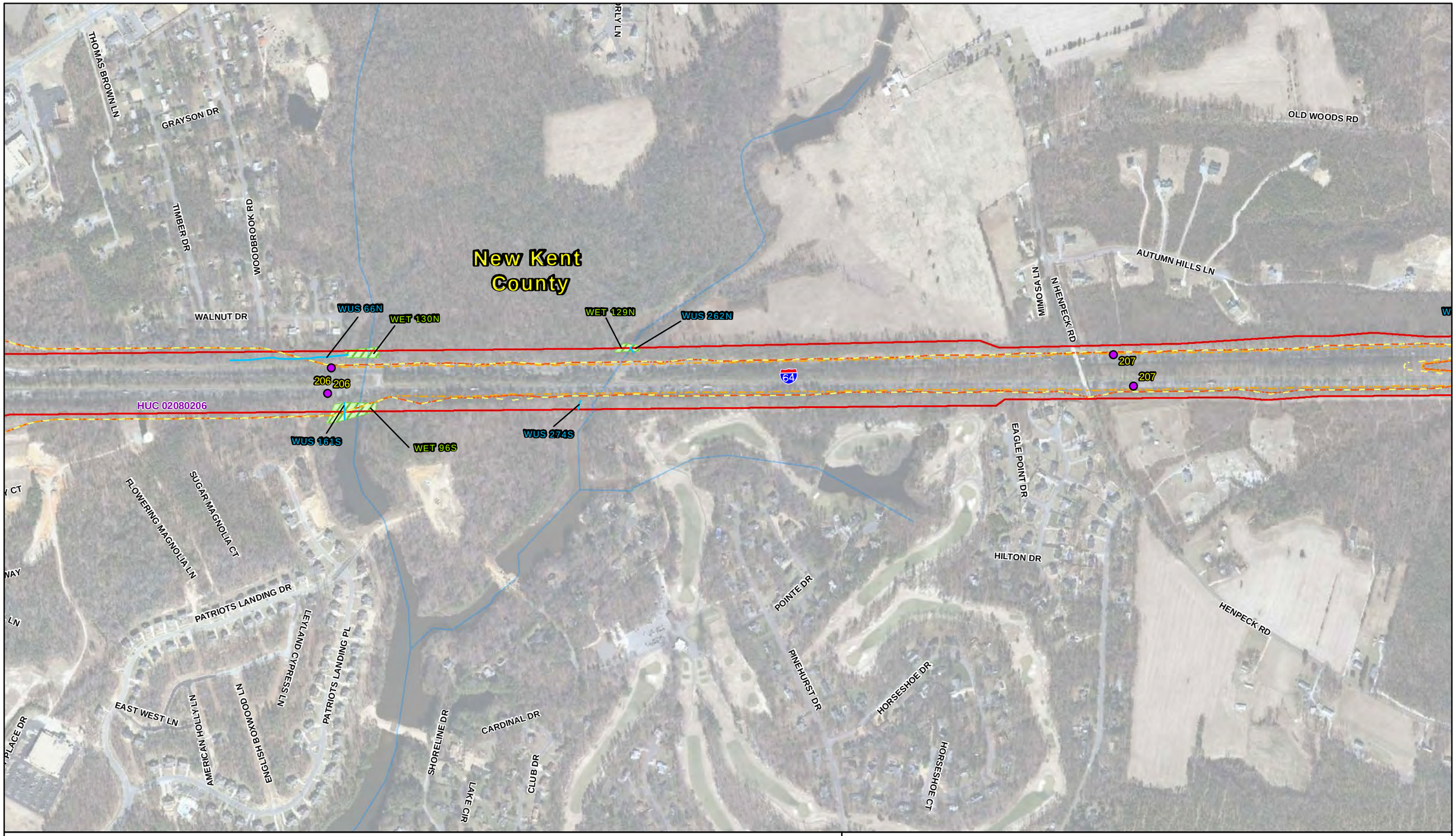
Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet



INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
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Waters of the United States Including Wetlands

Map 10 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet

OLD NOTTINGHAM RD
MARCELLA LN
Crump Swamp
640
612
PINE FORK RD
209
209
WUS 260N
WUS 261N
WUS 74M
WUS 75M
WUS 64N
WUS 259N
WET 52M
WET 51M
WUS 78M
WUS 79M
208
208
64
WUS 162S
WET 9S
WUS 77M
WUS 76M
WUS 9S
WET 10S
WUS 163S
WUS 10S
WET 11S
AIRPORT RD
New Kent County
HUC 02080206
OLD FIELD LN
ASHLAND FARM RD
OLD ROXBURY RD
TIMBER RIDGE RD
CROSSES GROVE RD
HENPECK RD
HEMLOCK RD

INTERSTATE 64 PENINSULA STUDY

Locality Jurisdiction
210 Mile Marker
Existing Right of Way
Hydrologic Unit Code Boundary
USGS Topoquadrangle Surface Water (Non-Assessed)
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Assessed Wetlands
Limits of Alternative 1A/2A Footprint
Limits of Alternative 1B/2B Footprint
Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

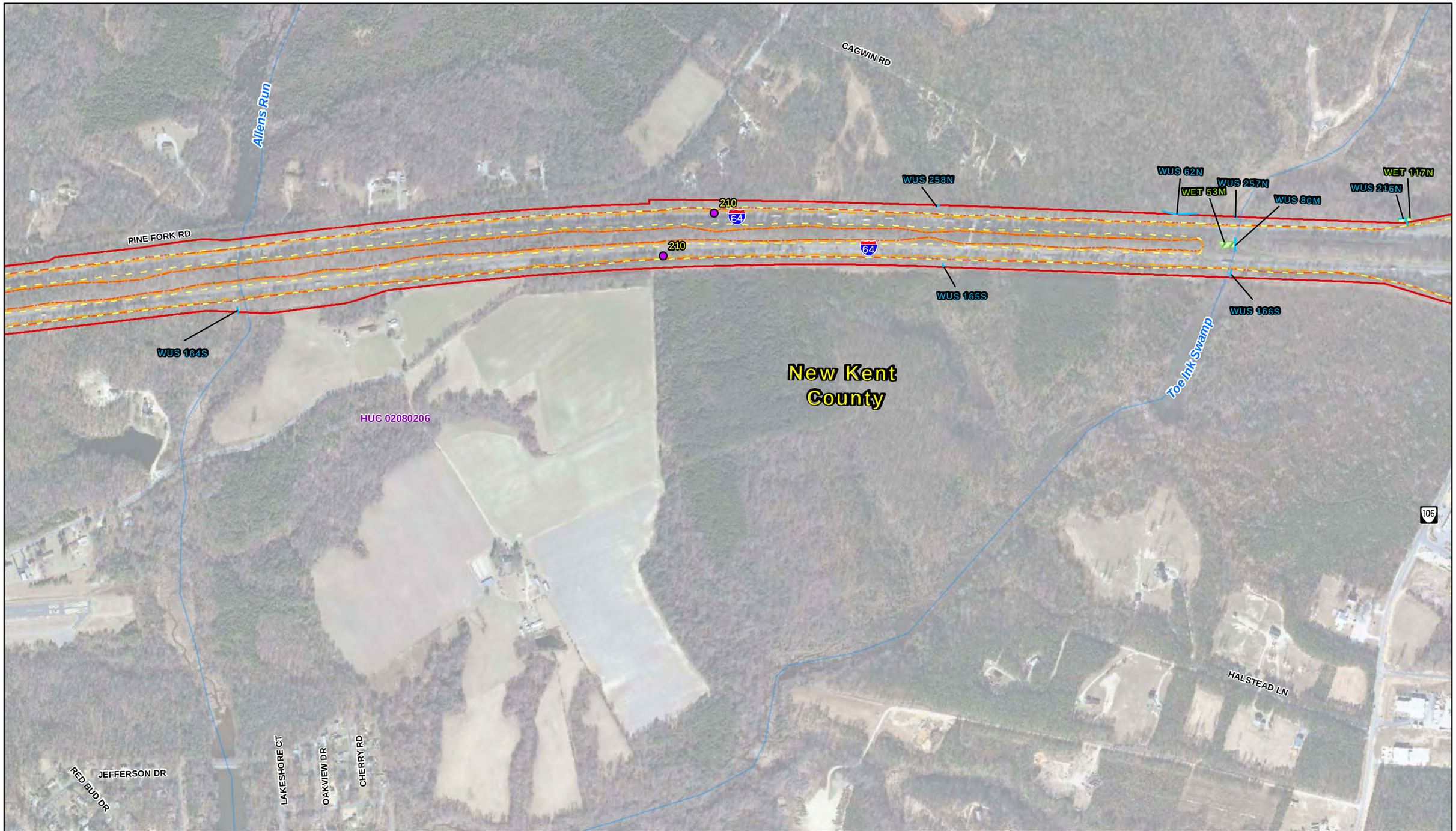
Map 11 of 43

Notes:
Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet



INTERSTATE 64 PENINSULA STUDY

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Waters of the United States Including Wetlands

Map 12 of 43

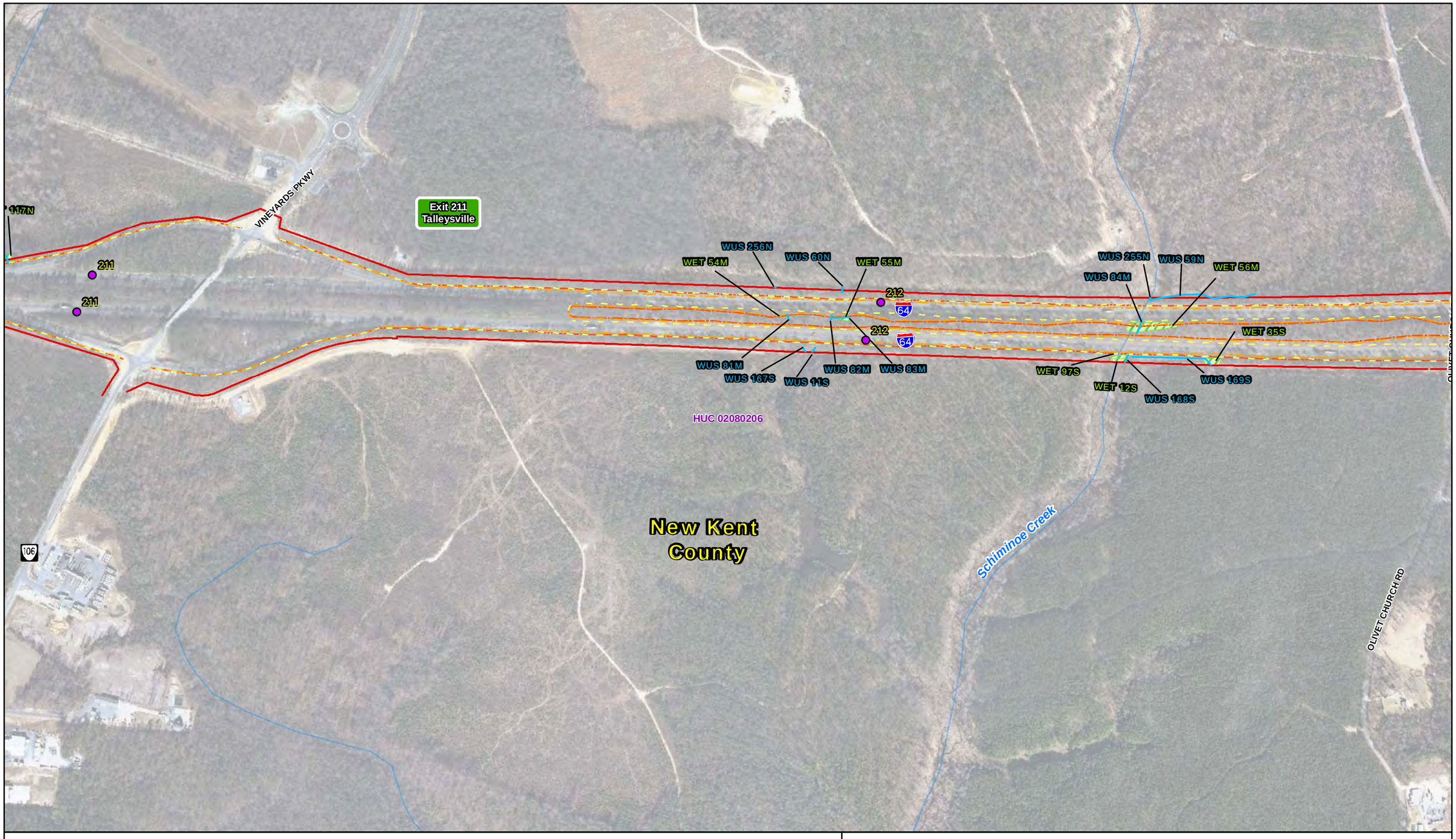
Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet



INTERSTATE 64 PENINSULA STUDY

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- Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 13 of 43

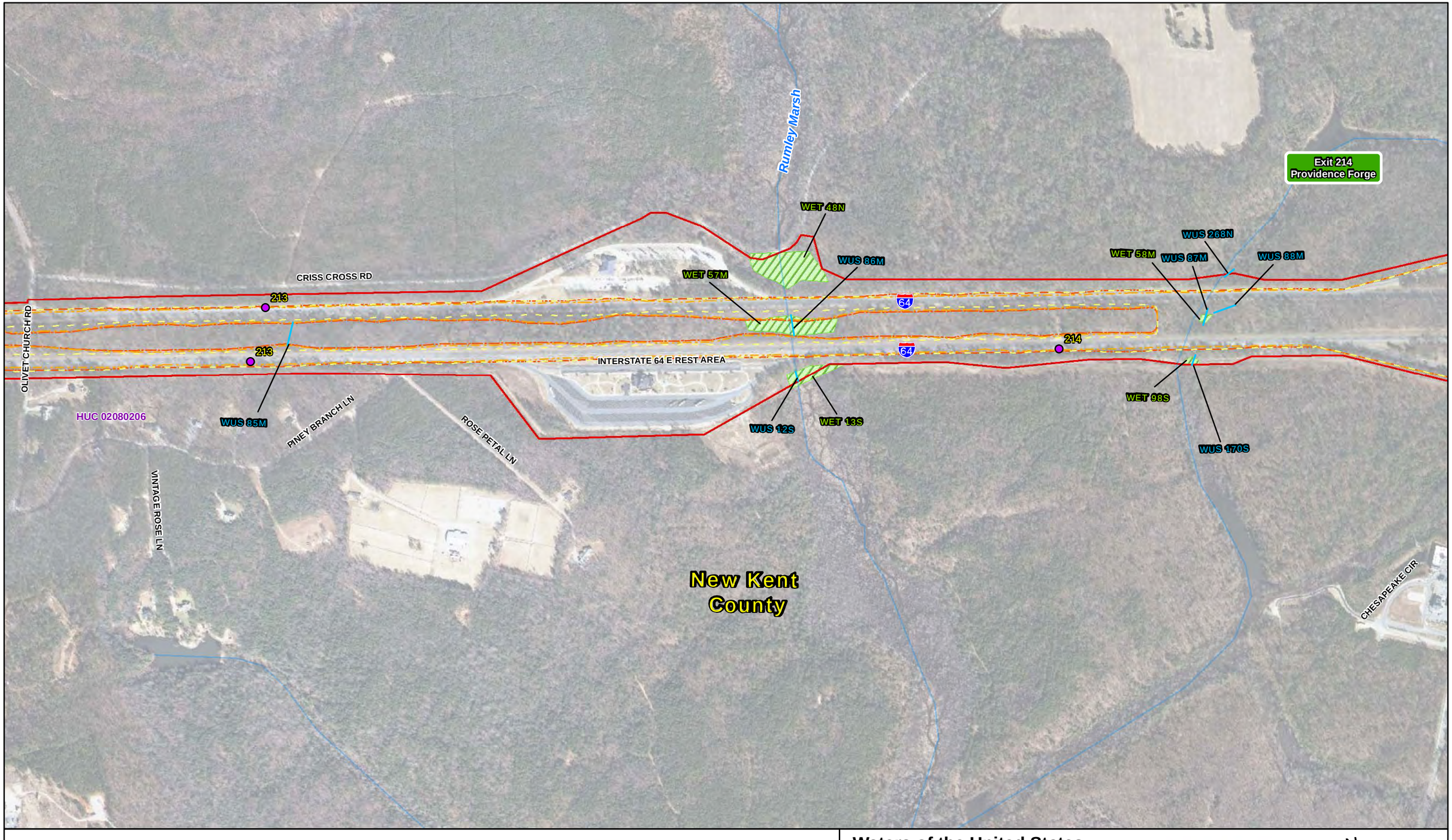
Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet



INTERSTATE 64 PENINSULA STUDY

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Waters of the United States Including Wetlands

Map 14 of 43

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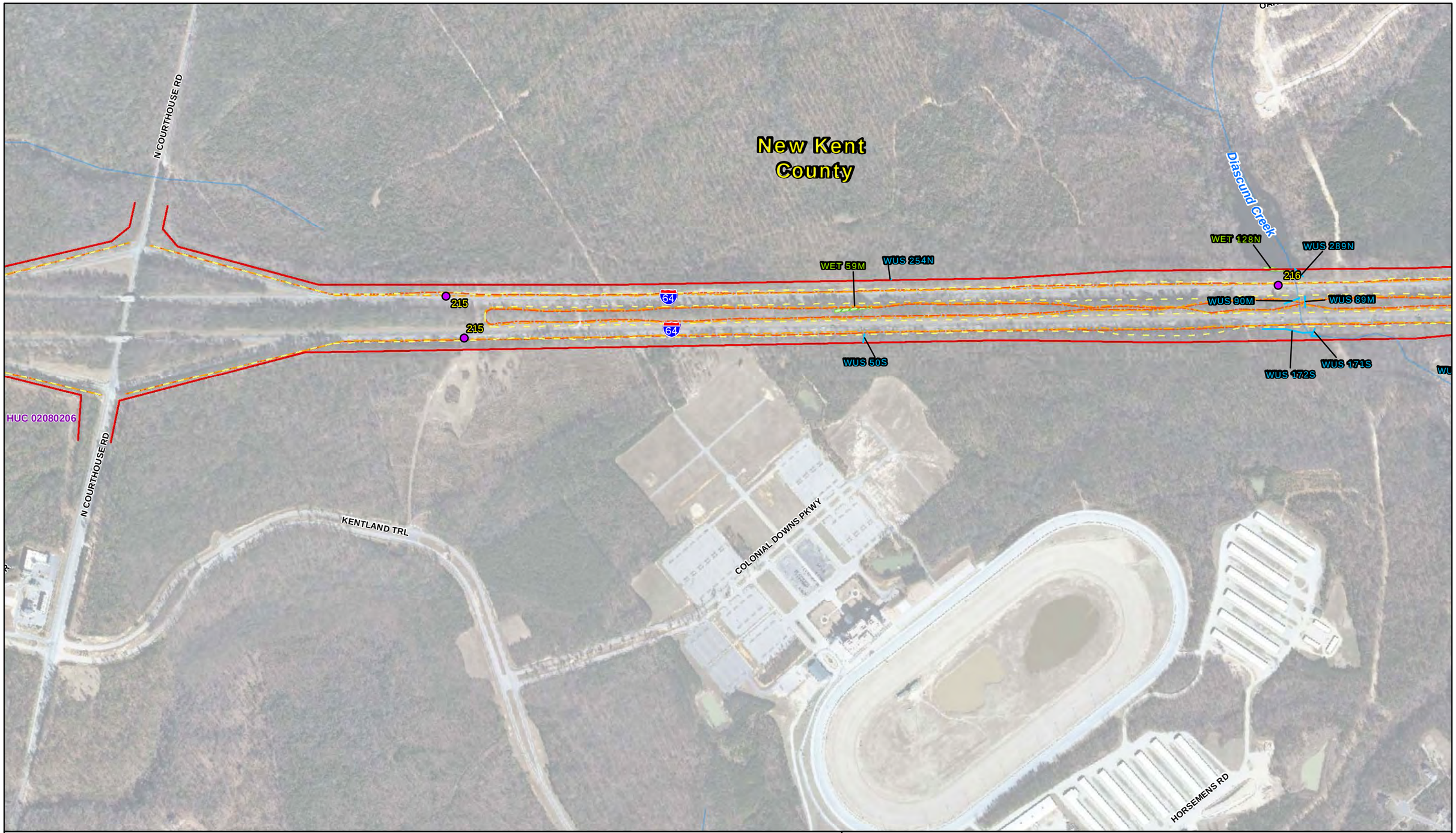
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet



INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
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- USGS Topoquadrangle Surface Water (Non-Assessed)
- Assessed Streams and Waterbodies
- Assessed Wetlands
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 15 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

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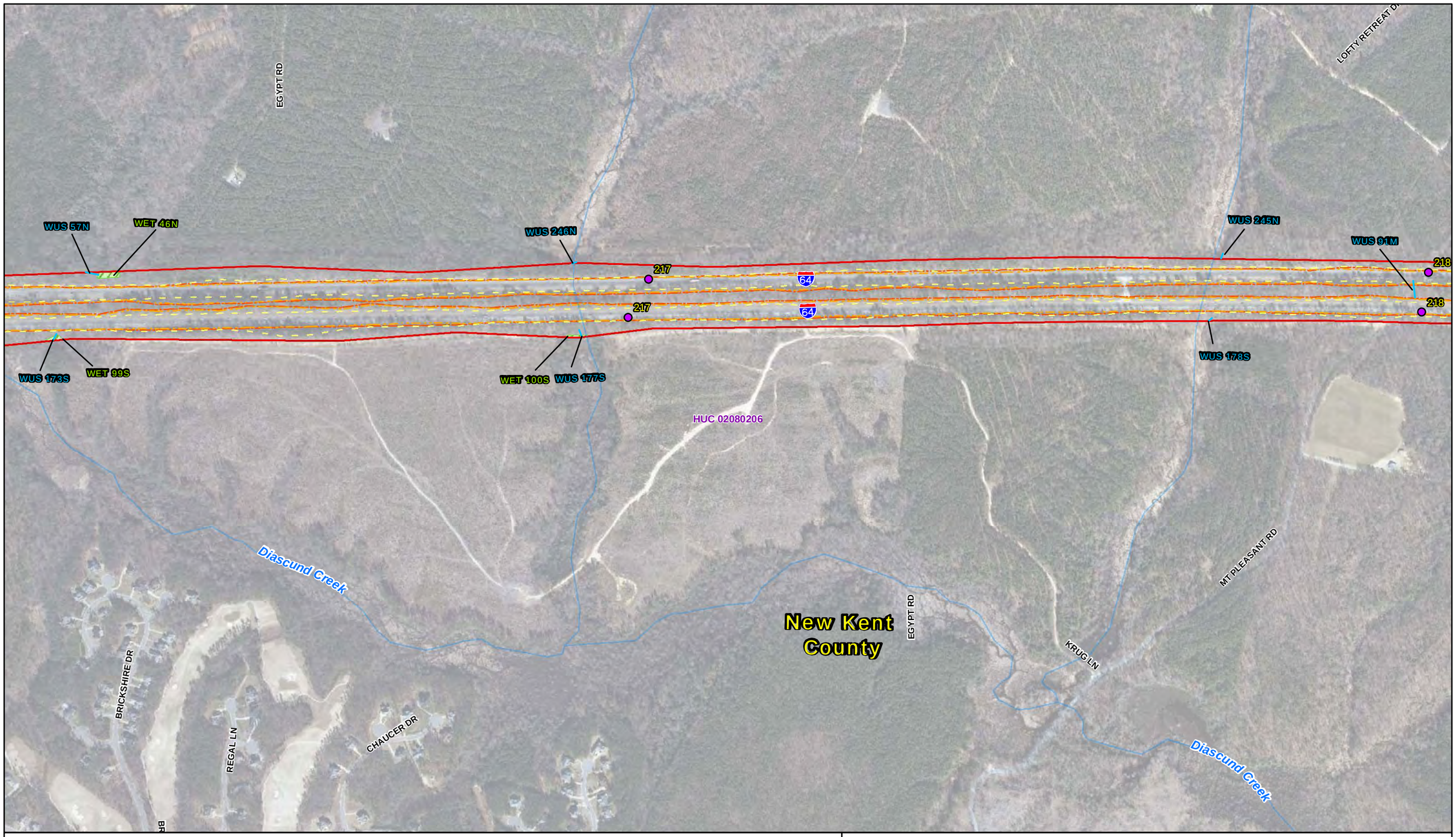
Feet



INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
- 210 Mile Marker
- Existing Right of Way
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Assessed Streams and Waterbodies
- Assessed Wetlands
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 16 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

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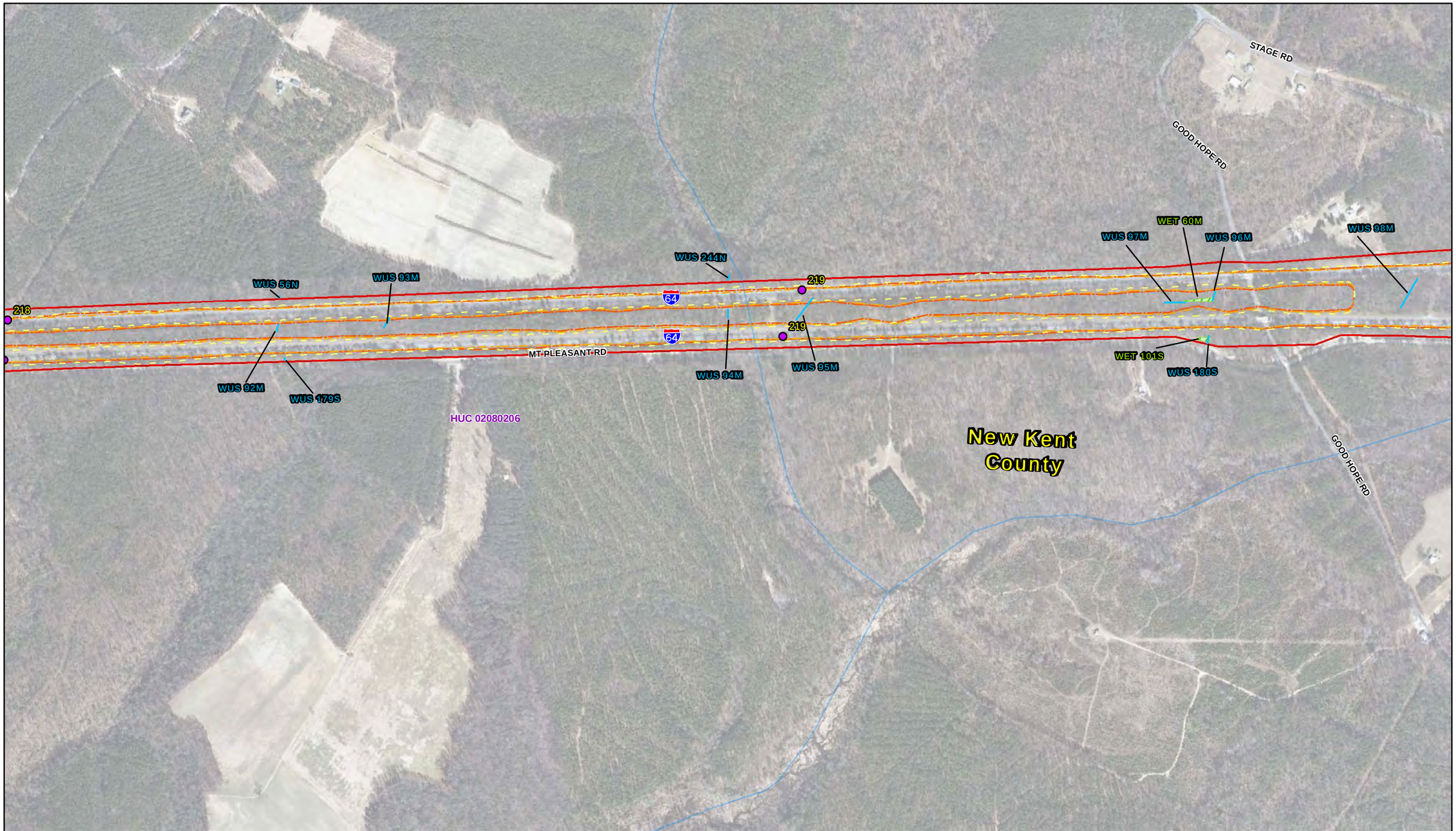

INTERSTATE 64 PENINSULA STUDY

Locality Jurisdiction

210 Mile Marker

Existing Right of Way

Hydrologic Unit Code Boundary

USGS Topoquadrangle Surface Water (Non-Assessed)

Assessed Streams and Waterbodies

Assessed Wetlands

Limits of Alternative 1A/2A Footprint

Limits of Alternative 1B/2B Footprint

Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 17 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

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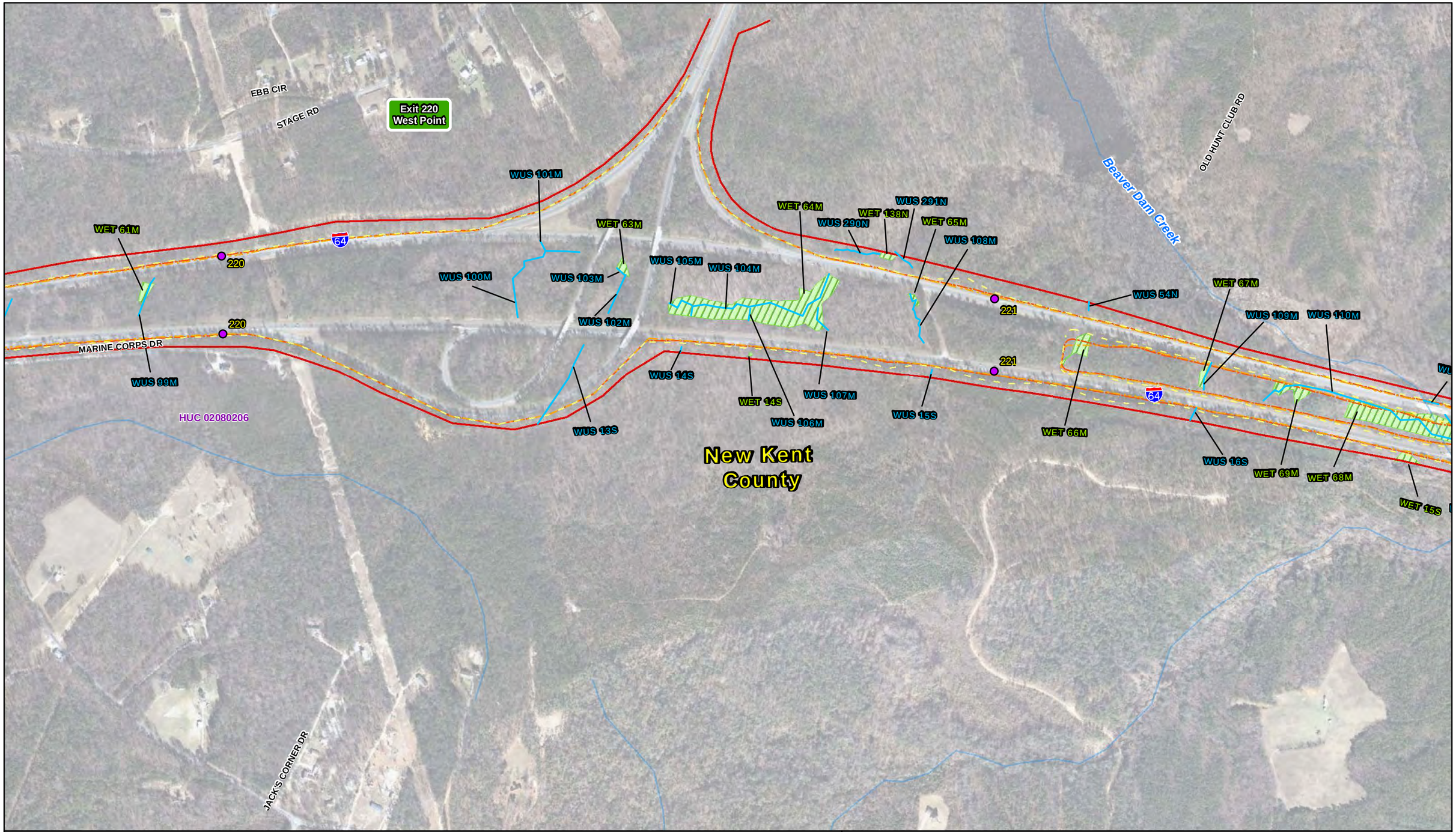
Feet



INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
- 210 Mile Marker
- Existing Right of Way
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Assessed Streams and Waterbodies
- Assessed Wetlands
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 18 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
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VDOT

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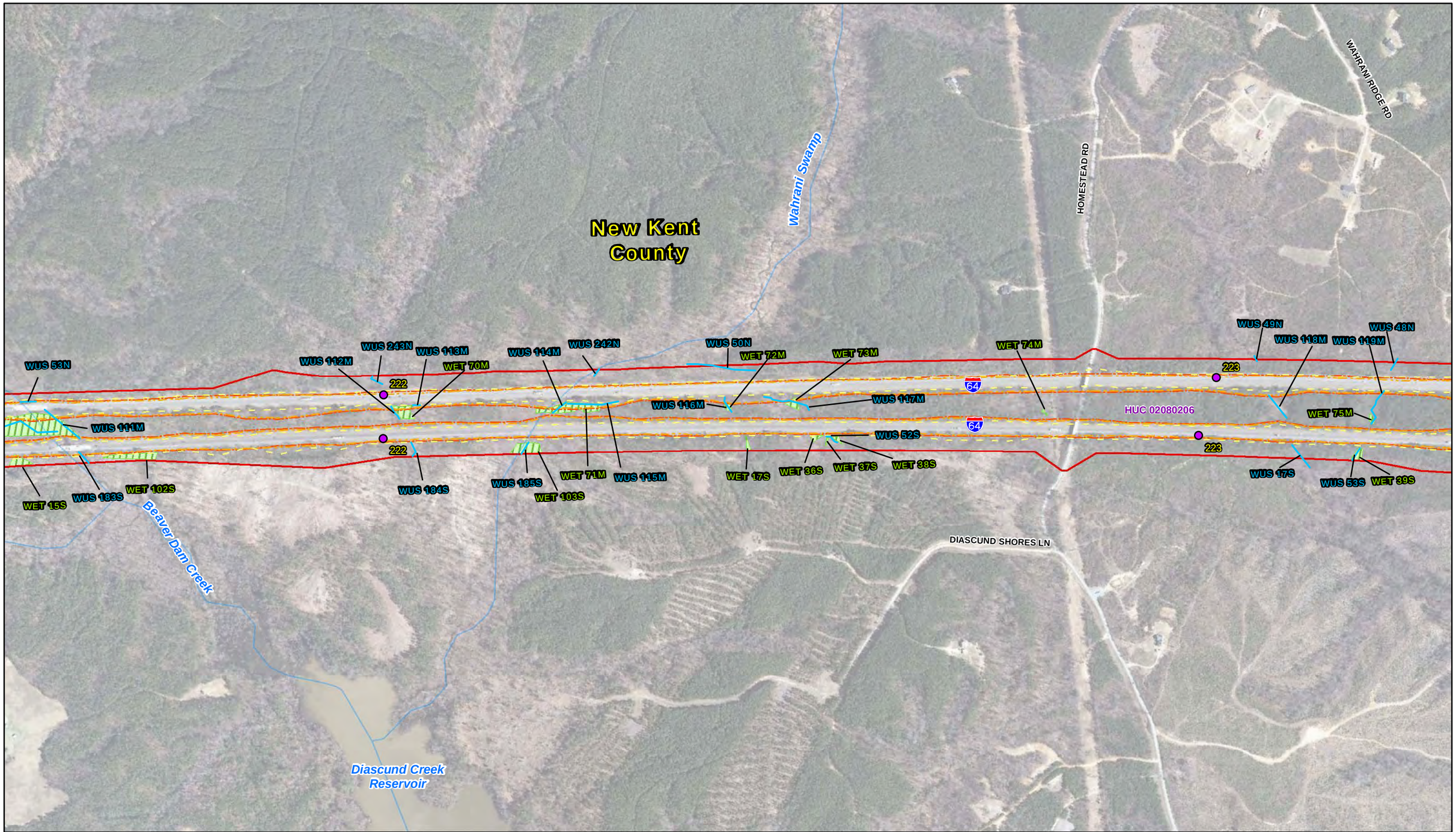
Feet



INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
- 210 Mile Marker
- Existing Right of Way
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
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- Assessed Wetlands
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 19 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

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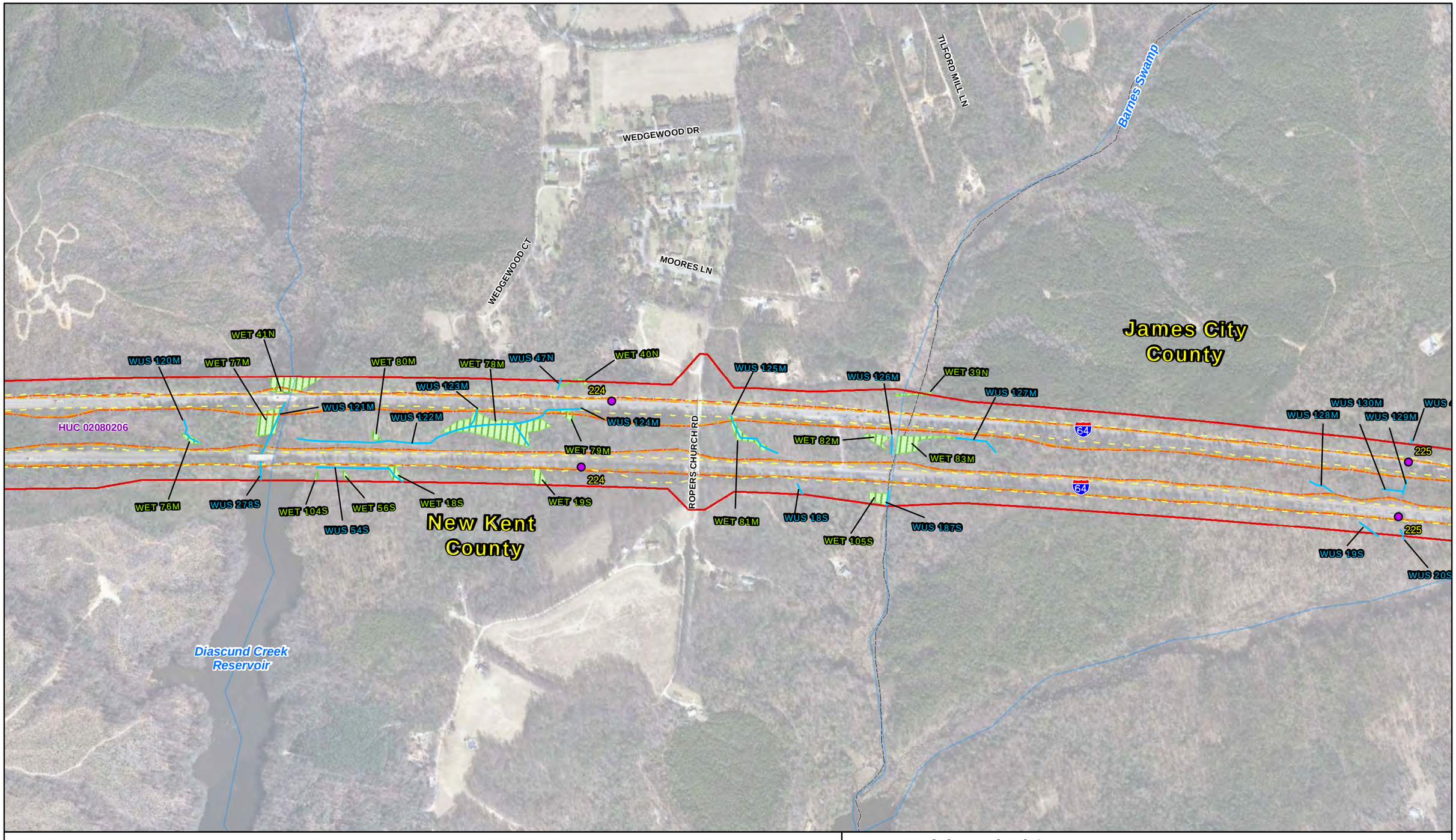

INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
- 210 Mile Marker
- Existing Right of Way
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Assessed Streams and Waterbodies
- Assessed Wetlands
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 20 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
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VDOT

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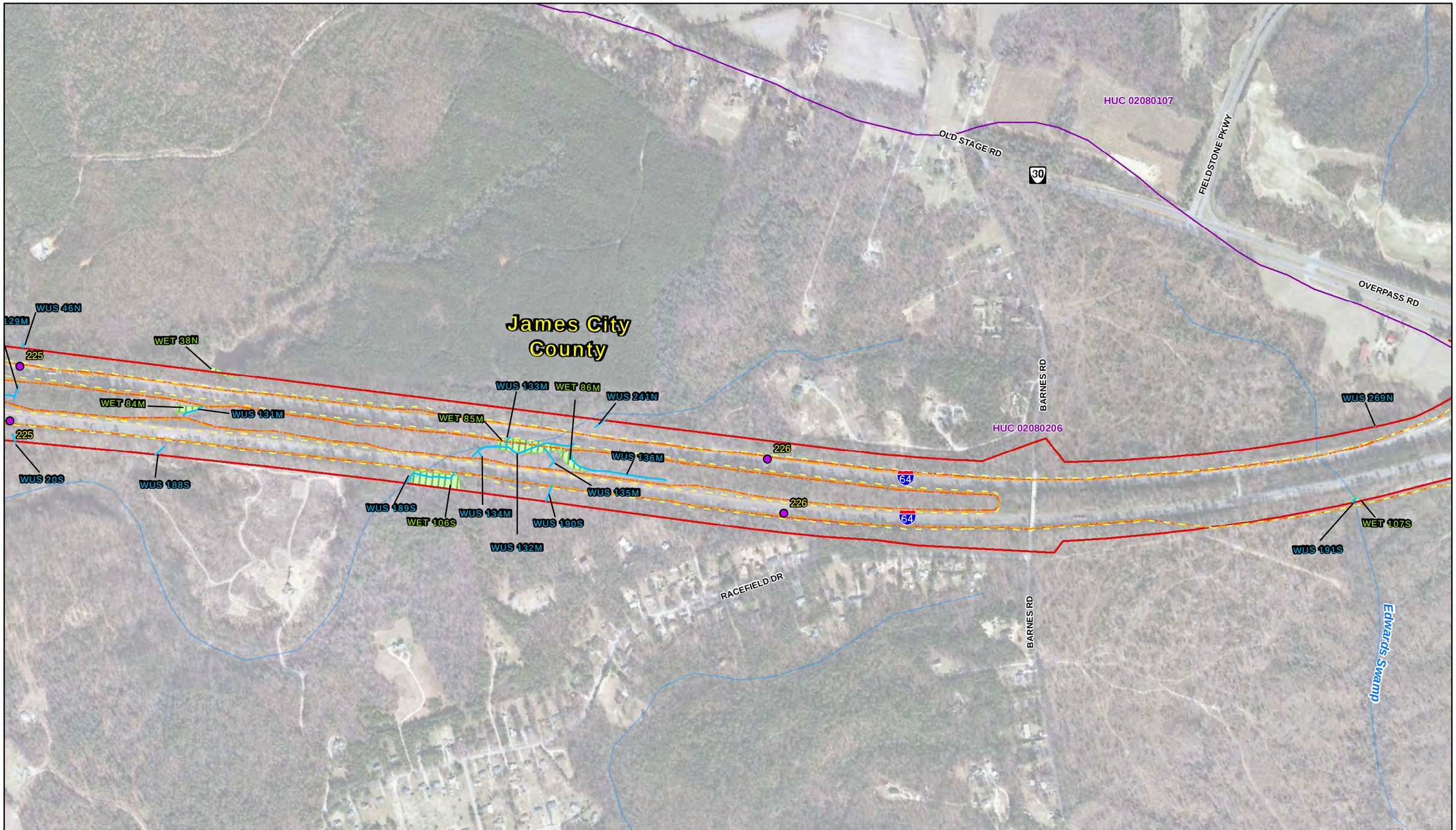

INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
- 210 Mile Marker
- Existing Right of Way
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Assessed Streams and Waterbodies
- Assessed Wetlands
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 21 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

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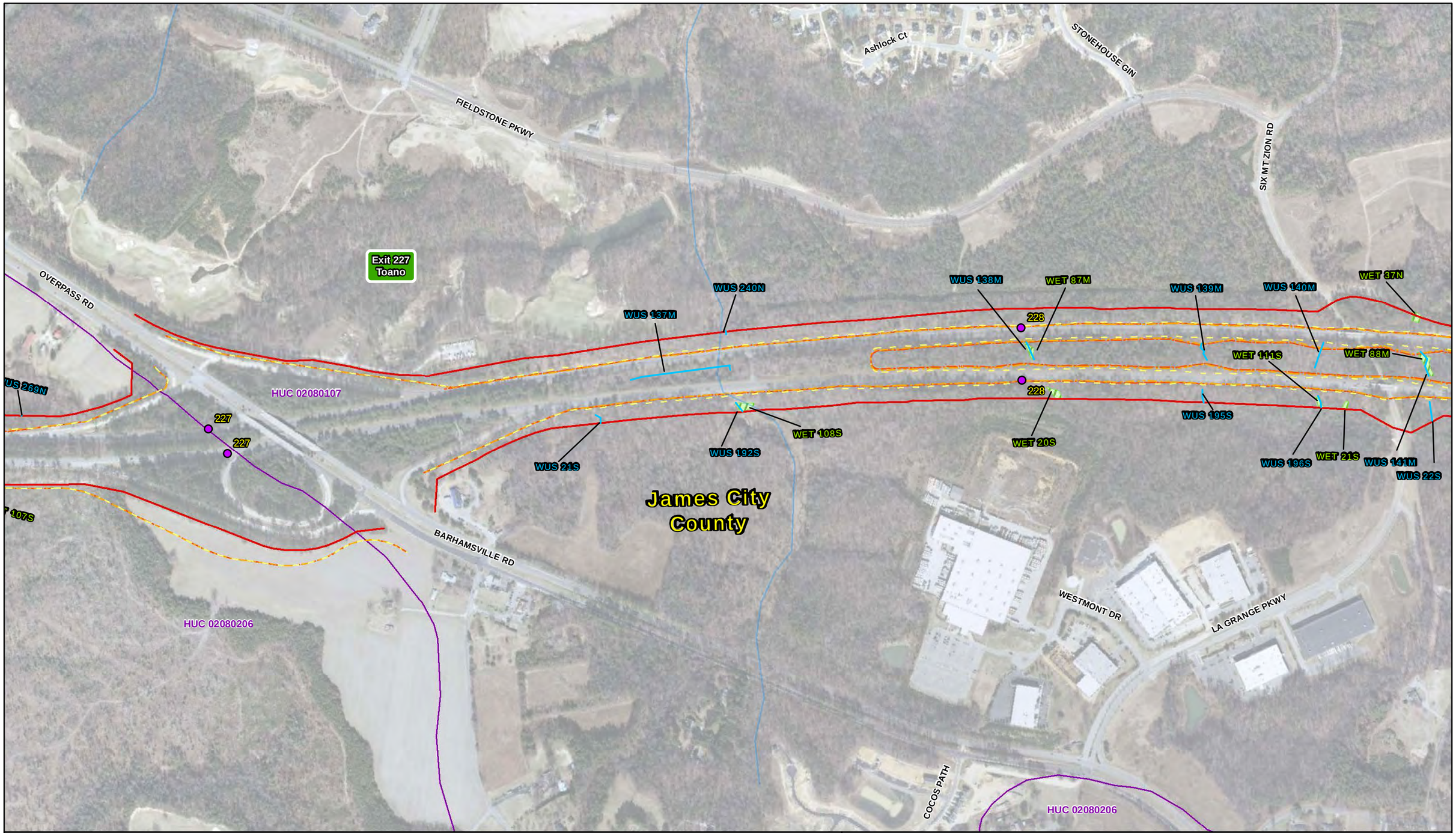

INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
- 210 Mile Marker
- Existing Right of Way
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Assessed Streams and Waterbodies
- Assessed Wetlands
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 22 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
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VDOT

N

0 400 800
Feet

James City County

France Swamp

HUC 02080107

MOUNT LAREL RD

WELSTEAD ST

LOUISE LN

HAZELWOOD AVE

FREDERICK DR

NORMAN DAVIS DR

COLONY MILL RD

JOANNE CT

PINE RIDGE RD

SAND DR W

BARN ELM RD

SAND HILL RD

ROCHAMBEAU DR

ASHINGTON WAY

WUS 43N
WUS 42N
WET 35N
WUS 41N
WET 36N
WUS 142M
WET 91M
WUS 145M
WET 92M
229
WET 90M
WET 89M
WET 22S
WUS 143M
WUS 197S
WUS 144M
WUS 23S
WET 23S
141M
WUS 22S
WUS 146M
WUS 147M
WET 93M
WUS 56S
WET 41S
WUS 198S
WET 24S
WUS 148M
WET 94M
230
WET 25S
WUS 239N
WUS 40N
WUS 39N
WET 34N
WET 33N
WUS 38N
WET 32N
WET 31N
WUS 150M
WET 95M
WUS 149M
WUS 24S
WUS 199S
WET 112S
230
30

64

INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
- 210 Mile Marker
- Existing Right of Way
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Assessed Streams and Waterbodies
- Assessed Wetlands
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 23 of 43

Notes:
Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

0 400 800
Feet

INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
- 210 Mile Marker
- Existing Right of Way
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Assessed Streams and Waterbodies
- Assessed Wetlands
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 24 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

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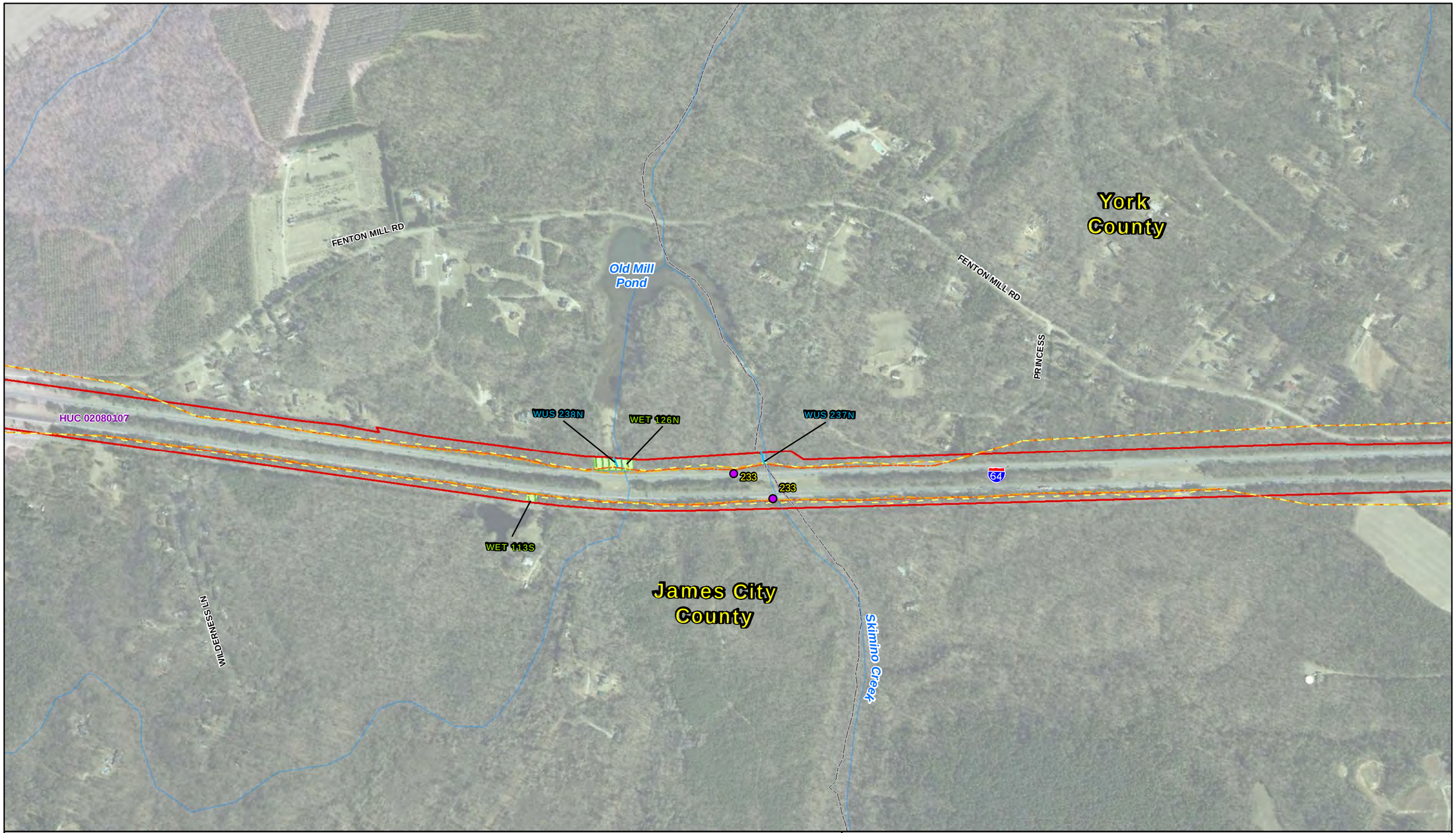

INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
- 210 Mile Marker
- Existing Right of Way
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Assessed Streams and Waterbodies
- Assessed Wetlands
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 25 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet

INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
- 210 Mile Marker
- Existing Right of Way
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Assessed Streams and Waterbodies
- Assessed Wetlands
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 26 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

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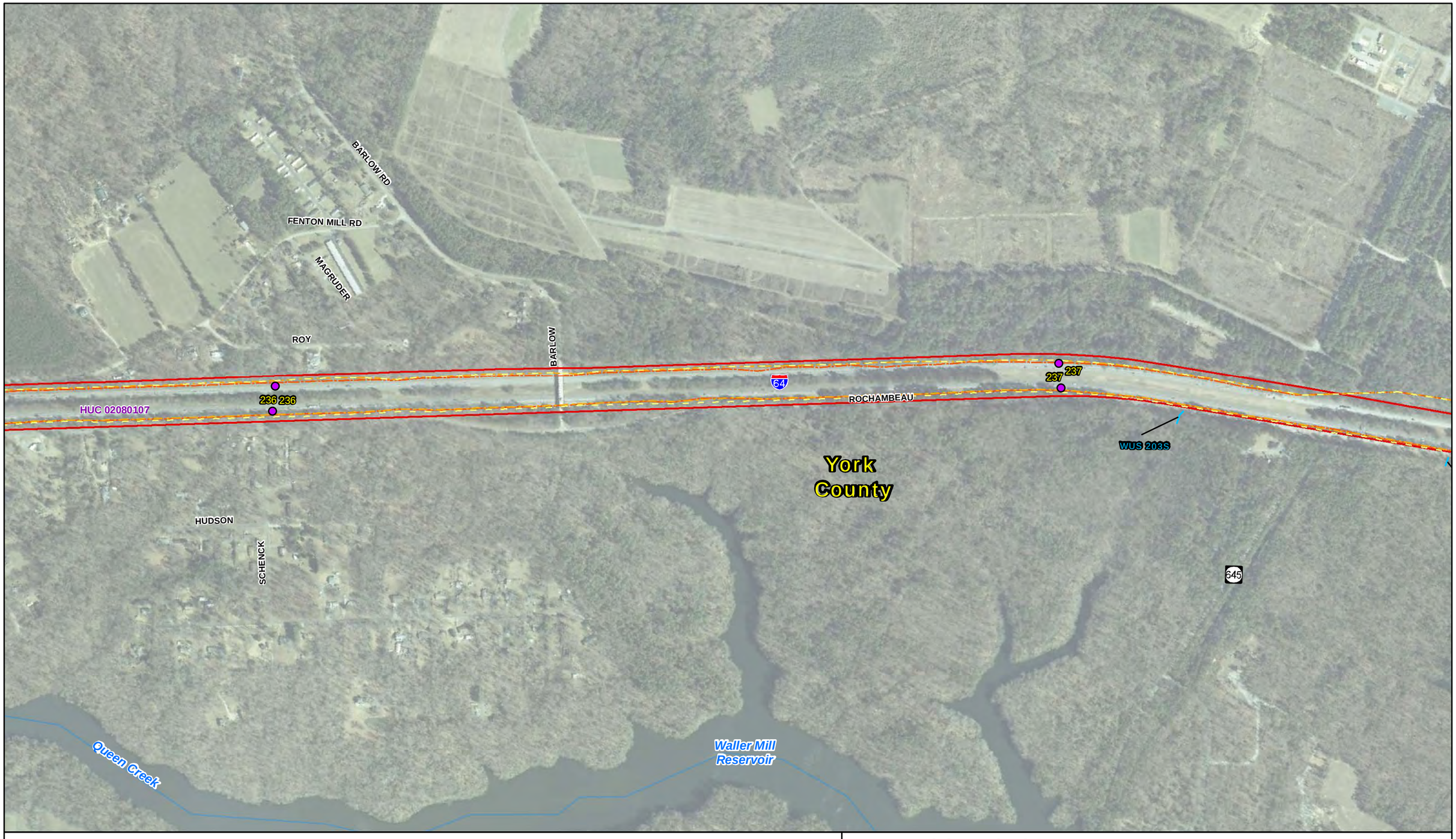

INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
- 210 Mile Marker
- Existing Right of Way
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Assessed Streams and Waterbodies
- Assessed Wetlands
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 27 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

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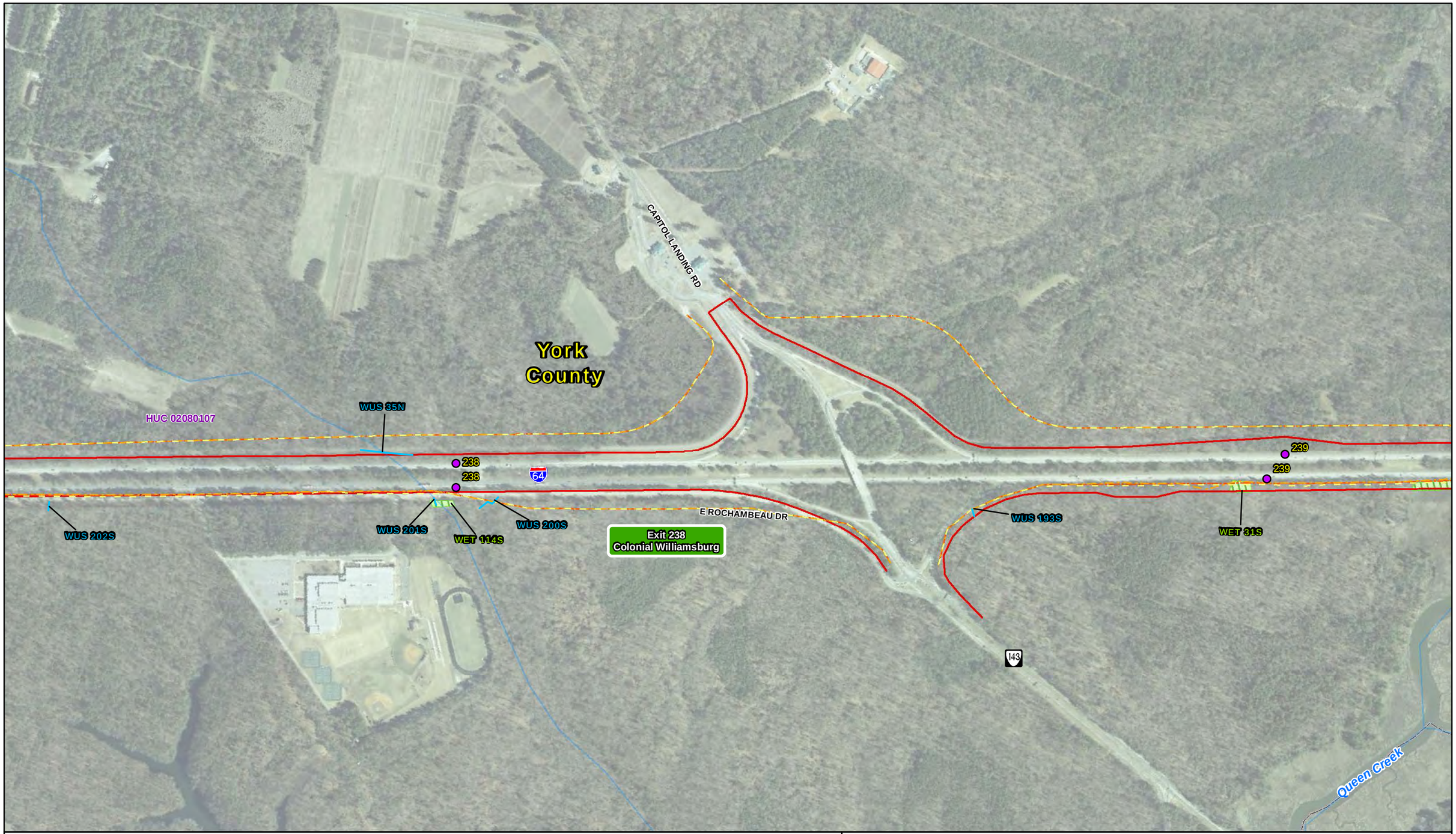
Feet



INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
- 210 Mile Marker
- Existing Right of Way
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Assessed Streams and Waterbodies
- Assessed Wetlands
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 28 of 43

Notes:
Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

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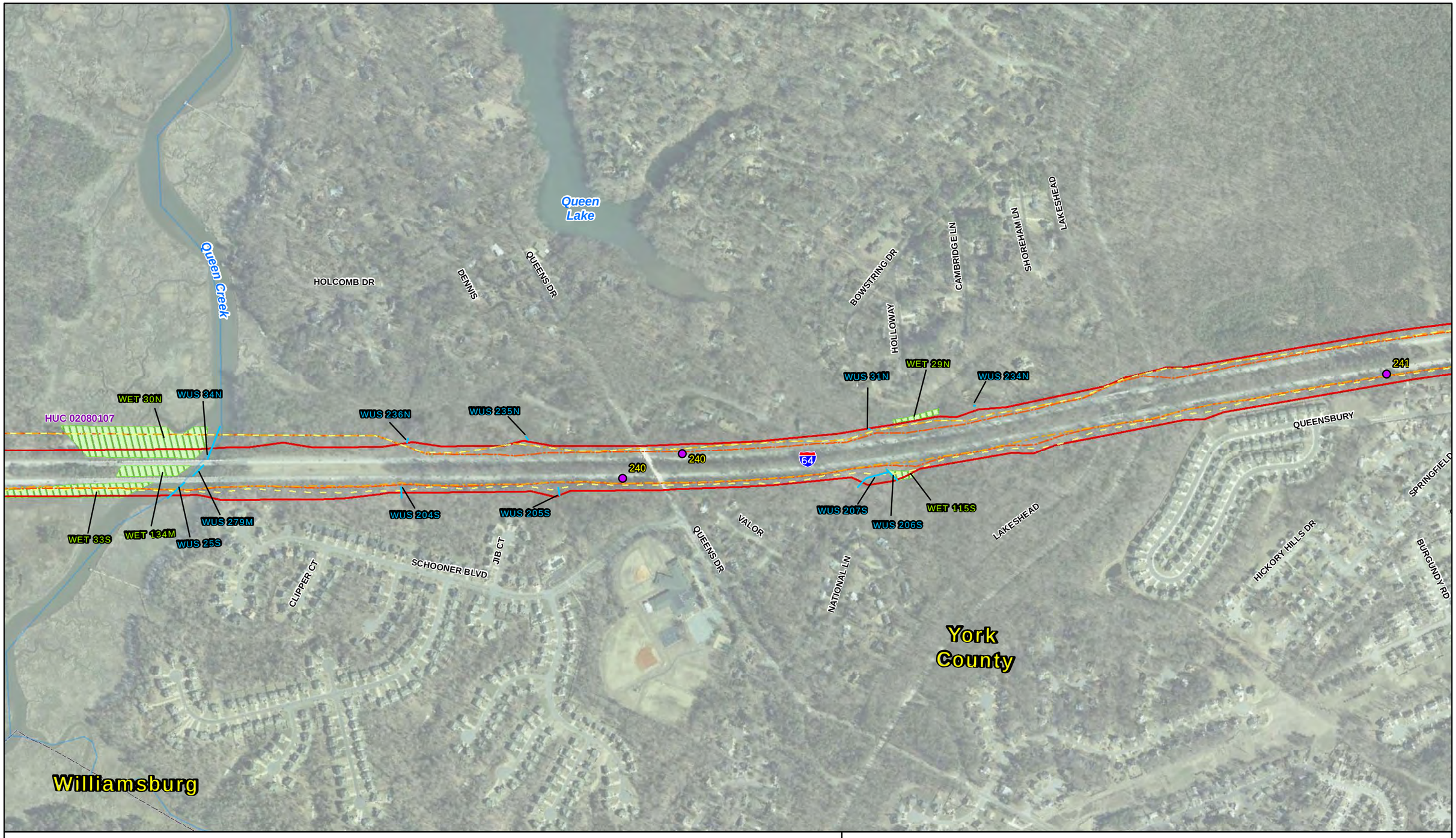

INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
- 210 Mile Marker
- Existing Right of Way
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Assessed Streams and Waterbodies
- Assessed Wetlands
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 29 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
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VDOT

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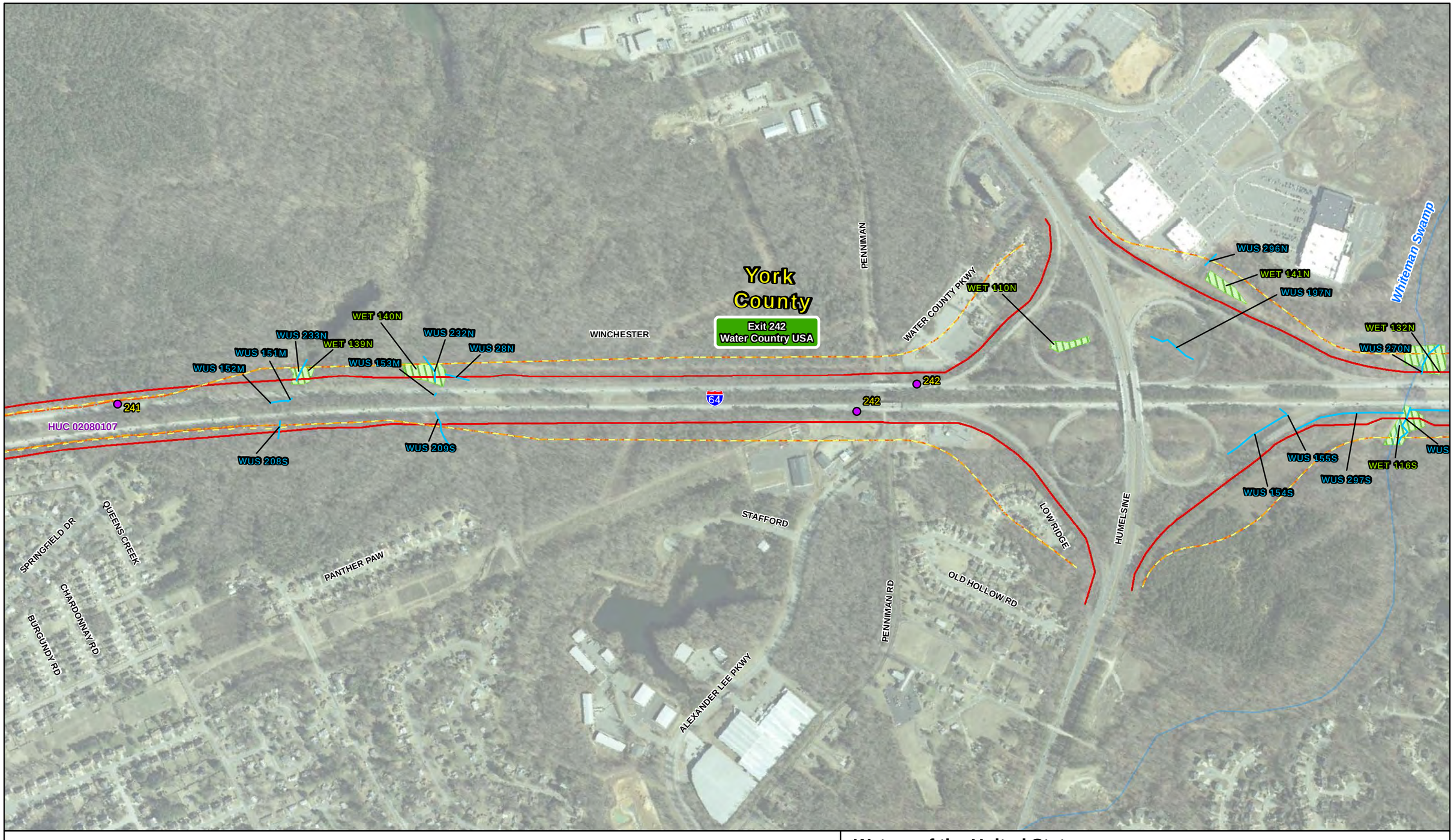
Feet



INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
- 210 Mile Marker
- Existing Right of Way
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Assessed Streams and Waterbodies
- Assessed Wetlands
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 30 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
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VDOT

N

0 400 800
Feet

King Creek

Exit 243
Busch Gardens

WUS 27N

WET 27N

WUS 298N

WUS 27N

York
County

CHEESECAKE RD

BURMA

244

244

HUC 02080107

243

64

243

WUS 210S

WUS 26S

WET 142S

WUS 299S

SERPENTINE

MERRIMAC TRL

HUC 02080206

ROLLING HILLS

James City
County

BUSCH GARDENS BLVD

INTERSTATE 64 PENINSULA STUDY

Locality Jurisdiction

210 Mile Marker

Existing Right of Way

Hydrologic Unit Code Boundary

USGS Topoquadrangle Surface Water (Non-Assessed)

Assessed Streams and Waterbodies

Assessed Wetlands

Limits of Alternative 1A/2A Footprint

Limits of Alternative 1B/2B Footprint

Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 31 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

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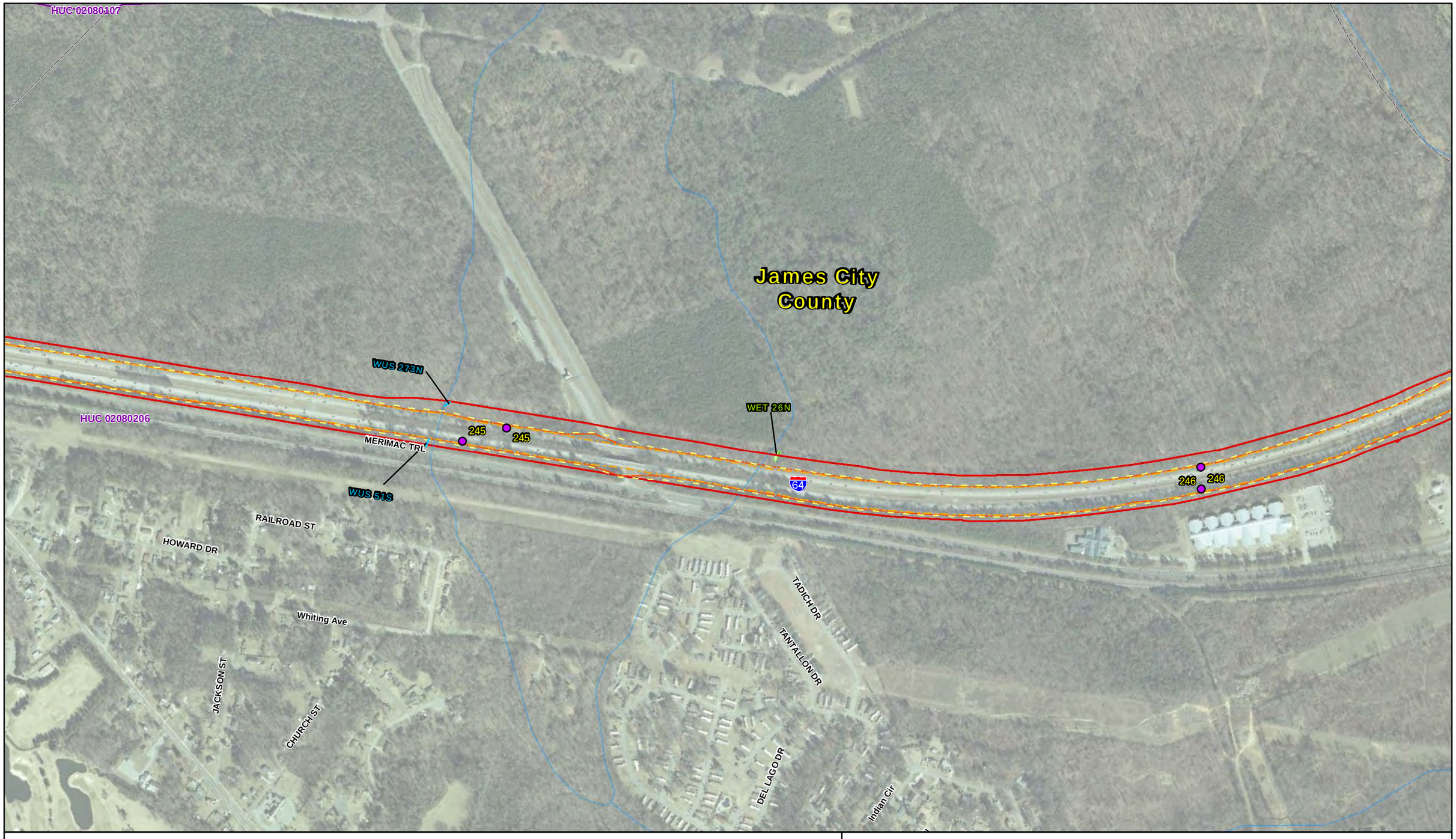

INTERSTATE 64 PENINSULA STUDY

Locality Jurisdiction

210 Mile Marker

Existing Right of Way

Hydrologic Unit Code Boundary

USGS Topoquadrangle Surface Water (Non-Assessed)

Assessed Streams and Waterbodies

Assessed Wetlands

Limits of Alternative 1A/2A Footprint

Limits of Alternative 1B/2B Footprint

Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 32 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

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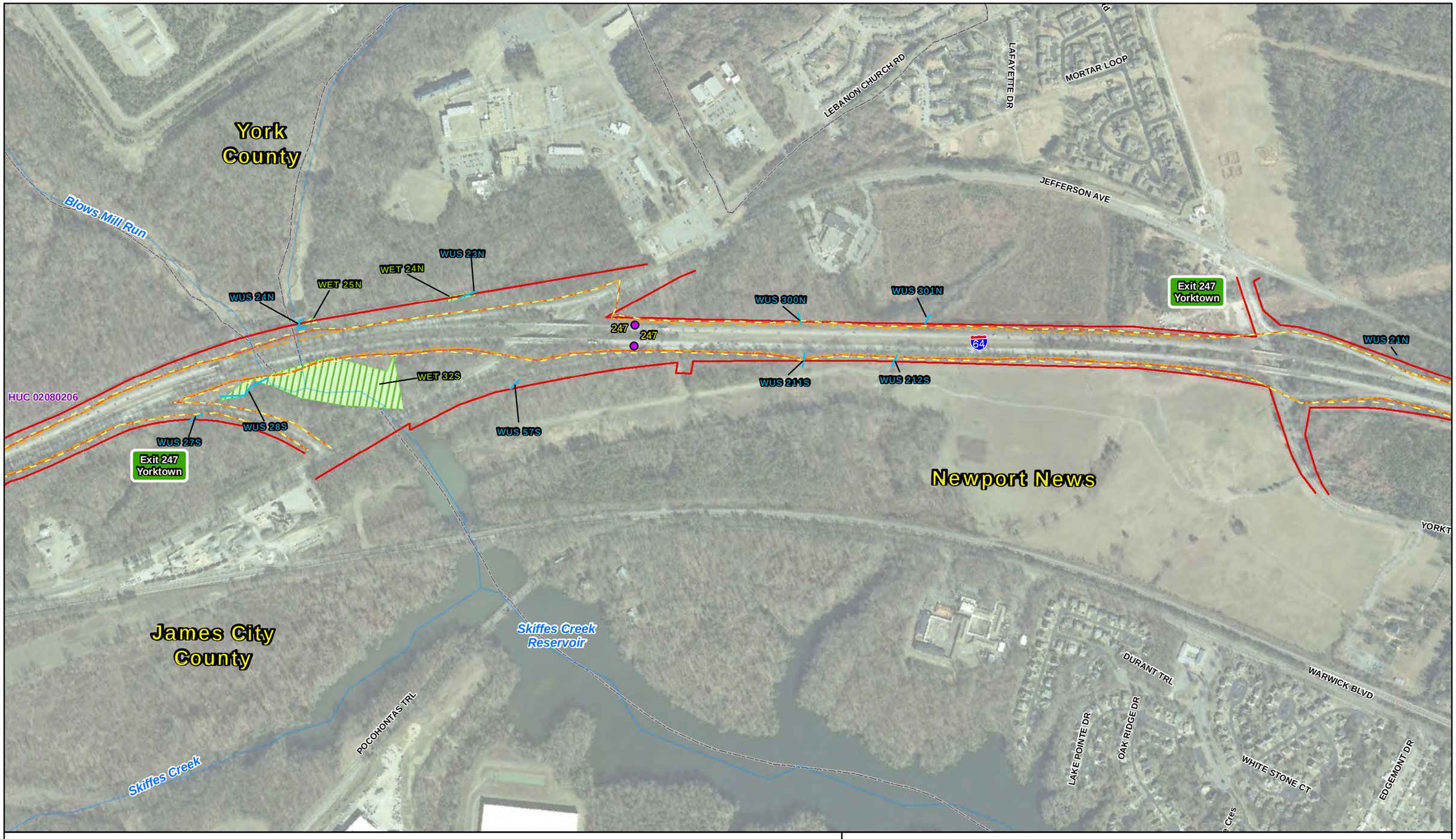
Feet



INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
- 210 Mile Marker
- Existing Right of Way
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Assessed Streams and Waterbodies
- Assessed Wetlands
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 33 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

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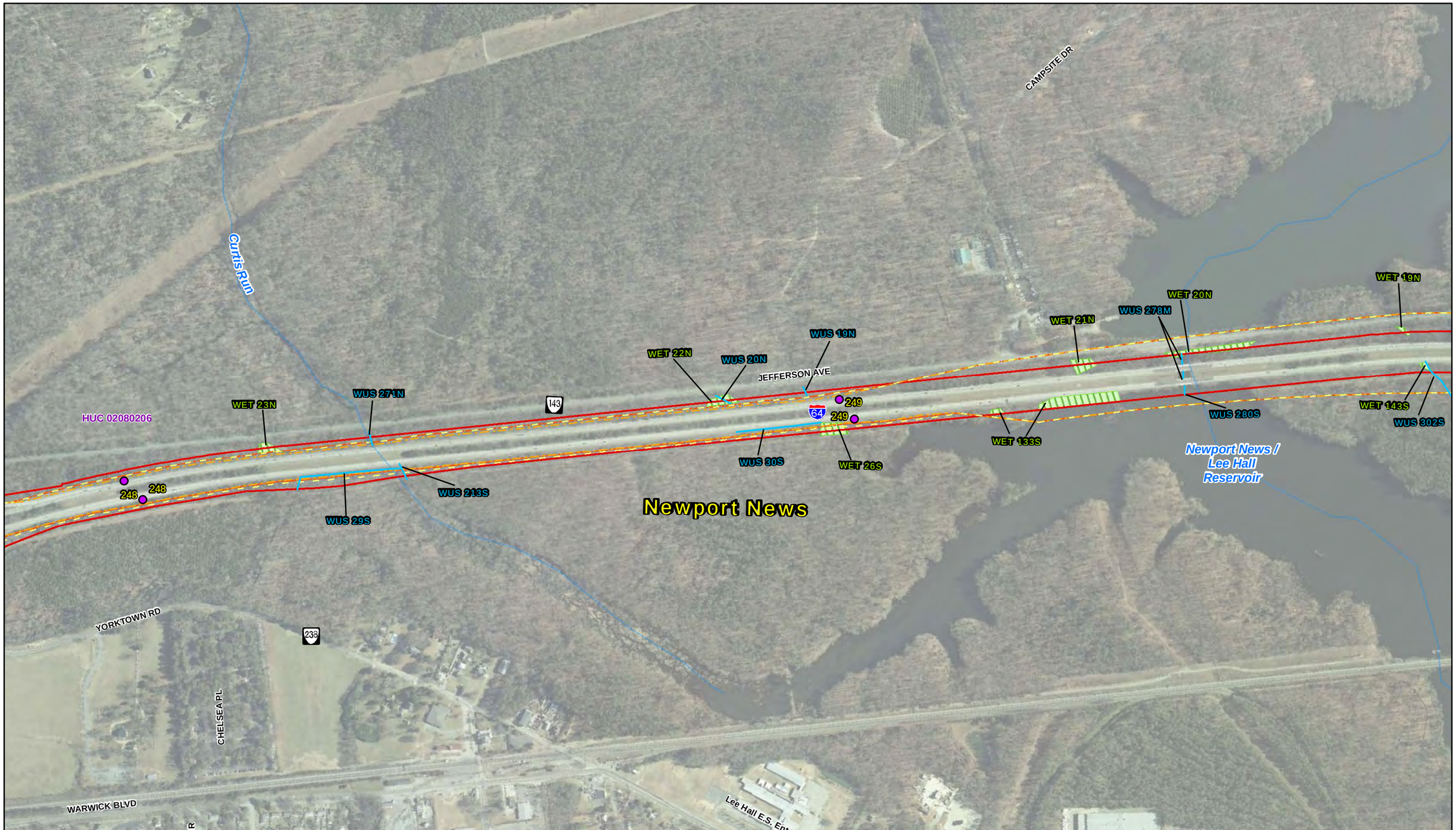
Feet



INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
- 210 Mile Marker
- Existing Right of Way
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Assessed Streams and Waterbodies
- Assessed Wetlands
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 34 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
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VDOT

0 400 800
Feet

INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
- 210 Mile Marker
- Existing Right of Way
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Assessed Streams and Waterbodies
- Assessed Wetlands
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 35 of 43

Notes:
Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

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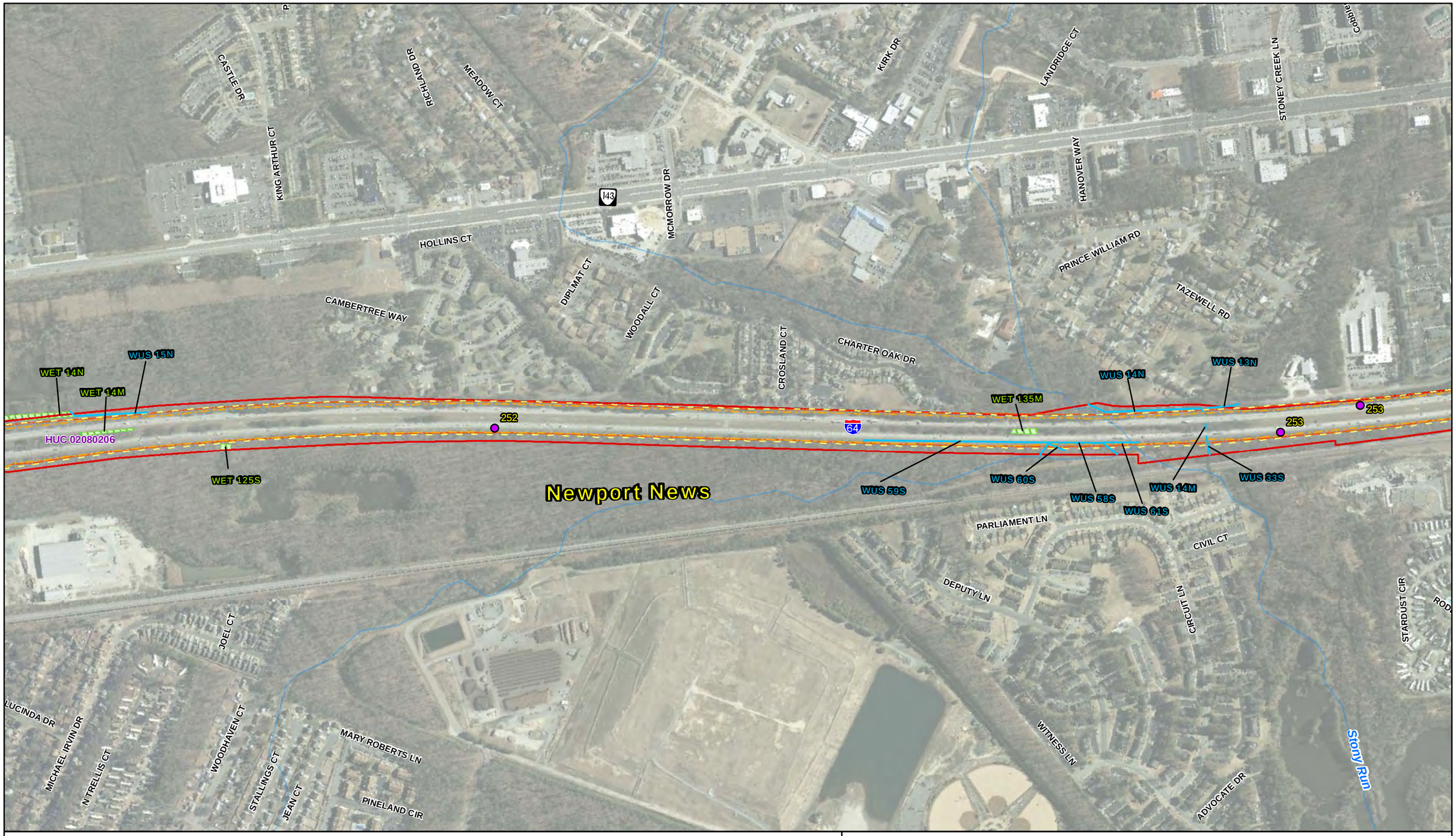
Feet



INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
- 210 Mile Marker
- Existing Right of Way
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Assessed Streams and Waterbodies
- Assessed Wetlands
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 36 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

0 400 800
Feet

INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
- 210 Mile Marker
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- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Assessed Streams and Waterbodies
- Assessed Wetlands
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 37 of 43

Notes:
Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

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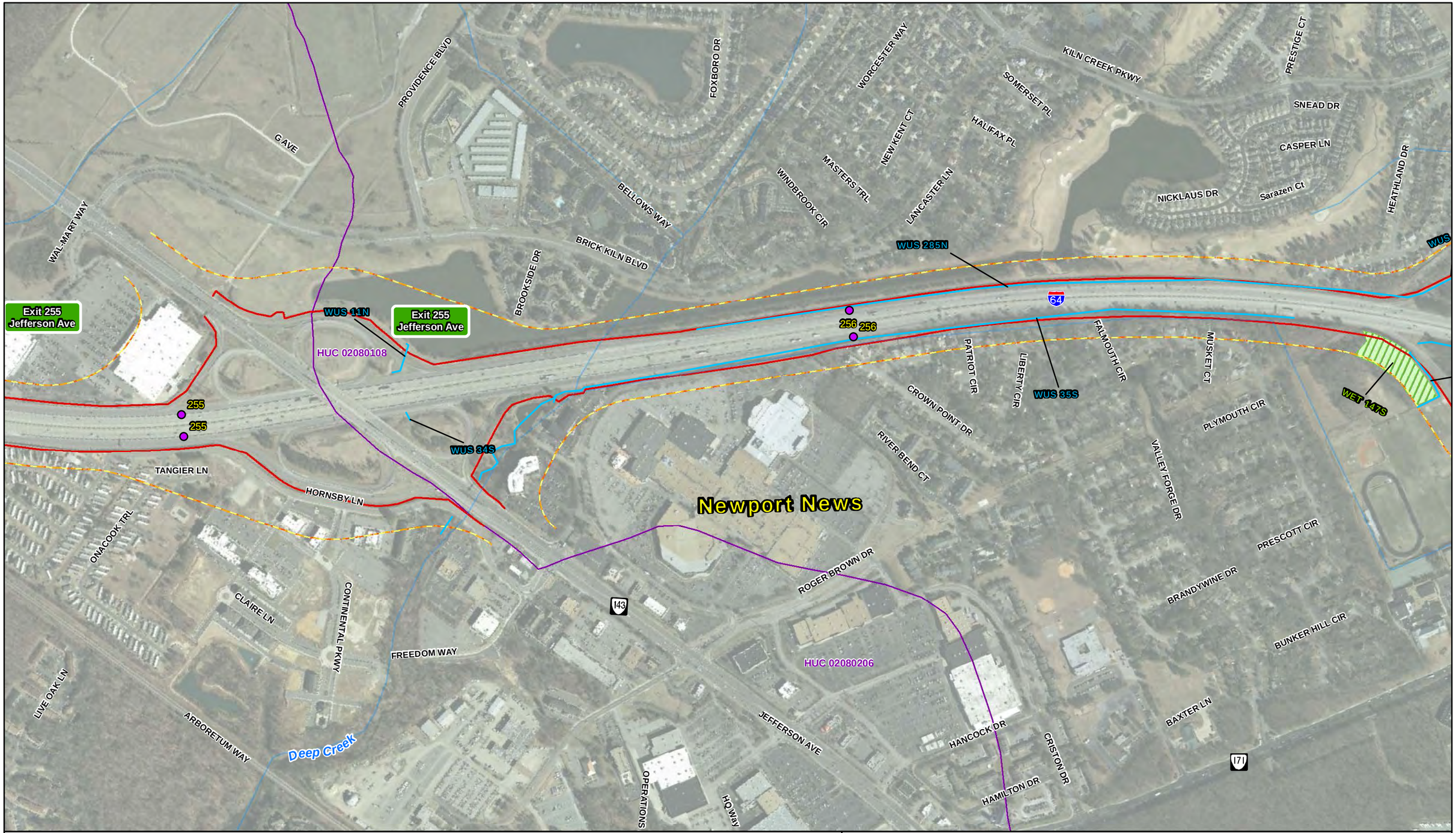
Feet



INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
- 210 Mile Marker
- Existing Right of Way
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
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- Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 38 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
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VDOT

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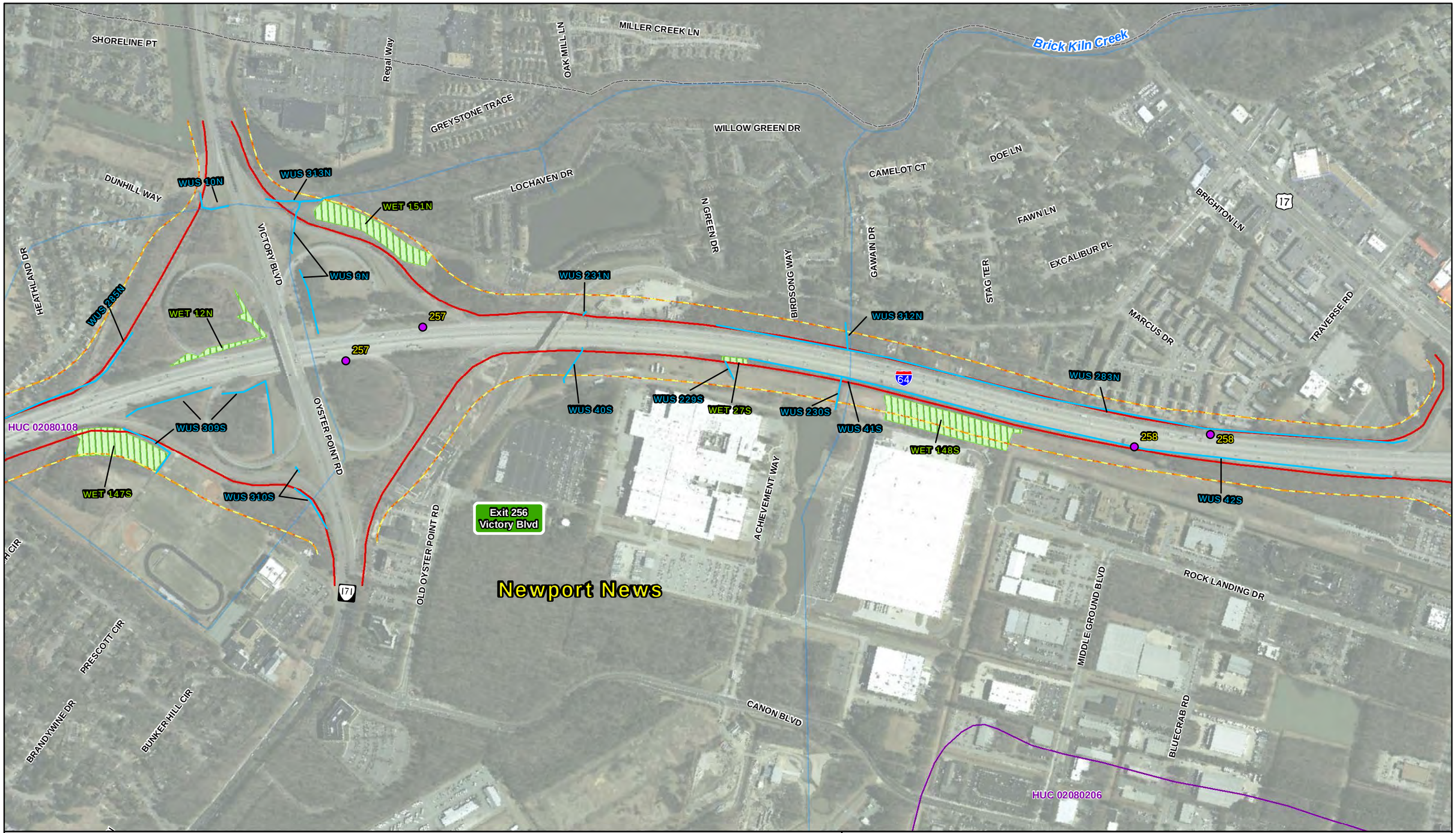
0 400 800
Feet



INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
- 210 Mile Marker
- Existing Right of Way
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
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- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 39 of 43

Notes:
Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

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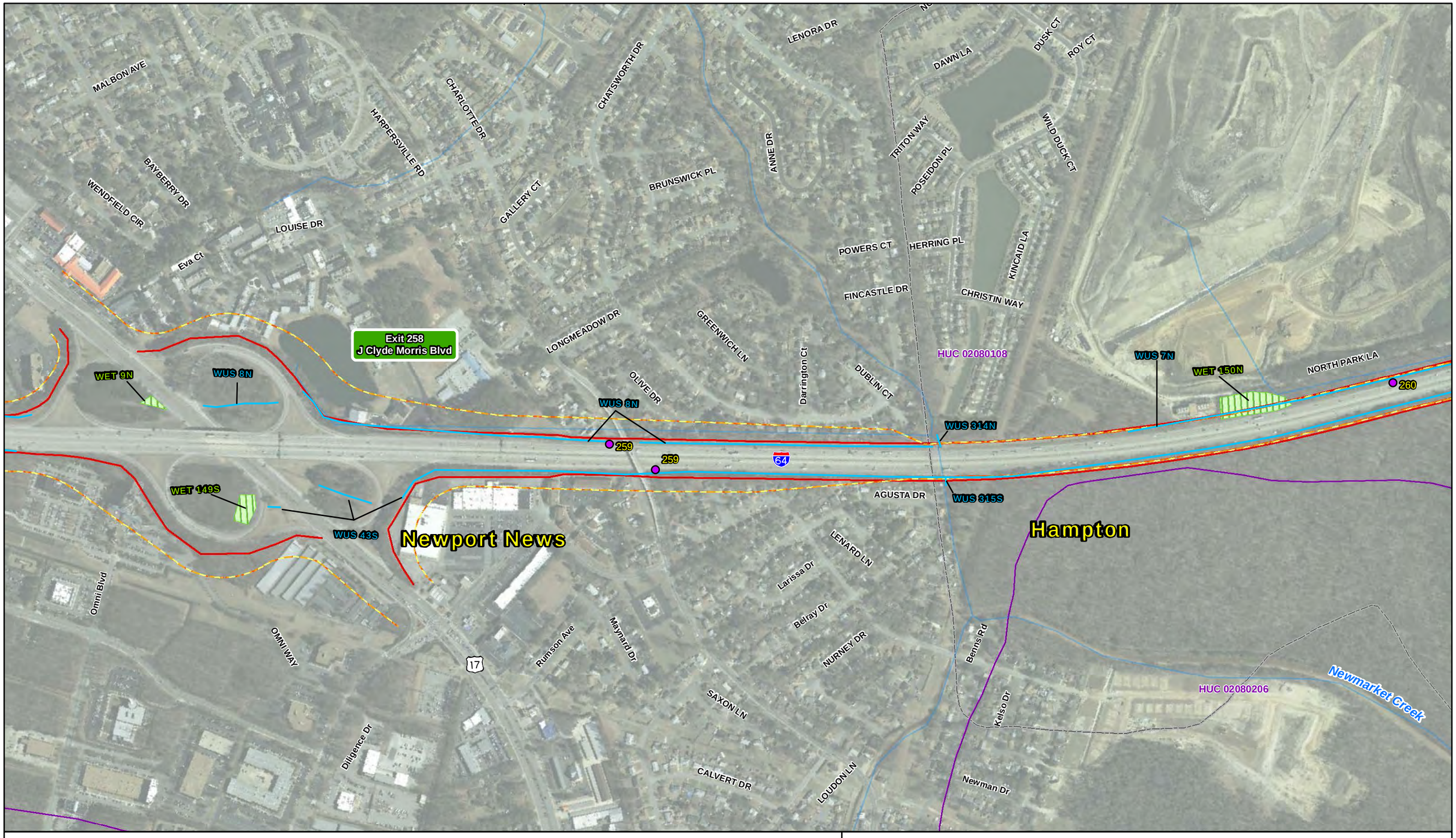
Feet



INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
- 210 Mile Marker
- Existing Right of Way
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Assessed Streams and Waterbodies
- Assessed Wetlands
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 40 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
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VDOT

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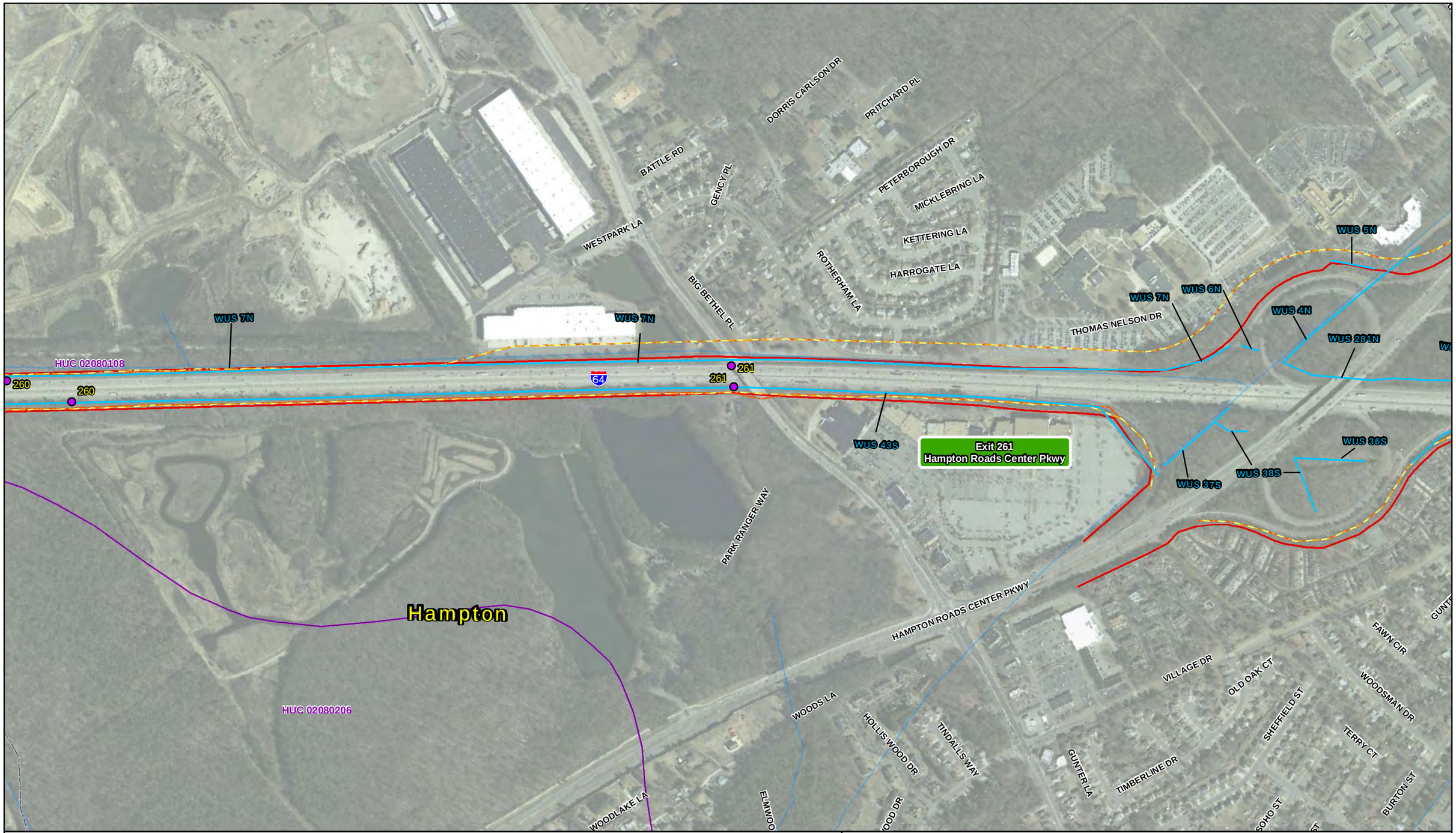
Feet



INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
- 210 Mile Marker
- Existing Right of Way
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Assessed Streams and Waterbodies
- Assessed Wetlands
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 41 of 43

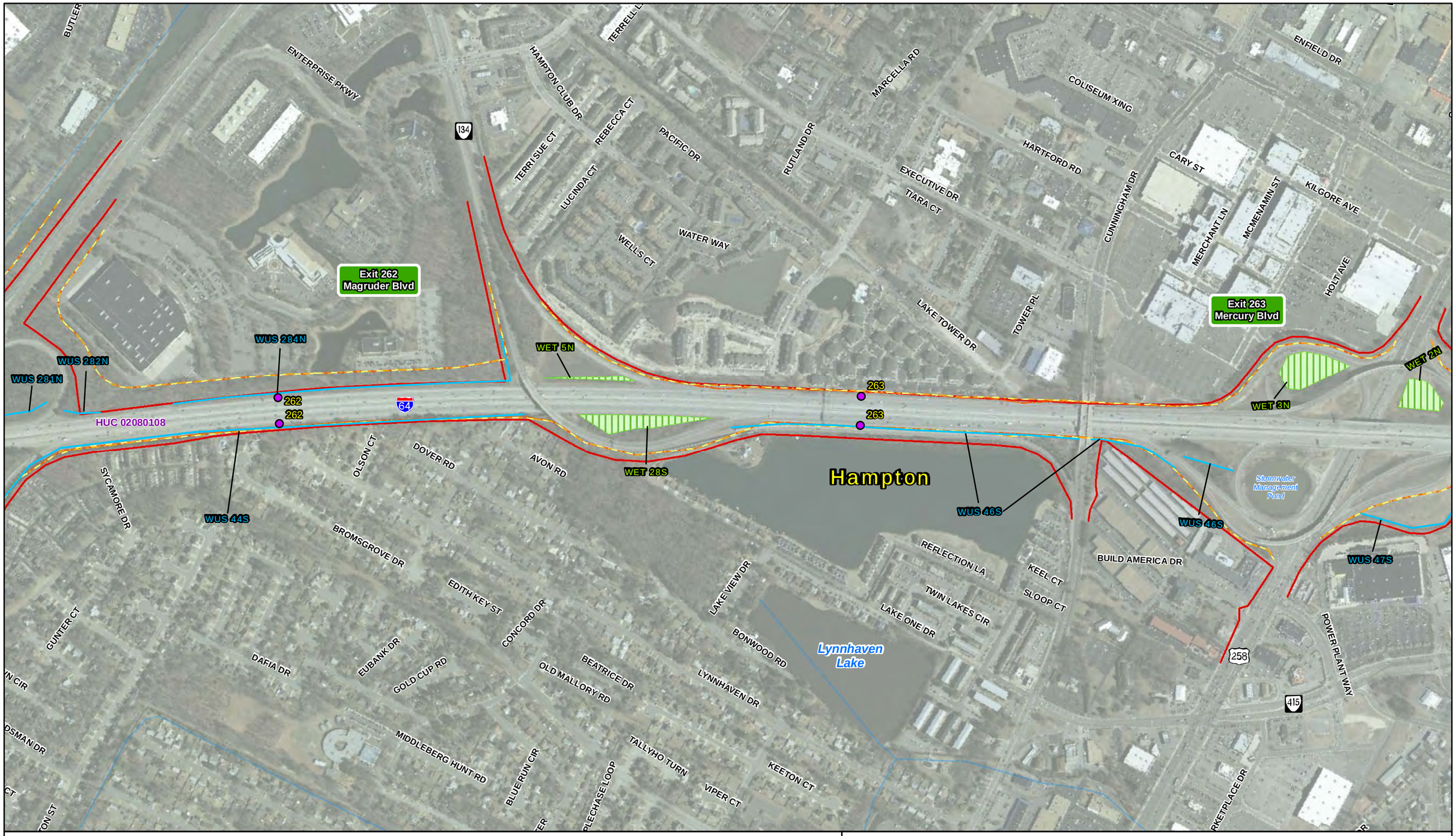
Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet



INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
- 210 Mile Marker
- Existing Right of Way
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Assessed Streams and Waterbodies
- Assessed Wetlands
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 42 of 43

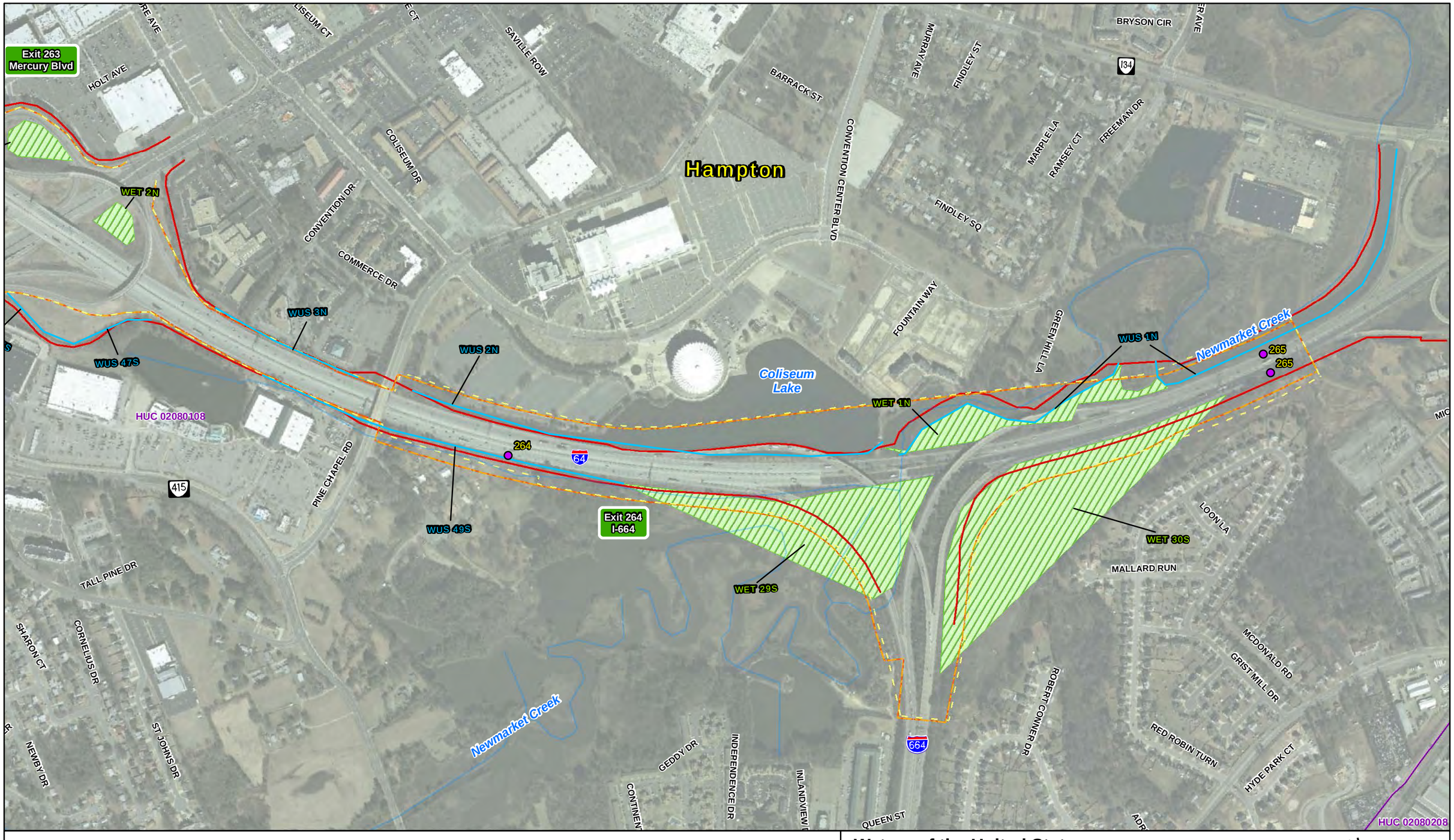
Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet



INTERSTATE 64 PENINSULA STUDY

- Locality Jurisdiction
- 210 Mile Marker
- Existing Right of Way
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Assessed Streams and Waterbodies
- Assessed Wetlands
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Waters of the United States Including Wetlands

Map 43 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet

INTERSTATE 64 PENINSULA STUDY

APPENDIX D

Wetland Data Sheets and USM Forms

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula Study	Date:	6/27/2011
Applicant/Owner:	VDOT	County:	Hampton
Investigator:	Doucette / Bode	State:	Virginia
Community ID:	PSS	Transect ID:	Plot ID: WET2N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Common Reed	*Phragmittes australis*	H	FACW
2.	Soft Rush	*Juncus effusus*	H	FACW+
3.	Black Willow	*Salix nigra*	S	FACW+
4.	Goldenrod	*Solidago sp.*	H	OBL
5.	Eastern Baccrus	*Baccharis halimifolia*	S	FACW
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 67-83%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: N/A (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 10 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PSS Transect ID: _____ Plot ID: WET2N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____
Field Observations Confirm Mapped Type? Yes _____ No _____
Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-6		10YR 4/1			Clay Loam
6-8		10YK 3/2			Sandy Loam
8-18		10 YR 4/1			Clay Loam

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No _____	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No _____	
Hydric Soils Present?	Yes X	No _____	Yes X No _____

Remarks: Pic N1584

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula Study	Date:	6/27/2011
Applicant/Owner:	VDOT	County:	Hampton
Investigator:	Bode / Sprenkle	State:	Virginia
Community ID:	PEM	Transect ID:	
Plot ID:	WET3N		

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Broadleaf Cattail	*Typha latifolia*	H	OBL
2.	Soft Rush	*Juncus effusus*	H	FACW+
3.	Canadian Rush	*Juncus canadensis*	H	OBL
4.	Eastern Baccharis	*Baccharis halimifolia*	S	FACW
5.	Blunt Spikerush	*Eleocharis obtusa*	H	OBL
6.	Pennsylvania Smartweed	*Polygonum pensylvanicum*	H	FACW
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks: Photo 15A1 East

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: N/A (in.)
- Depth to Free Water in Pit: 13 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- Water-Stained Leaves
- Local Soil Survey Data
- X FAC-Neutral Test
- Other (Explain in Remarks)

Remarks: 85% of wetland is inundated. Data point at edge.

Community ID: PEM Transect ID: _____ Plot ID: WET3N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____
Field Observations Confirm Mapped Type? Yes _____ No _____
Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-9		10YR 4/1	10YR 5/8	Few / Prominent	Clay Loam
9-12		10YR 3/1			Clay Loam
12-18		10YR 6/1	2.5Y 6/6	Few / Prominent.	Loamy Sand

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No _____	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No _____	
Hydric Soils Present?	Yes X	No _____	Yes X No _____

Remarks: Pic 1591

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula Study	Date:	6/27/2011
Applicant/Owner:	VDOT	County:	Hampton
Investigator:	Bode / Doucette	State:	Virginia
Community ID:	PEM	Transect ID:	Plot ID: WET5N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Black Willow	*Salix nigra*	H	FACW+
2.	Broadleaf Cattail	*Typha latifolia*	H	OBL
3.	Common Rush	*Juncus effusus*	H	FACW+
4.	Eastern baccharis	*Baccharis halimifolia*	H	FACW
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: N/A (in.)
- Depth to Free Water in Pit: >18 (in.)
- Depth to Saturated Soil: 6 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: Wetland contains impounded area, appears to be borrow pit for road.

Community ID: PEM Transect ID: _____ Plot ID: WET5N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____

Field Observations Confirm Mapped Type? Yes _____ No _____

Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-3		10YR 4/1			Loamy Sand
3-9		10YR 2/1			Sandy Clay
9-18		10YR 4/2			Loamy Sand

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No _____	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No _____	
Hydric Soils Present?	Yes X	No _____	Yes X No _____

Remarks: Photo 1594

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula Study	Date:	6/28/2011
Applicant/Owner:	VDOT	County:	Newport News
Investigator:	Bode / Doucette	State:	Virginia

Community ID: PEM Transect ID: Plot ID: WET9N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Blunt Spikerush	*Eleocharis obtusa*	H	OBL
2.	Deer Tongue	*Dichanthelium clandestinum*	H	FAC+
3.	Gray's Sedge	*Carex grayi*	H	FACW+
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: 1 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- X FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PEM Transect ID: _____ Plot ID: WET9N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____
Field Observations Confirm Mapped Type? Yes _____ No _____
Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-3		2.5Y 3/1			Loam
3-6		2.5Y 4/1			Clay loam
6-18		2.5Y 4/1	10YR 5/8	Common/Prominent	Clay loam

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes	X	No	
Hydric Soils Present?	Yes	X	No	Yes X No _____

Remarks: Photo 1613

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula Study	Date:	6/29/2011
Applicant/Owner:	VDOT	County:	Newport News
Investigator:	Bode / Doucette	State:	Virginia

Community ID: PEM Transect ID: Plot ID: WET12N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Common Rush	*Juncus effusus*	H	FACW+
2.	Deer Tongue	*Dichanthelium clandestinum*	H	FAC+
3.	Sweetgum	*Liquidambar styraciflua*	S	FAC
4.	Blunt Spikerush	*Eleocharis obtusa*	H	OBL
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: N/A (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- Water-Stained Leaves
- Local Soil Survey Data
- X FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PEM Transect ID: _____ Plot ID: WET12N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____
Field Observations Confirm Mapped Type? Yes _____ No _____
Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-2		10YR 5/1	10YR 6/8	Few/Prominent	Sandy clay
2-18		2.5YR 4/2	7.5YR 4/6	Common/Prominent	Sandy clay

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No _____	Is this Sampling Point Within a Wetland	
Wetland Hydrology Present?	Yes X	No _____		
Hydric Soils Present?	Yes X	No _____	Yes X	No _____

Remarks: Photo 1615

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula Study	Date:	6/29/2011
Applicant/Owner:	VDOT	County:	Newport News
Investigator:	Bode / Doucette	State:	Virginia

Community ID: PFO Transect ID: Plot ID: WET14N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Red maple	*Acer rubrum*	T/S	FAC
2.	Willow Oak	*Quercus phellos*	T	FAC+
3.	Sweetgum	*Liquidambar styraciflua*	T/S	FAC
4.	Poison Ivy	*Toxicodendron radicans*	V	FAC
5.	Roundleaf Greenbriar	*Smilax rotundifolia*	V	FAC
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: 3 (in.)
- Depth to Free Water in Pit: 2 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: _____ Plot ID: WET14N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____
Field Observations Confirm Mapped Type? Yes _____ No _____
Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-5		10YR 4/2			Clay loam
5-11		10YR 6/1	10YR 6/8		Clay loam
11-18		10YR 4/1			Clay

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes	X	No	
Hydric Soils Present?	Yes	X	No	Yes X No _____

Remarks: Photos 1629 and 1630

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula Study	Date:	6/29/2011
Applicant/Owner:	VDOT	County:	Newport News
Investigator:	Bode / Doucette	State:	Virginia

Community ID: PEM Transect ID: Plot ID: WET16N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Red Maple	*Acer rubrum*	T	FAC
2.	Sweetgum	*Liquidambar styraciflua*	S/T	FAC
3.	Loblolly Pine	*Pinus taeda*	S/T	FAC-
4.	Black Gum	*Nyssa sylvatica*	S/T	FAC
5.	Poison Ivy	*Toxicodendron radicans*	V	FAC
6.	Roundleaf Greenbrier	*Smilax rotundifolia*	V	FAC
7.	Common Rush	*Juncus effusus*	H	FACW+
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 86%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: 3 (in.)
- Depth to Free Water in Pit: 1 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- X Water Marks
- X Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- X FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PEM Transect ID: _____ Plot ID: WET16N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____
Field Observations Confirm Mapped Type? Yes _____ No _____
Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-2		10YR 3/2			Sany loam
2-18		10YR 3/1	2.5Y 7/6		Clay loam

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No _____	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No _____	
Hydric Soils Present?	Yes X	No _____	Yes X No _____

Remarks: Photo 1636

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula Study	Date:	6/29/2011
Applicant/Owner:	VDOT	County:	Newport News
Investigator:	Bode / Doucette	State:	Virginia

Community ID: PFO Transect ID: Plot ID: WET17N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Sweetgum	*Liquidambar styraciflua*	T	FAC
2.	Black Gum	*Nyssa sylvatica*	T	FAC
3.	Loblolly Pine	*Pinus taeda*	T	FAC-
4.	Red Maple	*Acer rubrum*	T	FAC
5.	Poison Ivy	*Toxicodendron radicans*	V	FAC
6.	Willow Oak	*Quercus phellos*	T	FAC+
7.	Roundleaf Greenbrier	*Smilax rotundifolia*	V	FAC
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 86%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: 1 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: _____ Plot ID: WET17N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____

Field Observations Confirm Mapped Type? Yes _____ No _____

Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
2-0	O				Organic
0-6		10YR 4/1	7.5YR 5/6	Common/Prominent	Clay loam
6-18		2.5Y 7/2	2.5Y 7/6	Common/Prominent	Clay loam

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes	X	No	
Hydric Soils Present?	Yes	X	No	Yes X No _____

Remarks: Photo 1638

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula Study	Date:	6/29/2011
Applicant/Owner:	VDOT	County:	Newport News
Investigator:	Bode / Doucette	State:	Virginia

Community ID: PFO Transect ID: Plot ID: WET18N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Sweetgum	*Liquidambar styraciflua*	T	FAC
2.	Black Gum	*Nyssa sylvatica*	T	FAC
3.	Loblolly Pine	*Pinus taeda*	T	FAC-
4.	Red Maple	*Acer rubrum*	T	FAC
5.	Poison Ivy	*Toxicodendron radicans*	V	FAC
6.	Willow Oak	*Quercus phellos*	T	FAC+
7.	Roundleaf Greenbrier	*Smilax rotundifolia*	V	FAC
8.	Soft Rush	*Juncus effusus*	H	FACW+
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 88%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: N/A (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- X FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: Plot ID: WET18N

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
2-0	O				Organic
0-6		10 YR 4/1	7.5 YR 5/6	Common/Prominent	Clay loam
6-18		2.5 Y 7/2	2.5 Y 7/6	Common/Distinct	Clay loam

Hydric Soil Indicators: Yes No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1639

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	6/29/2011
Applicant/Owner:		County:	Newport News
Investigator:	Bode / Doucette	State:	Virginia

Community ID: PFO Transect ID: Plot ID: WET19N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	American Hornbeam	*Carpinus caroliniana*	T	FAC
2.	Lizard's Tail	*Saururus cernuus*	H	OBL
3.	Red Maple	*Acer rubrum*	T	FAC
4.	Sweetgum	*Liquidambar styraciflua*	T	FAC
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: N/A (in.)
- Depth to Free Water in Pit: >18 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- Water-Stained Leaves
- Local Soil Survey Data
- X FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: _____ Plot ID: WET19N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____

Field Observations Confirm Mapped Type? Yes _____ No _____

Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-18		10 YR 4/1			Clay loam

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	X	No	_____
Wetland Hydrology Present?	Yes	X	No	_____
Hydric Soils Present?	Yes	X	No	_____

Is this Sampling Point Within a Wetland? Yes X No _____

Remarks: Photo 1641

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula Study	Date:	6/29/2011
Applicant/Owner:	VDOT	County:	Newport News
Investigator:	Bode	State:	Virginia

Community ID: PFO Transect ID: Plot ID: WET 20N (Newport News Reservoir)

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X

If needed, explain on reverse

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Slippery Elm	*Ulmus rubra*	T	FAC
2.	Red Maple	*Acer rubrum*	T	FAC
3.	Black Gum	*Nyssa sylvatica*	T	FAC
4.	Loblolly Pine	*Pinus taeda*	T	FAC-
5.	Poison Ivy	*Toxicodendron radicans*	V	FAC
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 80%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: N/A (in.)
- Depth to Free Water in Pit: >18 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: _____ Plot ID: WET20N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____

Field Observations Confirm Mapped Type? Yes _____ No _____

Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-5		10YR 3/2	10YR 5/8	Common/Prominent	Clay loam
5-18		10YR 5/1	10YR 5/8	Common/Prominent	Clay

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No _____	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No _____	
Hydric Soils Present?	Yes X	No _____	Yes X No _____

Remarks: Photo 1644

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula Study	Date:	6/29/2011
Applicant/Owner:	VDOT	County:	Newport News
Investigator:	Bode	State:	Virginia
Community ID:	PFO	Transect ID:	Plot ID: WET21N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Green Ash	*Fraxinus pennsylvanica*	T	FACW
2.	Sweetgum	*Liquidambar styraciflua*	T	FAC
3.	Red Maple	*Acer rubrum*	T	FAC
4.	Loblolly Pine	*Pinus taeda*	T	FAC-
5.	American Hornbeam	*Carpinus caroliniana*	T	FAC
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 80%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: 4 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- X FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: _____ Plot ID: WET21N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____
Field Observations Confirm Mapped Type? Yes _____ No _____
Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-4		10YR 3/2			Clay loam
4-9		10YR 5/1			Clay loam
9-18		10YR 6/2	10YR 5/6	Common/Prominent	Clay

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No _____	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No _____	
Hydric Soils Present?	Yes X	No _____	Yes X No _____

Remarks: Photo 1645

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	6/30/2011
Applicant/Owner:		County:	Newport News
Investigator:	Bode / Doucette	State:	Virginia

Community ID: PFO Transect ID: Plot ID: WET22N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Red Maple	*Acer rubrum*	T	FAC
2.	American Hornbeam	*Carpinus caroliniana*	T	FAC
3.	Tuliptree	*Liriodendron tulipifera*	T	FACU
4.	Hazel Alder	*Alnus serrulata*	S	OBL
5.	Sweetgum	*Liquidambar styraciflua*	T	FAC
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 80%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: N/A (in.)
- Depth to Free Water in Pit: 1 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: _____ Plot ID: WET22N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____
Field Observations Confirm Mapped Type? Yes _____ No _____
Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-2		10 YR 2/2			Clay loam
2-18		10 YR 3/1			Clay loam

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes	X	No	
Hydric Soils Present?	Yes	X	No	Yes X No

Remarks: Photo 1653

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	6/30/2011
Applicant/Owner:		County:	Newport News
Investigator:	Bode / Doucette	State:	Virginia
Community ID:	PFO	Transect ID:	Plot ID: WET23N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Red Maple	*Acer rubrum*	T	FAC
2.	Sweetgum	*Liquidambar styraciflua*	T	FAC
3.	Swamp Chestnut Oak	*Quercus michauxii*	S	FACW
4.	American Sycamore	*Platanus occidentalis*	T	FACW-
5.	Roundleaf Greenbrier	*Smilax rotundifolia*	V	FAC
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: 3 (in.)
- Depth to Free Water in Pit: 3 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- X FAC-Neutral Test
- Other (Explain in Remarks)

Remarks: Ponded - Data Point at edge

Community ID: PFO Transect ID: _____ Plot ID: WET23N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____
Field Observations Confirm Mapped Type? Yes _____ No _____
Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-7		10 YR 3/2			Clay loam
7-18		10 YR 5/1	10 YR 5/8	Common/Prominent	Clay loam

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No _____	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No _____	
Hydric Soils Present?	Yes X	No _____	Yes X No _____

Remarks: Photo 1651

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	6/27/2011
Applicant/Owner:	VDOT	County:	
Investigator:	Doucette / Bode	State:	Virginia
Community ID:	PEM	Transect ID: A	Plot ID: WET 24N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Lizard's Tail	*Saururus cernuus*	H	OBL
2.	Poison Ivy	*Toxicodenron radicans*	V	FAC-
3.	Sweet Gum	*Liquidambar styraciflua*	T	FAC-
4.	Red Maple	*Acer rubrum*	T	FAC-
5.	Virginia Creeper	*Parthenocissus quinquefolia*	H	FACU
6.	Pawpaw	*Asimina triloba*	S	FACU+
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 67%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: N/A (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PEM Transect ID: A Plot ID: WET 24N

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-5		10yr 2/2			Clay loam
5-8		2.5Y 6/3	7/5YR 5/8	many / prominent	Sandy clay
8-11		2.5Y 5/1			Sandy clay
11-18		2.5 Y 4/1			Sandy clay

Hydric Soil Indicators: Yes No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: PEM
Photo 1654

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	6/30/2011
Applicant/Owner:		County:	Newport News
Investigator:	Bode / Doucette	State:	Virginia
Community ID:	PEM	Transect ID:	Plot ID: WET25N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Hazel Alder	*Alnus serrulata*	S	OBL
2.	Red Maple	*Acer rubrum*	T	FAC
3.	Lizard's Tail	*Saururus cernuus*	H	OBL
4.	Sweetgum	*Liquidambar styraciflua*	T	FAC
5.	Scaldweed	*Cuscuta gronovii*	V	NL
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 60%

Remarks: Infested with Cuscuta Gronovii (Dodder)

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: N/A (in.)
- Depth to Free Water in Pit: 5 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PEM Transect ID: _____ Plot ID: WET25N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____
Field Observations Confirm Mapped Type? Yes _____ No _____
Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-5		10 YR 3/1			Clay loam
5-8		10 YR 5/1			Sandy clay
8-18		2.5 Y 5/2	10 YR 5/8	Common/Prominent	Sandy clay

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No _____	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No _____	
Hydric Soils Present?	Yes X	No _____	Yes X No _____

Remarks: Photos 1657 and 1658

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	6/30/2011
Applicant/Owner:		County:	James City
Investigator:	Bode / Doucette	State:	Virginia

Community ID: PFO Transect ID: Plot ID: WET26N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Poison Ivy	*Toxicodendron radicans*	V	FAC
2.	Pawpaw	*Asimina triloba*	S	FACU+
3.	Green Ash	*Fraxinus pennsylvanica*	T	FACW
4.	Red Maple	*Acer rubrum*	T	FAC
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 75%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: N/A (in.)
- Depth to Free Water in Pit: >18 (in.)
- Depth to Saturated Soil: 6 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: _____ Plot ID: WET26N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____
Field Observations Confirm Mapped Type? Yes _____ No _____
Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-10		5 Y 6/1			Clay loam
10-18		5 Y 6/1	7.5 YR 5/8	Common/Prominent	Clay loam

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	X	No	_____
Wetland Hydrology Present?	Yes	X	No	_____
Hydric Soils Present?	Yes	X	No	_____

Is this Sampling Point Within a Wetland? Yes X No _____

Remarks: Photo 1660

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	6/30/2011
Applicant/Owner:		County:	York
Investigator:	Bode / Doucette	State:	Virginia

Community ID: PEM Transect ID: Plot ID: WET27N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Broadleaf Cattail	*Typha latifolia*	H	OBL
2.	Lizard's Tail	*Saururus cernuus*	H	OBL
3.	Polygonum	*Polygonum sp*	H	OBL
4.	American Sycamore	*Platanus occidentalis*	T	FACW-
5.	Arrowleaf Tearthumb	*Polygonum sagittatum*	H	OBL
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: 0.50 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- Water-Stained Leaves
- Local Soil Survey Data
- X FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PEM Transect ID: Plot ID: WET27N

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-14		2.5 Y 4/1	2.5 Y 5/6	Many/Prominent	Clay

Hydric Soil Indicators: Yes No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks: Auger refusal at 14"

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1662

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Corridor	Date:	7/5/2011
Applicant/Owner:		County:	James City
Investigator:	Sekula / Doucette	State:	Virgina
Community ID:	PFO	Transect ID:	Plot ID: WET31N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Lizard's Tail	*Saururus cernuus*	H	OBL
2.	Poison Ivy	*Toxicodendron radicans*	V	FAC
3.	Christmas Fern	*Polystichum acrostichiodes*	H	FACU-
4.	American Holly	*Ilex opaca*	S	FACU+
5.	American Hornbeam	*Carpinus caroliniana*	S	FAC
6.	Pawpaw	*Asimina triloba*	S	FACU+
7.	Spicebush	*Lindera benzoin*	S	FACW-
8.	Tuliptree	*Liriodendron tulipifera*	T	FACU
9.	Red Maple	*Acer rubrum*	T	FAC
10.	Sweetgum	*Liquidambar styraciflua*	T	FAC
11.	Blackgum	*Nyssa sylvatica*	T	FAC
12.	Virginia Creeper	*Parthenocissus quinquefolia*	V	FACU

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 58%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):

- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:

Depth of Surface Water:	N/A	(in.)
Depth to Free Water in Pit:	3	(in.)
Depth to Saturated Soil:	0	(in.)

Wetland Hydrology Indicators:

Primary Indicators:

- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):

- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: Plot ID: WET31N

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-2		2.5 Y 3/1			Sandy clay loam
2-4		2.5 Y 6/4	5 YR 4/6	Few/Prominent	Sandy clay
4-6		2.5 Y 6/3			Sandy clay
6-12		2.5 Y 6/2			Sandy clay
12-18		2.5 Y 4/1			Silty clay

Hydric Soil Indicators: Yes No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks: A lot of sediment deposition from stormwater runoff

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Corridor	Date:	7/5/2011
Applicant/Owner:		County:	James City
Investigator:	Sekula / Doucette	State:	Virginia
Community ID:	PFO	Transect ID:	Plot ID: WET32N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Lizard's Tail	*Saururus cernuus*	H	OBL
2.	Shallow Sedge	*Carex lurida*	H	OBL
3.	Japanese Stilt Grass	*Microstegium vimineum*	H	FAC
4.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
5.	Golden Ragwort	*Senecio aureus*	H	FACW
6.	Sweetgum	*Liquidambar styraciflua*	S/T	FAC
7.	Hazel Alder	*Alnus serrulata*	S	OBL
8.	Red Maple	*Acer rubrum*	T	FAC
9.	Black Gum	*Nyssa sylvatica*	T	FAC
10.	Black Willow	*Salix nigra*	T	FAC
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):

- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:

Depth of Surface Water:	N/A	(in.)
Depth to Free Water in Pit:	4	(in.)
Depth to Saturated Soil:	0	(in.)

Wetland Hydrology Indicators:

Primary Indicators:

- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):

- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: _____ Plot ID: WET32N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____
Field Observations Confirm Mapped Type? Yes _____ No _____
Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-6		2.5 Y 6/3	5 YR 5/6	Common/Prominent	Sandy clay
		2.5 Y 4/2	5 YR 5/6	Common/Prominent	Sandy clay
18-Jun		2.5 Y 6/2			Sandy clay

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes	X	No	
Hydric Soils Present?	Yes	X	No	Yes X No _____

Remarks: Wetland at base of slope
Stormwater ditch flows into wetland

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	7/5/2011
Applicant/Owner:		County:	James City
Investigator:	Sekula / Doucette	State:	Virginia
Community ID:	PFO	Transect ID:	Plot ID: WET 33N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Smallspike False Nettle	*Boehmeria cylindrica*	H	FACW+
2.	Lizard's Tail	*Saururus cernuus*	H	OBL
3.	Japanese Stilt Grass	*Microstegium vimineum*	H	FAC
4.	Christmas Fern	*Polystichum acrostichoides*	H	FAC
5.	Shallow Sedge	*Carex lurida*	H	OBL
6.	Golden Ragwort	*Senecio aureus*	H	FACW
7.	Pawpaw	*Asimino triloba*	H/S	FACU+
8.	Red Maple	*Acer rubrum*	T	FAC
9.	American Sycamore	*Platanus occidentalis*	T	FACW-
10.	Poison Ivy	*Toxicodendron radicans*	V	FAC
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 80%

Remarks: Red maple - dominant
Herb layer dominated by microstegium

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: N/A (in.)
- Depth to Free Water in Pit: 2 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:
Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: _____ Plot ID: WET 33N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____
Field Observations Confirm Mapped Type? Yes _____ No _____
Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-8		10YR 4/2	5 YR 3/4	Common/Prominent	Silty clay loam
8-12		10 YR 5/1	5 YR 4/6	Many/Prominent	Silt clay
12-18		10 YR 6/1	5 YR 4/6	Many/Prominent	Silt clay

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No _____	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No _____	
Hydric Soils Present?	Yes X	No _____	Yes X No _____

Remarks: Wetland at base of slope

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	7/5/2011
Applicant/Owner:		County:	James City
Investigator:	Sekula / Doucette	State:	Virginia
Community ID:	PFO	Transect ID:	Plot ID: WET34N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Japanese Stilt Grass	*Microstegium vimineum*	H	FAC
2.	Lizard's Tail	*Saururus cernuus*	H	OBL
3.	Sweetgum	*Liquidambar styraciflua*	S	FAC
4.	Smallspike False Nettle	*Boehmeria cylindrica*	H	FACW+
5.	American Hornbeam	*Carpinus caroliniana*	T	FAC
6.	Red Maple	*Acer rubrum*	T	FAC
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks: Herb layer is domniated by microstegium

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: N/A (in.)
- Depth to Free Water in Pit: 8 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: Plot ID: WET34N

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-2		5 YR 5/6			Clay
2-6		2.5 Y 5/1	5 YR 6/6	Many/Prominent	Clay
6-18		10 YR 6/1	7.5 YR 5/8	Many/Prominent	Silt clay

Hydric Soil Indicators: Yes No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 026 looking west

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	7/5/2011
Applicant/Owner:		County:	James City
Investigator:	Sekula / Doucette	State:	Virginia

Community ID: PEM Transect ID: Plot ID: WET36N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Lizard's Tail	*Saururus cernuus*	H	OBL
2.	Smallspike False Nettle	*Boehmeria cylindrica*	H	FACW+
3.	Common Rush	*Juncus effusus*	H	FACW+
4.	Arrowleaf Tearthumb	*Polygonum sagittatum*	H	OBL
5.	Swamp Smartweed	*Polygonum hydropiperoides*	H	OBL
6.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
7.	American Elderberry	*Sarnbucus canadensis*	S	FACW-
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: N/A (in.)
- Depth to Free Water in Pit: 1 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: Stromwater ditch - source of hydrology
Drains into culvert under road

Community ID: PEM Transect ID: _____ Plot ID: WET36N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____
Field Observations Confirm Mapped Type? Yes _____ No _____
Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-6		10 YR 4/3			Sandy loam
6-18		2.5 Y 4/2	2.5 Y 6/6	Few/Prominent	Sandy loam

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes	X	No	
Hydric Soils Present?	Yes	X	No	Yes X No _____

Remarks: Pic 034

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	7/5/2011
Applicant/Owner:		County:	James City
Investigator:	Sekula / Doucette	State:	Virginia
Community ID:	PFO	Transect ID:	Plot ID: WET37N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Christmas Fern	*Polystichum acrostichoides*	H	FACU-
2.	Lizard's Tail	*Saururus cernuus*	H	OBL
3.	Smallspike False Nettle	*Boehmeria cylindrica*	H	FACW+
4.	Jewelweed	*Impatiens capensis*	H	FACW
5.	Tuliptree	*Lirodendron tulipifera*	S	FACU
6.	Pawpaw	*Asimina triloba*	S	FACU+
7.	Spicebush	*Lindera benzoin*	S	FACW-
8.	Virginia Creeper	*Parthenocissus quinquefolia*	V	FACU
9.	Poison Ivy	*Toxicodendron radicans*	V	FAC
10.	American Holly	*Ilex opaca*	S	FACU+
11.	Red Maple	*Acer rubrum*	T	FAC
12.	American Sycamore	*Platanus occidentalis*	T	FACW-

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 58%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):

- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:

Depth of Surface Water:	N/A	(in.)
Depth to Free Water in Pit:	3	(in.)
Depth to Saturated Soil:	0	(in.)

Wetland Hydrology Indicators:

Primary Indicators:

- Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):

- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: _____ Plot ID: WET37N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____
Field Observations Confirm Mapped Type? Yes _____ No _____
Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-12		2.5 Y 5/2			Sandy loam
12-18		2.5 Y 6/3			Sandy loam

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No _____	Is this Sampling Point Within a Wetland	
Wetland Hydrology Present?	Yes X	No _____		
Hydric Soils Present?	Yes X	No _____	Yes X	No _____

Remarks: Wetland appears to receive main source of hydrology from stormwater (boarderline wetland)
Flows into culvert under road

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	7/5/2011
Applicant/Owner:		County:	James City
Investigator:	Sekula / Doucette	State:	Virginia

Community ID: PEM Transect ID: Plot ID: WET38N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Shallow Sedge	*Carex lurida*	H	OBL
2.	Arrowleaf Tearthumb	*Polygonum sagittatum*	H	OBL
3.	Smallspike False Nettle	*Boehmeria cylindrica*	H	FACW+
4.	Common Rush	*Juncus effusus*	H	FACW+
5.	Common Boneset	*Eupatorium perfoliaturx*	H	FACW+
6.	Hazel Alder	*Alnus serrulata*	S	OBL
7.	American Sycamore	*Platanus occidentalis*	S	FACW-
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: N/A (in.)
- Depth to Free Water in Pit: 1 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- X FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PEM Transect ID: _____ Plot ID: WET38N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____
Field Observations Confirm Mapped Type? Yes _____ No _____
Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-4		2.5 Y 6/2			Sandy clay
4-18+		2.5 Y 2.5/1			Sandy clay

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No _____	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No _____	
Hydric Soils Present?	Yes X	No _____	Yes X No _____

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	7/5/2011
Applicant/Owner:		County:	James City
Investigator:	Sekula / Doucette	State:	Virginia

Community ID: PFO Transect ID: Plot ID: WET39N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Broadleaf Arrowhead	*Sagittaria latifolia*	H	OBL
2.	Cinnamon Fern	*Osmunda cinnamomea*	H	FACW
3.	Smallspike False Nettle	*Boehmeria cylindrica*	H	FACW+
4.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
5.	Polygonum	*Polygonum sp.*	H	
6.	Sweetgum	*Liquidambar styraciflua*	S	FAC
7.	Red Maple	*Acer rubrum*	T	FAC
8.	Black Willow	*Salix nigra*	T	FACW+
9.	American Sycamore	*Platanus occidentalis*	T	FACW-
10.	Poison Ivy	*Toxicodendron radicans*	V	FAC
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 90-100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: N/A (in.)
- Depth to Free Water in Pit: 10 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- X Saturated in Upper 12 inches
- X Water Marks
- Drift Lines
- Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- X FAC-Neutral Test
- Other (Explain in Remarks)

Remarks: Majority of wetland/stream complex is inundated
Beaver dam at culvert

Community ID: PFO Transect ID: _____ Plot ID: WET39N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____

Field Observations Confirm Mapped Type? Yes _____ No _____

Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-3		7.5 YR 3/4			Sandy loam
3-18		2.5 Y 6/2	7.5 YR 5/8	Many/Prominent	Sandy loam

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No _____	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No _____	
Hydric Soils Present?	Yes X	No _____	Yes X No _____

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	7/6/2011
Applicant/Owner:		County:	New Kent
Investigator:	Sekula / Doucette	State:	Virginia

Community ID: PFO Transect ID: Plot ID: WET40N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Lizard's Tail	*Saururus cernuus*	H	OBL
2.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
3.	Coastal Sweetpepperbush	*Clethra alnifolia*	H	FAC+
4.	Red Maple	*Acer rubrum*	T	FAC
5.	Sweetgum	*Liquidambar styraciflua*	T	FAC
6.	Blackgum	*Nyssa sylvatica*	T	FAC
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: N/A (in.)
- Depth to Free Water in Pit: 3 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- X FAC-Neutral Test
- Other (Explain in Remarks)

Remarks: Crayfish mounds
Seep wetland

Community ID: PFO Transect ID: _____ Plot ID: WET40N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____
Field Observations Confirm Mapped Type? Yes _____ No _____
Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-2		10 YR 3/2			Sandy loam
2-6		2.5 Y 6/2			Sandy clay
6-9		10 YR 4/1			Sandy silt loam
9-12		10 YR 4/1			Sandy clay loam
12-18		10 YR 5/2			Sandy clay loam

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	X	No	_____
Wetland Hydrology Present?	Yes	X	No	_____
Hydric Soils Present?	Yes	X	No	_____

Is this Sampling Point Within a Wetland? Yes X No _____

Remarks: Linear wetland paralleling highway

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	7/6/2011
Applicant/Owner:		County:	New Kent
Investigator:	Sekula / Doucette	State:	Virginia

Community ID: PFO Transect ID: Plot ID: WET46N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X

If needed, explain on reverse

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Lizard's Tail	*Saururus cernuus*	H	OBL
2.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
3.	Arrowleaf Tearthumb	*Polygonum sagittatum*	H	OBL
4.	Polygonum	*Polygonum sp.*	H	
5.	Hazel Alder	*Alnus serrulata*	S	OBL
6.	Red Maple	*Acer rubrum*	T	FAC
7.	Blackgum	*Nyssa sylvatica*	T	FAC
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 86-100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: N/A (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- X FAC-Neutral Test
- Other (Explain in Remarks)

Remarks: Seep wetland

Community ID: PFO Transect ID: _____ Plot ID: WET46N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____

Field Observations Confirm Mapped Type? Yes _____ No _____

Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-6		2.5 Y 6/2			Loamy sand
6-18		2.5 Y 5/1			Loamy sand

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No _____	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No _____	
Hydric Soils Present?	Yes X	No _____	Yes X No _____

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	7/6/2011
Applicant/Owner:		County:	New Kent
Investigator:	Sekula / Doucette	State:	Virginia

Community ID: PFO Transect ID: Plot ID: WET48N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Lizard's Tail	*Saururus cernuus*	H	OBL
2.	Green Arrow Arum	*Peltandra virginica*	H	OBL
3.	Japanese Stilt Grass	*Microstegium vimineum*	H	FAC
4.	Red Maple	*Acer rubrum*	T	FAC
5.	Blackgum	*Nyssa sylvatica*	T	FAC
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: N/A (in.)
- Depth to Free Water in Pit: 4 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- X Saturated in Upper 12 inches
- X Water Marks
- Drift Lines
- Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- X FAC-Neutral Test
- Other (Explain in Remarks)

Remarks: Majority of wetland is inundated

Community ID: PFO Transect ID: _____ Plot ID: WET48N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____
Field Observations Confirm Mapped Type? Yes _____ No _____
Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-2		10 YR 3/2			Silty sand
2-18		2.5 Y 5/1			Sandy clay

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No _____	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No _____	
Hydric Soils Present?	Yes X	No _____	Yes X No _____

Remarks: Wetland at rest area

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	7/8/2011
Applicant/Owner:		County:	New Kent
Investigator:	Sekula / Copeland	State:	Virginia

Community ID: PEM Transect ID: Plot ID: WET55N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Smallspike False Nettle	*Boehmeria cylindrica*	H	FACW+
2.	Common Rush	*Juncus effusus*	H	FACW+
3.	Green Arrow Arum	*Peltandra virginica*	H	OBL
4.	Common Buttonbush	*Cephalanthus occidentalis*	S	OBL
5.	Red Maple	*Acer rubrum*	T	FAC
6.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: N/A (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- Water-Stained Leaves
- Local Soil Survey Data
- X FAC-Neutral Test
- Other (Explain in Remarks)

Remarks: 75% of wetland is inundated

Community ID: PEM Transect ID: _____ Plot ID: WET55N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____
Field Observations Confirm Mapped Type? Yes _____ No _____
Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-5		10 YR 2/2			Clay loam
5-10		Gley 1 7/10Y			Sandy clay
10-18		2.5 Y 7/1			Loamy sand

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No _____	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No _____	
Hydric Soils Present?	Yes X	No _____	Yes X No _____

Remarks: Pics 81 and 82

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	7/8/2011
Applicant/Owner:		County:	New Kent
Investigator:	Sekula	State:	Virginia
Community ID:	PFO	Transect ID:	Plot ID: WET56N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Red Maple	*Acer rubrum*	T	FAC
2.	Willow Oak	*Quercus phellos*	T	FAC+
3.	Blackgum	*Nyssa sylvatica*	T	FAC
4.	Sweetgum	*Liquidambar styraciflua*	T	FAC
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: N/A (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- X Saturated in Upper 12 inches
- X Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks: 1/2 of wetland has pockets of standing water
Buttressed trunks observed

Community ID: PFO Transect ID: _____ Plot ID: WET56N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____
Field Observations Confirm Mapped Type? Yes _____ No _____
Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
1-0	O				Organic
0-8		10 YR 3/1			Sandy clay loam
8-18		10 YR 6/2		Many/Prominent	Sandy clay

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No _____	Is this Sampling Point Within a Wetland	
Wetland Hydrology Present?	Yes X	No _____		
Hydric Soils Present?	Yes X	No _____	Yes X	No _____

Remarks: Pic 83

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	7/8/2011
Applicant/Owner:		County:	New Kent
Investigator:	Sekula / Copeland	State:	Virginia

Community ID: PFO Transect ID: Plot ID: WET57N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Red Maple	*Acer rubrum*	T	FAC
2.	Blackgum	*Nyssa sylvatica*	T	FAC
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: N/A (in.)
- Depth to Free Water in Pit: 4 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- X Saturated in Upper 12 inches
- X Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks: Data point taken at floodplain fringe
Most of the wetland is inundated / overflow

Community ID: PFO Transect ID: _____ Plot ID: WET57N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____
Field Observations Confirm Mapped Type? Yes _____ No _____
Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
1-0	O				Organic
0-8		10 YR 4/1			Sandy clay
8-12		10 YR 5/1			Clay
12-18		10 YR 5/2	5 YR 4/6	Many/Prominent	Sandy clay

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes	X	No	
Hydric Soils Present?	Yes	X	No	Yes X No

Remarks: Pic 84 85 from roadway bridge
Wetland of the Chickahominy

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	7/8/2011
Applicant/Owner:		County:	Henrico
Investigator:	Sekula / Copeland	State:	Virginia
Community ID:	PEM	Transect ID:	Plot ID: WET58N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Common Rush	*Juncus effusus*	H	FACW+
2.	Broadleaf Cattail	*Typha latifolia*	H	OBL
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks: Cattail stand between highway and railroad tracks

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: 3 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- Water-Stained Leaves
- Local Soil Survey Data
- X FAC-Neutral Test
- Other (Explain in Remarks)

Remarks: Inundation appears to be higher than normal - most likely from previous night's rain

Community ID: PEM Transect ID: _____ Plot ID: WET58N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____
Field Observations Confirm Mapped Type? Yes _____ No _____
Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-8		10 YR 6/2	7.5 YR 5/6	Many / Prominent	Clay
8-18		2.5 Y 6/2	10 YR 6/8	Many / Prominent	Clay

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No _____	Is this Sampling Point Within a Wetland	
Wetland Hydrology Present?	Yes X	No _____		
Hydric Soils Present?	Yes X	No _____	Yes X	No _____

Remarks: Pic 88
Tadpoles observed

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	7/8/2011
Applicant/Owner:		County:	Henrico
Investigator:	Sekula / Copeland	State:	Virginia

Community ID: PEM Transect ID: Plot ID: WET60N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Lizard's Tail	*Saururus cernuus*	H	OBL
2.	Cinnamon Fern	*Osmunda cinnamomea*	H	FACW
3.	Deertongue	*Dichanthelium clandestinum*	H	FAC+
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: 2 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- X FAC-Neutral Test
- Other (Explain in Remarks)

Remarks: 75% of wetland is inundated

Community ID: PEM Transect ID: _____ Plot ID: WET60N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____
Field Observations Confirm Mapped Type? Yes _____ No _____
Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-6		10 YR 3/2			Clay loam
6-12		10 YR 4/1	2.5 Y 6/6	Common/Prominent	Clay
12-18		10 YR 4/1			Silty clay

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes	X	No	
Hydric Soils Present?	Yes	X	No	Yes X No

Remarks: Pic 90
Wetland between highway and railroad. Culvert under road looks clogged.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	7/11/2011
Applicant/Owner:		County:	Henrico
Investigator:	Sekula / Doucette	State:	Virginia

Community ID: PFO Transect ID: Plot ID: WET62N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Sedge	*Carex sp.*	H	
2.	Eastern Baccharis	*Baccharis halimifolia*	S	FACW
3.	Possumhaw	*Viburnum nudum*	S	OBL
4.	Red Maple	*Acer rubrum*	T	FAC
5.	Blackgum	*Nyssa sylvatica*	T	FAC
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 80-100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: 1/2 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- X Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- X FAC-Neutral Test
- Other (Explain in Remarks)

Remarks: 3" of standing water in wetland by the data point

Community ID: PFO Transect ID: _____ Plot ID: WET62N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____
Field Observations Confirm Mapped Type? Yes _____ No _____
Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-2		10 YR 5/2			Clay loam
2-12		2.5 Y 3/1	5 YR 5/8	Few/Prominent	Clay
12-18		2.5 Y 5/1			Sandy clay

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No _____	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No _____	
Hydric Soils Present?	Yes X	No _____	Yes X No _____

Remarks: Isolated wetland in interchange (no inlet or outlet)
Photo 92

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	7/11/2011
Applicant/Owner:		County:	Henrico
Investigator:	Sekula / Doucette	State:	Virginia
Community ID:	PFO	Transect ID:	Plot ID: WET63N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Sedge	*Carex sp.*	H	
2.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
3.	Red Maple	*Acer rubrum*	S/T	FAC
4.	Willow Oak	*Quercus phellos*	S/T	FAC+
5.	Loblolly pine	*Pinus taeda*	T	FAC-
6.	Sweetgum	*Liquidambar styraciflua*	S/T	FAC
7.	Blackgum	*Nyssa sylvatica*	S/T	FAC
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 71-86%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: N/A (in.)
- Depth to Free Water in Pit: 2 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: Wetland seep in clover leaf of interchange
Outlet is culvert under the road

Community ID: PFO Transect ID: _____ Plot ID: WET63N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____
Field Observations Confirm Mapped Type? Yes _____ No _____
Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-6		2.5 Y 3/1			Sandy clay
6-18		2.5 Y 5/1			Clay

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No _____	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No _____	
Hydric Soils Present?	Yes X	No _____	Yes X No _____

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	7/11/2011
Applicant/Owner:		County:	Henrico
Investigator:	Sekula / Doucette	State:	Virginia

Community ID: PEM Transect ID: Plot ID: WET64N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Deertongue	*Dichanthelium clandestinum*	H	FAC+
2.	Pennsylvania smartweed	*Polygonum pensylvanicum*	H	FACW
3.	Japanese Stilt Grass	*Microstegium vimineum*	H	FAC
4.	Common Rush	*Juncus effusus*	H	FACW+
5.	Willow Oak	*Quercus phellos*	S/T	FAC+
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: N/A (in.)
- Depth to Free Water in Pit: 2 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- X Saturated in Upper 12 inches
- Water Marks
- X Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks: 50% of wetland is inundated

Community ID: PEM Transect ID: _____ Plot ID: WET64N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____
Field Observations Confirm Mapped Type? Yes _____ No _____
Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-5		10 YR 3/2			Silty clay loam
5-18		10 YR 4/2	5 YR 5/6	Many/Prominent	Clay

Hydric Soil Indicators: Yes _____ No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes	X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes	X	No	
Hydric Soils Present?	Yes	X	No	Yes X No _____

Remarks: Photo 97

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/17/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 117N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X

If needed, explain on reverse

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Red Maple	*Acer rubrum*	T	FAC
2.	Sycamore	*Platanus occidentalis*	T	FACW-
3.	Lizards Tail	*Saururus cernuus*	H	OBL
4.	Sweet Gum	*Liquidambar styraciflua*	T	FAC
5.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ___ Streams
- X Aerial Photographs
- ___ Other
- ___ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ___ (in.)
- Depth to Free Water in Pit: ___ (in.)
- Depth to Saturated Soil: ___ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- ___ Saturated in Upper 12 inches
- ___ Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ___ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ___ Local Soil Survey Data
- X FAC-Neutral Test
- ___ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: _____ Plot ID: WET 117N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____
Field Observations Confirm Mapped Type? Yes _____ No _____
Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10YR 4/1	5YR 4/6	10%	Loamy sand

Hydric Soil Indicators: Yes X No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
_____	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No _____	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No _____	
Hydric Soils Present?	Yes X	No _____	Yes X No _____

Remarks: PFO
Photo 1537

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/17/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 118N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Netted-Veined Chain Fern	*Woodwardia areolata*	H	FACW+
2.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
3.	Soft Rush	*Juncus effusus*	H	FACW+
4.	Coastal Sweetpepperbush	*Clethra alnifolia*	S	FAC+
5.	Sweet Gum	*Liquidambar styraciflua*	T	FAC
6.	Red Maple	*Acer rubrum*	T	FAC
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: Receives hydrology from road runoff

Community ID: PFO Transect ID: _____ Plot ID: WET 118N

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____
Field Observations Confirm Mapped Type? Yes _____ No _____
Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-10	A	G1 - 3/N			Sandy loam
10-16	B	7.5YR 4/1			Sandy loam

Hydric Soil Indicators: Yes X No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No _____	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No _____	
Hydric Soils Present?	Yes X	No _____	Yes X No _____

Remarks: PFO
Photo 1539

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/17/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PEM Transect ID: A Plot ID: WET 119N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X

If needed, explain on reverse

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Soft Rush	*Juncus effusus*	H	FACW+
2.	Willow Oak	*Quercus phellos*	T	FAC+
3.	Green Ash	*Fraxinus pennsylvanica*	S	FACW
4.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
5.	Woolgrass	*Scirpus cyperinus*	H	FACW+
6.	Smallspike False Nettle	*Boehmeria cylindrica*	H	FACW+
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PEM Transect ID: A Plot ID: WET 119N

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 3/1			Loamy sand

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1540

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	12/6/2011
Applicant/Owner:	VDOT	County:	Henrico
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PEM Transect ID: A Plot ID: WET 120N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Soft Rush	*Juncus effusus*	H	FACW+
2.	Smallspike False Nettle	*Boehmeria cylindrica*	H	FACW+
3.	Woolgrass	*Scirpus cyperinus*	H	FACW+
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):

	Streams
	Aerial Photographs
	Other
X	No Recorded Data Available

Field Observations:

Depth of Surface Water:		(in.)
Depth to Free Water in Pit:		(in.)
Depth to Saturated Soil:	4	(in.)

Wetland Hydrology Indicators:

Primary Indicators:

	Inundated
X	Saturated in Upper 12 inches
	Water Marks
	Drift Lines
	Sediment Deposits
	Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):

	Oxidized Root Channels in Upper 12 inches
X	Water-Stained Leaves
	Local Soil Survey Data
	FAC-Neutral Test
	Other (Explain in Remarks)

Remarks:

Community ID: PEM Transect ID: A Plot ID: WET 120N

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
No soils					

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks: No soils - molded around ROW line

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: PEM
Photo 008

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	12/6/2011
Applicant/Owner:	VDOT	County:	Henrico
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	PSS	Transect ID: A	Plot ID: WET 121N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Pin Oak	*Quercus palustris*	T	FACW
2.	Button Bush	*Cephalanthus occidentalis*	S	OBL
3.	Soft Rush	*Juncus effusus*	H	FACW+
4.	River Birch	*Betula nigra*	T	FACW
5.	Woolgrass	*Scirpus cyperinus*	H	FACW+
6.	Jewelweed	*Impatiens capensis*	H	FACW
7.	Smooth Alder	*Alnus serrulata*	S	OBL
8.	Coastal Sweetpepperbush	*Clethra alnifolia*	S	
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):

	Streams
	Aerial Photographs
	Other
X	No Recorded Data Available

Field Observations:

Depth of Surface Water:		(in.)
Depth to Free Water in Pit:	6	(in.)
Depth to Saturated Soil:	5	(in.)

Wetland Hydrology Indicators:

Primary Indicators:

	Inundated
X	Saturated in Upper 12 inches
	Water Marks
	Drift Lines
	Sediment Deposits
X	Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):

	Oxidized Root Channels in Upper 12 inches
X	Water-Stained Leaves
	Local Soil Survey Data
X	FAC-Neutral Test
	Other (Explain in Remarks)

Remarks:

Community ID: PSS Transect ID: A Plot ID: WET 121N

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 3/1			Silty clay loam

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: PSS - Merge WET121 & WET122 / This was an old beaver pond
Photos 009, 0011-0013

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	12/6/2011
Applicant/Owner:	VDOT	County:	Henrico
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PEM Transect ID: A Plot ID: WET 122N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Boradleaf Cattail	*Typha latifolia*	H	OBL
2.	Soft Rush	*Juncus effusus*	H	FACW+
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- X Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: Riprap accumulation is substrate for cattails

Community ID: PEM Transect ID: A Plot ID: WET 122N

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
No soils					

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks: No soils - riprap sediment accumulation

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 0016

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	12/7/2011
Applicant/Owner:	VDOT	County:	James City
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PSS Transect ID: A Plot ID: WET 126N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X

If needed, explain on reverse

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Red Maple	*Acer rubrum*	T	FAC
2.	Broad-leaved Cattail	*Typha latifolia*	H	OBL
3.	River Birch	*Betula nigra*	T	FACW
4.	Smooth Alder	*Alnus serrulata*	S	OBL
5.	False Nettle	*Boehmeria cylindrica*	H	FACW+
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: Cannot access

Community ID: PSS Transect ID: A Plot ID: WET 126N

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
No soils					

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks: No soils - could not get past fence

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: PSS
Photo 1564

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	12/8/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	PEM	Transect ID: A	Plot ID: WET 128N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Woolgrass	*Scirpus cyperinus*	H	FACW+
2.	Halberd Leaved Tearthumb	*Polygonum arifolium*	H	OBL
3.	Fringed Sedge	*Carex crinita*	H	OBL
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):

- ____ Streams
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water:		(in.)
Depth to Free Water in Pit:	12	(in.)
Depth to Saturated Soil:	0	(in.)

Wetland Hydrology Indicators:

Primary Indicators:

- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):

- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PEM Transect ID: A Plot ID: WET 128N

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 4/1			Silty clay loam

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: PEM
Photo 1497

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	12/8/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PEM Transect ID: A Plot ID: WET 129N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Woolgrass	*Scirpus cyperinus*	H	FACW+
2.	Soft Rush	*Juncus effusus*	H	FACW+
3.	Japanese Stiltgrass	*Microstegium vimineum*	H	FAC
4.	False Nettle	*Boehmeria cylindrica*	H	FACW+
5.	Northern Bugleweed	*Lycopus uniflorus*	H	OBL
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):

- ____ Streams
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

- Depth of Surface Water: 3 (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:

- X Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):

- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PEM Transect ID: A Plot ID: WET 129N

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 4/1			Loamy sand

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: PEM
Photo 1509

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	12/8/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	PSS	Transect ID: A	Plot ID: WET 130N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	River Birch	*Betula nigra*	S	FACW
2.	Red Maple	*Acer rubrum*	S	FAC
3.	Smooth Alder	*Alnus serrulata*	S	OBL
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):

- ____ Streams
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

- Depth of Surface Water: 12 (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:

- X Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):

- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PSS Transect ID: A Plot ID: WET 130N

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
No soils					

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks: No soils - inundation to the toe of slope

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: PSS
Photo 1510

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	12/8/2011
Applicant/Owner:	VDOT	County:	Henrico
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 131N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Red Maple	*Acer rubrum*	T	FAC
2.	Black Willow	*Nyssa sylvatica*	T	FAC
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks: No other plants becauase it is deeply inundated.

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:
- Depth of Surface Water: 12 (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- X Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 131N

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 3/2	5YR 4/6	5%	Sandy clay

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks: Soils are on fringe

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: PFO
Photo 1511

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	12/8/2011
Applicant/Owner:	VDOT	County:	York
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PEM Transect ID: A Plot ID: WET 132N

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Broadleaved Cattail	*Typha latifolia*	H	OBL
2.	Japanese Stiltgrass	*Microstegium vimineum*	H	FAC
3.	Woolgrass	*Scirpus cyperinus*	H	FACW+
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:
- Depth of Surface Water: 12 (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PEM Transect ID: A Plot ID: WET 132N

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	2.5YR 3/1			

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: PEM
Photo 1520

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/1/2011
Applicant/Owner:	VDOT	County:	Henrico
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PEM Transect ID: A Plot ID: WET 50M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes X	No
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Broadleaf Cattail	*Typha latifolia*	H	OBL
2.	Woolgrass	*Scirpus cyperinus*	H	FACW+
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: 1 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks: Receives hydrology from roadway drainage

Community ID: PEM Transect ID: A Plot ID: WET 50M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16		7.5YR 4/1	5YR 4/8	15%	Sandy clay loam

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Wetland drains to a drain inlet in median
Invasives: Japanese Honeysuckle Photo 1409/1410

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/1/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	PFO	Transect ID: A	Plot ID: WET 51M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Netted Chainfern	*Woodwardia areolata*	H	FACW+
2.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
3.	Spicebush	*Lindera benzoin*	S	FACW-
4.	Common Elderberry	*Sambucus canadensis*	S	FACW-
5.	Lizard's Tail	*Saururus cernuus*	H	OBL
6.	Cinnamon Fern	*Osmunda cinnamomea*	H	FACW
7.	Hornbeam	*Carpinus caroliniana*	S	FACW+
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: 1 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: Crayfish mound

Community ID: PFO Transect ID: A Plot ID: WET 51M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 4/1			Loamy sand

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1430

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/1/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 52M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Water Smartweed	*Polygonum amphibium*	H	OBL
2.	Red Maple	*Acer Rubrum*	T	FAC
3.	Spicebush	*Lindera benzion*	S	FACW-
4.	Lizard's Tail	*Saururus cernuus*	H	OBL
5.	Slippery Elm	*Ulmus rubra*	T	FAC
6.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
7.	False Nettle	*Boehmeria cylindrica*	H	FACW+
8.	River Birch	*Betula nigra*	T	FACW
9.	Common Elderberry	*Sambucus canadensis*	S	FACW-
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 52M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 4/1	5YR 4/6	28%	Sandy clay loam

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Invasive Japanese Stiltgrass
Photo 1437

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/1/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 53M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Net-veined Chain Fern	*Woodwardia areoloata*	H	FACW+
2.	Red Maple	*Acer rubrum*	T	FAC
3.	False Nettle	*Boehmeria cylindrica*	H	FACW+
4.	Sweet Gum	*Liquidambar styraciflua*	T	FAC
5.	Sycamore	*Platanus occidentalis*	T	FACW-
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: (in.)
- Depth to Free Water in Pit: 3 (in.)
- Depth to Saturated Soil: 3 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 53M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-4	A	2.5Y 3/1			Sandy loam
4-16	B	2.5Y 6/2	5YR 4/6		Sandy loam

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Invasive Japanese Stiltgrass
Photo 1439

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/1/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 54M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
2.	Cinnamon Fern	*Osmunda cinnamomea*	H	FACW
3.	Highbush Blueberry	*Vaccinium corymbosum*	S	FACW-
4.	Ironwood	*Carpinus caroliniana*	S	FACW+
5.	American sycamore	*Platanus occidentalis*	T	FACW-
6.	Slippery Elm	*Ulmus rubra*	T	FAC
7.	Spicebush	*Lindera benzoin*	S	FACW-
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: 3 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 54M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-5	A	2.5Y 3/1			Sandy loam
5-16	B	2.5Y 6/2	5YR		Sandy loam

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1442

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/1/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	PFO	Transect ID: A	Plot ID: WET 55M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
2.	Net-Veined Chain Fern	*Woodwardia areolata*	H	FACW+
3.	Highbush Blueberry	*Vaccinium coryumbosum*	H	FACW-
4.	Cinnamon Fern	*Osmunda cinnamomea*	H	FACW
5.	Red Maple	*Acer rubum*	T	FAC
6.	Sweet Bay	*Magnolia virginiana*	S	FACW+
7.	Sycamore	*Platanus occidentalis*	T	FACW+
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 55M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	2.5Y 3/1			Sandy loam

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1444

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/2/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 56M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Royal Fern	*Osmunda regalis*	H	OBL
2.	Red Maple	*Acer rubrum*	T	FAC
3.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
4.	Sweet Gum	*Liquidambar styraciflua*	T	FAC
5.	Net-Veined Chain Fern	*Woodwardia areolata*	H	FACW+
6.	Green Ash	*Fraxinus pennsylvanica*	T	FACW
7.	Lizard's Tail	*Saururus cernuus*	H	OBL
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: 1 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 56M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-7	A	10YR 6/2	5YR 4/6	3%	Sandy loam
7-16		10YR 6/2	G1 4/N	7%	Sandy loam

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1410

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/2/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	PFO/PSS -50/50%	Transect ID: A	Plot ID: WET 57M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
2.	Lizard's Tail	*Saururus cernuus*	H	OBL
3.	Royal Fern	*Osmunda regalis*	H	OBL
4.	Red Maple	*Acer rubrum*	T	FAC
5.	Sweet Bay	*Magnolia virginiana*	S	FACW+
6.	Buttonbush	*Cephalanthus occidentalis*	S	OBL
7.	Rice Cutgrass	*Leersia oryzoides*	H	OBL
8.	Sycamore	*Platanus occidentalis*	T	FACW-
9.	Ironwood	*Carpinus caroliniana*	S	FACW+
10.	Highbush Blueberry	*Vaccinium corymbosum*	H	FACW-
11.	Silky Dogwood	*Cornus amomum*	S	FACW
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks: 50% PFO , 50% PSS

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO/PSS -50/50% Transect ID: A Plot ID: WET 57M

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____
Field Observations Confirm Mapped Type? Yes _____ No _____
Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 4/1			Loamy clay

Hydric Soil Indicators: Yes X No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
_____	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No _____	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No _____	
Hydric Soils Present?	Yes X	No _____	Yes X No _____

Remarks: Photo 1414

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/2/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 58M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Net-Veined Chain Fern	*Woodwardia areolata*	H	FACW+
2.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
3.	False Nettle	*Boehmeria cylindrica*	H	FACW+
4.	Red Maple	*Acer rubrum*	T	FAC
5.	Royal Fern	*Osmunda regalis*	H	OBL
6.	Highbush Blueberry	*Vaccinium corymbosum*	H	FACW-
7.	Sweet Gum	*Liquidambar styraciflua*	T	FAC
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: 1 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: Crayfish burrows

Community ID: PFO Transect ID: A Plot ID: WET 58M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 4/1			Loamy clay

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1420

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/2/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 59M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
2.	Net-Veined Chain Fern	*Woodwardia areolata*	H	FACW+
3.	Red Maple	*Acer rubrum*	T	FAC
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: 1 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 59M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 4/1			Sandy Clay loam

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1421

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/2/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 60M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
2.	Royal Fern	*Osmunda regalis*	H	OBL
3.	Red Maple	*Acer rubrum*	T	FAC
4.	Marsh Marigold	*Caltha palustris*	H	OBL
5.	Highbush Blueberry	*Vaccinium corymbosum*	H	FACW-
6.	Spicebush	*Lindera benzoin*	S	FACW-
7.	Common Elderberry	*Sambucus canadensis*	S	FACW-
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: 1 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 60M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10YR 3/1			Silty clay loam

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1431

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/2/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 61M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Coastal Sweetpepperbush	*Clethra alnifolia*	S	FAC+
2.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
3.	Red Maple	*Acer rubrum*	T	FAC
4.	Ironwood	*Carpinus caroliniana*	S	FACW+
5.	Royal Fern	*Osmunda regalis*	H	OBL
6.	Blackgum	*Nyssa sylvatica*	T	FAC
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 61M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 3/1			Sandy clay loam

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1436

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/2/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 63M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
2.	River Birch	*Betula nigra*	T	FACW
3.	Royal Fern	*Osmunda regalis*	H	OBL
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 63M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10YR 3/1			Sandy clay loam

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1441

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/2/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	PFO	Transect ID: A	Plot ID: WET 64M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Sycamore	*Platanus occidentalis*	T	FACW-
2.	Silky Dogwood	*Cornus amomum*	S	FACW
3.	Ironwood	*Carpinus caroliniana*	S	FACW+
4.	Sweet Gum	*Liquidambar styraciflua*	T	FAC
5.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
6.	Lizard's Tail	*Saururus cernuus*	H	OBL
7.	Coastal Sweetpepperbush	*Clethra alnifolia*	S	FAC+
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: 1 (in.)
- Depth to Free Water in Pit: 2 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 64M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 5/1	7.5YR 5/6		Loamy sand

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo1450

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/2/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	PSS	Transect ID: A	Plot ID: WET 65M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
2.	Coastal Sweetpepperbush	*Clethra alnifolia*	S	FAC+
3.	Ironwood	*Carpinus caroliniana*	S	FACW+
4.	Spicebush	*Lindera benzoin*	S	FACW-
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PSS Transect ID: A Plot ID: WET 65M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-3	A	7.5YR 5/1			Loamy sand
3-16	B	7.5YR 2.5/1			Loamy sand

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1453

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/2/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	PFO	Transect ID: A	Plot ID: WET 66M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Lizard's Tail	*Saururus cernuus*	H	OBL
2.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
3.	Red Maple	*Acer rubrum*	T	FAC
4.	Spicebush	*Lindera benzoin*	S	FACW-
5.	Cinnamon Fern	*Osmunda cinnamomea*	H	FACW
6.	Royal Fern	*Osmunda regalis*	H	OBL
7.	Ironwood	*Carpinus caroliniana*	S	FACW+
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 66M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10YR 4/2	5YR 4/6	2%	Sandy loam

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1454

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/3/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	PFO	Transect ID: A	Plot ID: WET 67M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Ironwood	*Carpinus caroliniana*	S	FACW+
2.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
3.	Highbush Blueberry	*Vaccinium corymbosum*	S	FACW-
4.	Red Maple	*Acer rubrum*	T	FAC
5.	Sweet Gum	*Liquidambar styraciflua*	T,S	FAC
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: (in.)
- Depth to Free Water in Pit: (in.)
- Depth to Saturated Soil: (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 67M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-9	A	5YR 4/1			Sandy loam
9-16	B	G1 4/N			Sandy loam

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1411

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/3/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 68M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Lizard's Tail	*Saururus cernuus*	H	OBL
2.	River Birch	*Betula nigra*	T,S	FACW
3.	Sycamore	*Platanus occidentalis*	T,S	FACW-
4.	Red Maple	*Acer rubrum*	T,S	FAC
5.	Ironwood	*Carpinus caroliniana*	S	FACW+
6.	Highbush Blueberry	*Vaccinium corymbosum*	S	FACW-
7.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: 1 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 68M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-9	A	10YR 4/1			Sandy clay loam
9-16	B	G1 4/N			Sandy clay loam

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1414

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/3/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 69M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Royal Fern	*Osmunda regalis*	H	OBL
2.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
3.	Ironwood	*Carpinus caroliniana*	S	FACW+
4.	Sycamore	*Platanus occidentalis*	T	FACW-
5.	Cinnamon Fern	*Osmunda cinnamomea*	H	FACW
6.	Red Maple	*Acer rubrum*	T	FAC
7.	River Birch	*Betula nigra*	T	FACW
8.	Highbush Blueberry	*Vaccinium corymbosum*	H	FACW-
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: 1 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 69M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-7	A	10YR 4/1			Sandy loam
7-16	B	G1 4/N			Sandy loam

Hydric Soil Indicators: Yes No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1415

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/3/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 70M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X

If needed, explain on reverse

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	River Birch	*Betula nigra*	S	FACW
2.	Sycamore	*Platanus occidentalis*	T	FACW-
3.	Red Maple	*Acer rubrum*	T	FAC
4.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
5.	Ironwood	*Carpinus caroliniana*	S	FACW+
6.	Virginia Knotweed	*Polygonum virginianum*	H	FAC
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: Receives hydrology from WUS113M

Community ID: PFO Transect ID: A Plot ID: WET 70M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10YR 4/1	5YR 4/6	5%	Sandy loam

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1421

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/3/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 71M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Sycamore	*Platanus occidentalis*	T	FACW-
2.	Lizard's Tail	*Saururus cernuus*	H	OBL
3.	Marsh Marigold	*Caltha palustris*	H	OBL
4.	Virginia Knotweed	*Polygonum virginianum*	H	FAC
5.	Red Maple	*Acer rubrum*	T	FAC
6.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
7.	Royal Fern	*Osmunda regalis*	H	OBL
8.	Highbush Blueberry	*Vaccinium corymbosum*	S	FACW-
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: 1 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: Crayfish burrows, receives hydrology from I-64

Community ID: PFO Transect ID: A Plot ID: WET 71M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 3/1			Sandy loam

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1424

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/3/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 72M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
2.	River Birch	*Betula nigra*	S	FACW
3.	Ironwood	*Carpinus caroliniana*	S	FACW+
4.	Slippery Elm	*Ulmus rubra*	S	FAC
5.	Green Ash	*Fraxinus pennsylvanica*	T	FAC
6.	Sweet Gum	*Liquidambar styraciflua*	T	FAC
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: 5 (in.)
- Depth to Saturated Soil: 3 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- X Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 72M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10YR 4/2	5YR 4/6	3%	Sandy loam

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Crayfish burrows
Photo1426

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/3/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 73M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Red Maple	*Acer rubrum*	T	FAC
2.	Ironwood	*Carpinus caroliniana*	S	FACW+
3.	Slippery Elm	*Ulmus rubra*	T	FAC
4.	Green Ash	*Fraxinus pennsylvanica*	T	FACW
5.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: (in.)
- Depth to Free Water in Pit: (in.)
- Depth to Saturated Soil: (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 73M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	5YR 3/1			Sandy loam

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo ?

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/3/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 74M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Lizard's Tail	*Saururus cernuus*	H	OBL
2.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
3.	Ironwood	*Carpinus caroliniana*	S	FACW+
4.	Red Maple	*Acer rubrum*	T	FAC
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: 1 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 74M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	5YR 3/1			Silt clay loam

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo1428

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/3/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 75M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
2.	Red Maple	*Acer rubrum*	T,S	FAC
3.	Blackgum	*Nyssa sylvatica*	T,S	FAC
4.	Sweet Gum	*Liquidambar styraciflua*	T,S	FAC
5.	Cinnamon Fern	*Osmunda cinnamomea*	H	FACW
6.	Ironwood	*Carpinus caroliniana*	S	FACW+
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: 0.5 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 75M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	5YR 3/1			

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1432

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/3/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 76M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	River Birch	*Betula nigra*	T	FACW
2.	Coastal Sweetpepperbush	*Clethra alnifolia*	S	FAC+
3.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
4.	Ironwood	*Carpinus caroliniana*	S	FACW+
5.	Red Maple	*Acer rubrum*	T,S	FAC
6.	Highbush Blueberry	*Vaccinium corymbosum*	S	FACW-
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: (in.)
- Depth to Free Water in Pit: (in.)
- Depth to Saturated Soil: (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 76M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	G1 4/N			Loamy sand

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1434

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/3/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 77M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	River Birch	*Betula nigra*	S	FACW
2.	Black Willow	*Salix nigra*	S	FACW+
3.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
4.	Royal Fern	*Osmunda regalis*	H	OBL
5.	Smooth Alder	*Alnus serrulata*	S	OBL
6.	Red Maple	*Acer rubrum*	S	FAC
7.	Lizard's Tail	*Saururus cernuus*	H	OBL
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- X Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: 3 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 77M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
					No soils taken

Hydric Soil Indicators: Yes No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime	X	Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo1435

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/3/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 78M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Lizard's Tail	*Saururus cernuus*	H	OBL
2.	River Birch	*Betula nigra*	T,S	FACW
3.	Highbush Blueberry	*Vaccinium corymbosum*	S	FACW-
4.	Cinnamon Fern	*Osmunda cinnamomea*	H	FACW
5.	Sycamore	*Platanus occidentalis*	T,S	FACW-
6.	Royal Fern	*Osmunda regalis*	H	OBL
7.	Red Maple	*Acer rubrum*	T,S	FAC
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: 1 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: Crayfish burrows

Community ID: PFO Transect ID: A Plot ID: WET 78M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 3/1			Sandy clay loam

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo1439

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/3/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	PFO	Transect ID: A	Plot ID: WET 79M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Sphagnum Moss	*Sphagnum*	H	
2.	Coastal Sweetpepperbush	*Clethra alnifolia*	S	FAC+
3.	Red Maple	*Acer rubrum*	T	FAC
4.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
5.	Royal Fern	*Osmunda regalis*	H	OBL
6.	Lizard's Tail	*Saururus cernuus*	H	OBL
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 79M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 3/1			Sandy clay loam

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1444

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/3/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 80M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	River Birch	*Betula nigra*	T,S	FACW
2.	Coastal Sweetpepperbush	*Clethra alnifolia*	S	FAC+
3.	Red Maple	*Acer rubrum*	T,S	FAC
4.	Sweet Gum	*Liquidambar styraciflua*	T,S	FAC
5.	Ironwood	*Carpinus caroliniana*	S	FACW+
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: (in.)
- Depth to Free Water in Pit: (in.)
- Depth to Saturated Soil: (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 80M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 3/2	5YR 4/6	5%	Sandy loam

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo1443

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/3/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 81M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X

If needed, explain on reverse

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
2.	Ironwood	*Carpinus caroliniana*	S	FACW+
3.	Red Maple	*Acer rubrum*	T,S	FAC
4.	Lizard's Tail	*Saururus cernuus*	H	OBL
5.	Common Elderberry	*Sambucus canadensis*	S	FACW-
6.	Sweet Gum	*Liquidambar styraciflua*	T,S	FAC
7.	Net-Veined Chain Fern	*Woodwardia areolata*	H	FACW+
8.	Cinnamon Fern	*Osmunda cinnamomea*	H	FACW
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: (in.)
- Depth to Free Water in Pit: (in.)
- Depth to Saturated Soil: (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 81M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10YR 5/1			Loamy sand

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo1446

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/3/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	PFO	Transect ID: A	Plot ID: WET 82M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Lizard's Tail	*Saururus cernuus*	H	OBL
2.	Sweet Gum	*Liquidambar styraciflua*	T,S	FAC
3.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
4.	Cinnamon Fern	*Osmunda cinnamomea*	H	FACW
5.	Red Maple	*Acer rubrum*	T,S	FAC
6.	Royal Fern	*Osmunda regalis*	H	OBL
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: 1 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 82M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	5YR 3/1			Sandy loam

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo1452

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/3/2011
Applicant/Owner:	VDOT	County:	James City
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 83M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	River Birch	*Betula nigra*	T,S	FACW
2.	Net-Veined Chain Fern	*Woodwardia areolata*	H	FACW+
3.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
4.	Royal Fern	*Osmunda regalis*	H	OBL
5.	Lizard's Tail	*Saururus cernuus*	H	OBL
6.	Red Maple	*Acer rubrum*	T,S	FAC
7.	Highbush Blueberry	*Vaccinium corymbosum*	S	FACW-
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: Crayfish burrows

Community ID: PFO Transect ID: A Plot ID: WET 83M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	5YR 3/1			Sandy loam

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1453

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/8/2011
Applicant/Owner:	VDOT	County:	James City
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: Plot ID: WET 84M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Lizard's Tail	*Saururus cernuus*	H	OBL
2.	Halberd Leaved Tearthumb	*Polygonum arifolium*	H	OBL
3.	Ironwood	*Carpinus caroliniana*	S	FACW+
4.	American Sycamore	*Platanus occidentalis*	T	FACW-
5.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
6.	Highush Blueberry	*Vaccinium corymbosum*	S	FACW-
7.	Smooth Alder	*Alnus serrulata*	S	OBL
8.	Wax Myrtle	*Morella cerifera*	S	FAC
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: 1 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: _____ Plot ID: WET 84M

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____
Field Observations Confirm Mapped Type? Yes _____ No _____
Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-9	A	7.5YR 4/1	5YR 4/6	5%	Loamy sand
9-16	B	10YR 4/2	5YR 4/6	5%	Loamy sand

Hydric Soil Indicators: Yes X No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No _____	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No _____	
Hydric Soils Present?	Yes X	No _____	Yes X No _____

Remarks: Photo 1414

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/9/2011
Applicant/Owner:	VDOT	County:	James City
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 86M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Ironwood	*Carpinus caroliniana*	S	FACW+
2.	Spicebush	*Lindera benzoin*	S	FACW-
3.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
4.	Lizard's Tail	*Saururus cernuus*	H	OBL
5.	Sweet Gum	*Liquidambar styraciflua*	T	FAC
6.	American Sycamore	*Platanus occidentalis*	T	FACW-
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 86M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	5YR 4/1	5YR 4/6	2%	Sandy clay loam

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Need to merge this wetland with the one it touches
Photo 1420

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/9/2011
Applicant/Owner:	VDOT	County:	James City
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 87M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Ironwood	*Carpinus caroliniana*	S	FACW+
2.	Blackgum	*Nyssa sylvatica*	T	FAC
3.	Highbush Blueberry	*Vaccinium corymbosum*	S	FACW-
4.	Red Maple	*Acer rubrum*	S	FAC
5.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
6.	Net-Veined Chain Fern	*Woodwardia areolata*	H	FACW+
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 87M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	5YR 4/1	5YR 4/6	1%	Loamy sandy

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1424

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/9/2011
Applicant/Owner:	VDOT	County:	James City
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 88M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
2.	Net-Veined Chain Fern	*Woodwardia areolata*	H	FACW+
3.	Green Ash	*Fraxinus pennsylvanica*	S	FACW
4.	Lizard's Tail	*Saururus cernuus*	H	OBL
5.	Ironwood	*Carpinus caroliniana*	S	FACW+
6.	Spicebush	*Lindera benzoin*	S	FACW-
7.	Red Maple	*Acer rubrum*	T	FAC
8.	Marsh Marigold	*Caltha palustris*	H	OBL
9.	Common Elderberry	*Sambucus canadensis*	S	FACW-
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: (in.)
- Depth to Free Water in Pit: 3 (in.)
- Depth to Saturated Soil: 2 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- Saturated in Upper 12 inches
- Water Marks
- X Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 88M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-12	A	7.5YR 4/1	5YR 4/6	1%	Sandy clay loam
12-16	B	7.5YR 6/1			Loamy sand

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1429

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/9/2011
Applicant/Owner:	VDOT	County:	James City
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	PFO	Transect ID:	Plot ID: WET 89M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
2.	Net-Veined Chain Fern	*Woodwardia areolata*	H	FACW+
3.	Green Ash	*Fraxinus pennsylvanica*	S	FACW
4.	Lizard's Tail	*Saururus cernuus*	H	OBL
5.	Ironwood	*Carpinus caroliniana*	S	FACW+
6.	Spicebush	*Lindera benzoin*	S	FACW
7.	Red Maple	*Acer rubrum*	T	FAC
8.	Marsh Marigold	*Caltha palustris*	H	OBL
9.	Common Elderberry	*Sambucus canadensis*	S	FACW-
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: (in.)
- Depth to Free Water in Pit: 3 (in.)
- Depth to Saturated Soil: 2 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- Saturated in Upper 12 inches
- Water Marks
- X Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: _____ Plot ID: WET 89M

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____

Field Observations Confirm Mapped Type? Yes _____ No _____

Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-12	A	7.5YR 4/1	5YR 4/6	1%	Sandy clay loam
12-16	B	7.5YR 6/1			Loamy sand

Hydric Soil Indicators: Yes X No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No _____	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No _____	
Hydric Soils Present?	Yes X	No _____	Yes X No _____

Remarks: Photo 1432

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/9/2011
Applicant/Owner:	VDOT	County:	James City
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 90M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Lizard's Tail	*Saururus cernuus*	H	OBL
2.	Marsh Marigold	*Caltha palustris*	H	OBL
3.	Seed Box	*Ludwigia alternifolia*	H	FACW+
4.	Red Maple	*Acer rubrum*	T	FAC
5.	False Nettle	*Boehmeria cylindrica*	H	FACW+
6.	Sweet Gum	*Liquidambar styraciflua*	T,S	FAC
7.	Black Willow	*Salix nigra*	S	FACW+
8.	Green Ash	*Fraxinus pennsylvanica*	T	FACW
9.	Slippery Elm	*Ulmus rubra*	T	FAC
10.	Water Smartweed	*Polygonum amphibium*	H	OBL
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: 0 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- X FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 90M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	O				Muck Soil

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon	X	High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: This is a bog
Photo 1438

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/9/2011
Applicant/Owner:	VDOT	County:	James City
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 91M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Lizard's Tail	*Saururus cernuus*	H	OBL
2.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
3.	Red Maple	*Acer rubrum*	T	FAC
4.	Net-Veined Chain Fern	*Woodwardia areolata*	H	FACW+
5.	Spicebush	*Lindera benzoin*	S	FACW-
6.	Sweet Gum	*Liquidambar styraciflua*	T	FAC
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: 1 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 91M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10YR 3/1			Sand clay loam

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1441

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/9/2011
Applicant/Owner:	VDOT	County:	James City
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 92M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Slippery Elm	*Ulmus rubra*	T,S	FAC
2.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
3.	Royal Fern	*Osmunda regalis*	H	OBL
4.	Ironwood	*Carpinus caroliniana*	S	FACW+
5.	Lizard's Tail	*Saururus cernuus*	H	OBL
6.	Green Ash	*Fraxinus pennsylvanica*	T,S	FACW
7.	Marsh Marigold	*Caltha palustris*	H	OBL
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: 1 (in.)
- Depth to Free Water in Pit: 2 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 92M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.6YR 4/1			Loamy Sand

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1445

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/9/2011
Applicant/Owner:	VDOT	County:	James City
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 93M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Marsh Marigold	*Caltha palustris*	H	OBL
2.	Lizard's Tail	*Saururus cernuus*	H	OBL
3.	False Nettle	*Boehmeria cylindrica*	H	FACW+
4.	Cinnamon Fern	*Osmunda cinnamomea*	H	FACW
5.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
6.	Red Maple	*Acer rubrum*	T	FAC
7.	Slippery Elm	*Lumus rubra*	T	FAC
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: 6 (in.)
- Depth to Saturated Soil: 6 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 93M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 3/1	5YR 4/6	5%	Loamy sand

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1449

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/9/2011
Applicant/Owner:	VDOT	County:	James City
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	PFO	Transect ID:	Plot ID: WET 94M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	River Birch	*Betula nigra*	T	FACW
2.	Net-Veined Chain Fern	*Woodwardia areolata*	H	FACW+
3.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
4.	Lizard's Tail	*Saururus cernuus*	H	OBL
5.	Common Elderberry	*Sambucus canadensis*	S	FACW-
6.	Red Maple	*Acer rubrum*	S	FAC
7.	False Nettle	*Boehmeria cylindrica*	H	FACW+
8.	Ironwood	*Carpinus caroliniana*	S	FACW+
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: 0 (in.)
- Depth to Free Water in Pit: 1 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: _____ Plot ID: WET 94M

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____

Field Observations Confirm Mapped Type? Yes _____ No _____

Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	5Y 6/1	5YR 4/6	5%	Loamy sand

Hydric Soil Indicators: Yes X No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
_____	Sulfidic Odor	X	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
X	Reducing Conditions	_____	Listed on National Hydric Soils List
_____	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No _____	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No _____	
Hydric Soils Present?	Yes X	No _____	Yes X No _____

Remarks: Photo 1451

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/9/2011
Applicant/Owner:	VDOT	County:	James City
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 95M

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Red Maple	*Acer rubrum*	T	FAC
2.	Sweet Gum	*Liquidambar styraciflua*	T	FAC
3.	Sycamore	*Platanus occidentalis*	T	FACW-
4.	Green Ash	*Fraxinus pennsylvanica*	S	FACW
5.	Water Smartweed	*Polygonum amphibium*	H	OBL
6.	River Birch	*Betula nigra*	S	FACW
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks: Not much vegetation

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: 3 (in.)
- Depth to Saturated Soil: 2 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 95M

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 4/1	5YR 4/6	10%	Sandy clay loam

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1454

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula Study	Date:	6/27/2011
Applicant/Owner:	VDOT	County:	Henrico
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PEM Transect ID: A Plot ID: WET 1S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Soft Rush	*Juncus effusus*	H	FACW+
2.	Rice Cutgrass	*Leersia oryzoides*	H	OBL
3.	Skunk Cabbage	*Symplocarpus foetidus*	H	OBL
4.	Royal Fern	*Osmunda regalis*	H	OBL
5.	Broad leaved Cattail	*Typha latifolia*	H	OBL
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: 2 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PEM Transect ID: A Plot ID: WET 1S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10 YR 2/1			

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Pic 1076

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula Study	Date:	6/28/2011
Applicant/Owner:	VDOT	County:	Henrico
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PEM Transect ID: A Plot ID: WET 2S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Rice Cutgrass	*Leersia oryzoides*	H	OBL
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: 1 (in.)
- Depth to Free Water in Pit: 2 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks: May not be jurisdictional.

Community ID: PEM Transect ID: A Plot ID: WET 2S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10YR 3/1			Sandy clay loam

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Pic 1081

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula Study	Date:	6/28/2011
Applicant/Owner:	VDOT	County:	Henrico
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 3S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Red Maple	*Acer rubrum*	T	FACW+
2.	Sweetgum	*Liquidambar styraciflua*	T	FAC
3.	Lizard's Tail	*Saururus cernuus*	H	OBL
4.	Smallspike False Nettle	*Boehmeria cylindrica*	H	FACW+
5.	Fringed Sedge	*Carex crinita*	H	OBL
6.	Bladder Sedge	*Carex intumescens*	H	FACW+
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: (in.)
- Depth to Free Water in Pit: (in.)
- Depth to Saturated Soil: (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 3S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-15	A	10YR 2/1	2.5YR 3/6	10%	Clay/Loam

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Pic 1085

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula Study	Date:	6/28/2011
Applicant/Owner:	VDOT	County:	Henrico
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PSS Transect ID: A Plot ID: WET 4S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Willow Oak	*Quercus phellos*	T	FAC+
2.	Soft Rush	*Juncus effusus*	H	FACW+
3.	Woolgrass	*Scirpus cyperinus*	H	FACW+
4.	Hazel Alder	*Alnus serrulata*	S	OBL
5.	Water Tupelo	*Nyssa aquatica*	T	OBL
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: 4 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PSS Transect ID: A Plot ID: WET 4S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks: Inundated - no soils taken.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Pic 1086

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula Study	Date:	6/28/2011
Applicant/Owner:	VDOT	County:	Henrico
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 5S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Highbush Blueberry	*Vaccinium corymbosum*	H	FACW-
2.	Common Boneset	*Eupatorium perfoliatum*	H	FACW+
3.	Soft Rush	*Juncus effusus*	H	FACW+
4.	Red Maple	*Acer rubrum*	T	FAC
5.	Sweetgum	*Liquidambar styraciflua*	T	FAC
6.	Fringed Sedge	*Carex crinita*	H	OBL
7.	Poison Ivy	*Toxicodendron radicans*	V	FAC
8.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 5S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 2.5/1	5YR 3/4	10%	Clay Loam

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Pic 1090

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula Study	Date:	6/28/2010
Applicant/Owner:	VDOT	County:	Henrico
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 6S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X

If needed, explain on reverse

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Rice Cutgrass	*Leersia oryzoides*	H	OBL
2.	Red Maple	*Acer rubrum*	T	FAC
3.	Japanese Stilt Grass	*Microstegium vimineum*	H	FAC
4.	False Nettle	*Boehmeria cylindrica*	H	FACW+
5.	Bladder Sedge	*Carex intumescens*	H	FACW+
6.	Poison Ivy	*Toxicodendron radicans*	V	FAC
7.	Black Gum	*Nyssa sylvatica*	T	FAC
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:
Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 6S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10YR 4/1	5YR 3/4	10%	Clay Loam

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: 1093

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula Study	Date:	6/28/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 7S

Do Normal Conditions exist on the site?	Yes	No
Is the site significantly disturbed (Atypical situation)?	Yes	No
Is the area a potential Problem Area?	Yes	No

If needed, explain on reverse

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Rice Cutgrass	*Leersia oryzoides*	H	OBL
2.	False Nettle	Boehmeria cylindrica	H	FACW+
3.	Sweetgum	*Liquidambar styraciflua*	T	FAC
4.	Red Maple	*Acer rubrum*	T	FAC
5.	Poison Ivy	*Toxicodendron radicans*	V	FAC
6.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
7.	Royal Fern	*Osmunda regalis*	H	OBL
8.	Muscle Wood	*Carpinus caroliniana*	S	FACW+
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: 6 (in.)
- Depth to Saturated Soil: 3 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 7S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	5YR 2.5/1			Silt loam

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: 1095

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula Study	Date:	6/28/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PSS Transect ID: A Plot ID: WET 8S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Willow Oak	*Quercus phellos*	S	FAC+
2.	Black Willow	*Salix nigra*	S	FACW+
3.	Water Tupelo	*Nyssa aquatica*	T	OBL
4.	Duck Weed	*Lemna minor*	H	OBL
5.	Buttonbush	*Cephalanthus occidentalis*	S	OBL
6.	Red Maple	*Acer rubrum*	S	FAC
7.	False Nettle	*Boehmeria cylindrica*	H	FACW+
8.	Yellow Pond Lily	*Nuphar lutea*	H	OBL
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: 6 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PSS Transect ID: A Plot ID: WET 8S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime	X	Listed on Local Hydric Soils List
	Reducing Conditions	X	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:
No soils taken

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: 1096

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula Study	Date:	6/28/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PSS Transect ID: A Plot ID: WET 9S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Lizard's Tail	*Saururus cernuus*	H	OBL
2.	Broadleaf Cattail	*Typha latifolia*	H	OBL
3.	False Nettle	*Boehmeria cylindrica*	H	FACW+
4.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
5.	Hazel Alder	*Alnus serrulata*	S	OBL
6.	Rice Cutgrass	*Leersia oryzoides*	H	OBL
7.	Sweetgum	*Liquidambar styraciflua*	S	FAC
8.	Red Maple	*Acer rubrum*	T	FAC
9.	Soft Rush	*Juncus effusus*	H	FACW+
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- X Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PSS Transect ID: A Plot ID: WET 9S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 3/1			Clay loam

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Pics 1105/1106

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula Study	Date:	6/28/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 10S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Lizards Tail	*Saururus cernuus*	H	OBL
2.	Fringed Sedge	*Carex crinita*	H	OBL
3.	Japanese Stilt Grass	*Microstegium vimineum*	H	FAC
4.	Red Maple	*Acer rubrum*	T	FAC
5.	American Sycamore	*Platanus occidentalis*	T	FACW-
6.	Spice Bush	*Lindera benzoin.*	S	FACW-
7.	False Nettle	*Boehmeria cylindrica*	H	FACW+
8.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
9.	Soft Rush	*Juncus effusus*	H	FACW+
10.	River Birch	*Betula nigra*	T	FACW
11.	Bristlebract Sedge	*Carex tribuloides*	H	FACW+
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- x Inundated
- x Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- x Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- x Oxidized Root Channels in Upper 12 inches
- x Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 10S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10YR 2/1	2.5YR 3/6	10%	Clay Loam

Hydric Soil Indicators: Yes x No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
x	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
x	Reducing Conditions		Listed on National Hydric Soils List
x	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes x	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes x	No	
Hydric Soils Present?	Yes x	No	Yes x No

Remarks: Pix 1111

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula Study	Date:	6/29/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 12S

Do Normal Conditions exist on the site?	Yes x	No
Is the site significantly disturbed (Atypical situation)?	Yes	No x
Is the area a potential Problem Area?	Yes	No x
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Red Maple	*Acer rubrum*	T	FAC
2.	Japanese Stilt Grass	*Microstegium vimineum*	H	FAC
3.	Sweetgum	*Liquidambar styraciflua*	T	FAC
4.	Lizards Tail	*Saururus cernuus*	H	OBL
5.	High Bush Blueberry	*Vaccinium corymbosum*	H	FACW-
6.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
7.	Jewel Weed	*Impatiens capensis*	H	FACW
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- x Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- x Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- x Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 12S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10YR 2/1	2.5YR 3/6		Loam

Hydric Soil Indicators: Yes x No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
x	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
x	Reducing Conditions		Listed on National Hydric Soils List
x	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes x	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes x	No	
Hydric Soils Present?	Yes x	No	Yes x No

Remarks: 1127

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula Study	Date:	6/29/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 13S

Do Normal Conditions exist on the site?	Yes x	No
Is the site significantly disturbed (Atypical situation)?	Yes	No x
Is the area a potential Problem Area?	Yes	No x

If needed, explain on reverse

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
2.	False nettle	*Boehmeria cylindrica*	H	FACW+
3.	Red maple	*Acer rubrum*	T	FAC
4.	Lizards Tail	*Saururus cernuus*	H	OBL
5.	Bladder sedge	*Carex intumescens*	H	FACW+
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: 1 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- x Inundated
- x Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- x Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- x Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 13S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.

Hydric Soil Indicators: Yes x No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
x	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:
Innundated - no soils taken

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes x	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes x	No	
Hydric Soils Present?	Yes x	No	Yes x No

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula Study	Date:	6/29/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 14S

Do Normal Conditions exist on the site?	Yes x	No
Is the site significantly disturbed (Atypical situation)?	Yes	No x
Is the area a potential Problem Area?	Yes	No x
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Lizards Tail	*Saururus cernuus*	H	OBL
2.	Red Maple	*Acer rubrum*	T	FAC
3.	Royal Fern	*Osmunda regalis*	H	OBL
4.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
5.	Poison Ivy	*Toxicodendron radicans*	V	FAC
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: <1 (in.)
- Depth to Free Water in Pit: 1 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- x Inundated
- x Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- x Sediment Deposits
- x Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- x Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 14S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-15	A	7.5 YR 4/1	2.5 YR 3/4	10%	Sandy Clay loam

Hydric Soil Indicators: Yes x No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
x	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
x	Reducing Conditions		Listed on National Hydric Soils List
x	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes x	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes x	No	
Hydric Soils Present?	Yes x	No	Yes x No

Remarks: 1146

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	6/29/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 15S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	False Nettle	*Boehmeria cylindrica*	H	FACW+
2.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
3.	Red Maple	*Acer rubrum*	T	FAC
4.	Japanese Stilt Grass	*Microstegium vimineum*	H	FAC
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: PFO within ROW, PEM outside

Community ID: PFO Transect ID: A Plot ID: WET 15S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-12	A	7.5 YR 3/1			Sandy loam
12-16	B	7.5 YR 5/1	5 YR 4/6	10%	Sandy loam

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Pic 1070
Invasive Japanese Stilt Grass

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	7/6/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET17S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Lizard's Tail	*Saururus cernuus*	H	OBL
2.	Red Maple	*Acer Rubrum*	T	FAC
3.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
4.	Green Ash	*Fraxinus pennsylvanica*	T	FACW
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: 9 (in.)
- Depth to Saturated Soil: 8 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 17S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-15	A	G1 5/N	5 YR 3/4		Loamy sand

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Pic 1083

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	7/6/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 19S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Lizard's Tail	*Saururus cernuus*	H	OBL
2.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
3.	Cinnamon Fern	*Osmunda cinnamomea*	H	FACW
4.	Red Maple	*Acer rubrum*	T	FAC
5.	Marsh Marigold	*Caltha palustris*	H	OBL
6.	Highbush Blueberry	*Vaccinium corymbosum*	H	FACW-
7.	Green Ash	*Fraxinus pennsylvanica*	T	FACW
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 19S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-15	A	7.5 YR 2.5/1			Loamy sand

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: 1104/1105

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	7/6/2011
Applicant/Owner:	VDOT	County:	James City
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 20S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Lizard's Tail	*Saururus cernuus*	H	OBL
2.	False Nettle	*Boehmeria cylindrica*	H	FACW+
3.	Rice Cutgrass	*Leersia oryzoides*	H	OBL
4.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
5.	Red Maple	*Acer rubrum*	T	FAC
6.	Marsh Marigold	*Caltha palustris*	H	OBL
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: 1 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 20S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10 YR 2/1			Loamy sand

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: 1086

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	7/6/2011
Applicant/Owner:	VDOT	County:	James City
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PEM Transect ID: A Plot ID: WET 21S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Lizard's Tail	*Saururus cernuus*	H	OBL
2.	False Nettle	*Boehmeria cylindrica*	H	FACW+
3.	Japanese Stilt Grass	*Microstegium vimineum*	H	FAC
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PEM Transect ID: A Plot ID: WET 21S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10 YR 2/1			Loamy sand

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Pic 1091
Invasive Japanses Stilt Grass

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	7/6/2011
Applicant/Owner:	VDOT	County:	James City
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PEM Transect ID: A Plot ID: WET 22S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Rice Cutgrass	*Leersia oryzoides*	H	OBL
2.	Red Maple	*Acer rubrum*	T	FAC
3.	Green Ash	*Fraxinus pennsylvanica*	T	FACW
4.	Black Willow	*Salix nigra*	S	FACW+
5.	American Sycamore	*Platanus occidentalis*	T	FACW-
6.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
7.	Soft Rush	*Juncus effusus*	H	FACW+
8.	False Nettle	*Boehmeria cylindrica*	H	FACW+
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: 2 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- X Water Marks
- Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PEM Transect ID: A Plot ID: WET 22S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	5 YR 2.5/1			Loamy sand

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Pic 1094

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	7/6/2011
Applicant/Owner:	VDOT	County:	James City
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	PFO	Transect ID: A	Plot ID: WET 23S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Lizard's Tail	*Saururus cernuus*	H	OBL
2.	American Sycamore	*Platanus occidentalis*	T	FACW-
3.	Spicebush	*Lindera benzoin*	S	FACW-
4.	Green Ash	*Fraxinus pennsylvanica*	T	FACW
5.	Red Maple	*Acer rubrum*	T	FAC
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: (in.)
- Depth to Free Water in Pit: 6 (in.)
- Depth to Saturated Soil: 4 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 23S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-15	A	10 YR 5/1			Loamy sand

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Pic 1098

S

ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	7/6/2011
Applicant/Owner:	VDOT	County:	James City
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 24S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Lizard's Tail	*Saururus cernuus*	H	OBL
2.	Marsh Marigold	*Caltha palustris*	H	OBL
3.	Japanese Stilt Grass	*Microstegium vimineum*	H	FAC
4.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks: Invasive Japanese Stilt Grass

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: 5 (in.)
- Depth to Saturated Soil: 4 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A WET 24S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-15	A	10 YR 2/1			Sand

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Pic 1101

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	7/6/2011
Applicant/Owner:	VDOT	County:	James City
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	PFO	Transect ID: A	Plot ID: WET 25S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
2.	Poison Ivy	*Toxicodendron Radicans*	V	FAC
3.	Marsh Marigold	*Caltha palustris*	H	OBL
4.	Red Maple	*Acer rubrum*	T	FAC
5.	Cinnamon Fern	*Osmunda cinnamomea*	H	FACW
6.	Lizard's Tail	*Saururus cernuus*	H	OBL
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: 6 (in.)
- Depth to Saturated Soil: 4 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: _____ Plot ID: WET 25S

SOILS

Map Unit Name
(Series and Phase): _____ Drainage Class: _____
Field Observations Confirm Mapped Type? Yes _____ No _____
Taxonomy (Subgroup): _____

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-15	A	7.5 YR 5/1			Loamy sand

Hydric Soil Indicators: Yes X No _____
(If yes, check them)

_____	Histosol	_____	Concretions
_____	Histic Epidon	_____	High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor	_____	Organic Streaking in Sandy Soils
_____	Aquic Moisture Regime	_____	Listed on Local Hydric Soils List
_____	Reducing Conditions	_____	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors	_____	Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No _____	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No _____	
Hydric Soils Present?	Yes X	No _____	Yes X No _____

Remarks: Pics 1104/1105

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	7/11/2011
Applicant/Owner:	VDOT	County:	Newport News
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 26S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Rough Horsetail	*Equisetum hymale*	H	OBL
2.	Lizard's Tail	*Saururus cernuus*	H	OBL
3.	False Nettle	*Boehmeria cylindrica*	H	FACW+
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks: PEM

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: (in.)
- Depth to Free Water in Pit: 1 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 26S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-15	A	7.5 YR 4/1			Sand

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Pics 1113/1115
Invasive Japanese Stilt Grass

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	7/11/2011
Applicant/Owner:	VDOT	County:	Newport News
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 27S

Do Normal Conditions exist on the site?	Yes	No X
Is the site significantly disturbed (Atypical situation)?	Yes X	No
Is the area a potential Problem Area?	Yes	No X

If needed, explain on reverse

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Red Maple	*Acer rubrum*	T	FAC
2.	Lizard's Tail	*Saururus cernuus*	H	OBL
3.	False Nettle	*Boehmeria cylindrica*	H	FACW+
4.	Poison Ivy	*Toxicodendron radicans*	V	FAC
5.	Japansese Stilt Grass	*Microstegium vimineum*	H	FAC
6.	Green Ash	*Fraxinus pennsylvanica*	T	FACW
7.	Marsh Marigold	*Caltha palustris*	H	OBL
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: 2 (in.)
- Depth to Saturated Soil: 1 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 27S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-15	A	7.5 YR 4/1			Sandy loam

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks: Invasive Japansese Stilt Grass

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Pics 1131

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	8/18/2011
Applicant/Owner:	VDOT	County:	Hampton
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	E2EM1P	Transect ID: A	Plot ID: WET 29S (Newmarket Creek)

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Common Reed	*Phragmites australis*	H	FACW
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: 0 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 3 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- X Saturated in Upper 12 inches
- Water Marks
- X Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: E2EM1P Transect ID: A Plot ID: WET 29S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10YR 4/1			Silt Loam

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	8/18/2011
Applicant/Owner:	VDOT	County:	Hampton
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: E2EM1P Transect ID: A Plot ID: WET 30S (Newmarket Creek)

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X

If needed, explain on reverse

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Common Reed	*Phragmites australis*	H	FACW
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: 0 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 4 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- X Saturated in Upper 12 inches
- Water Marks
- X Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: E2EM1P Transect ID: A Plot ID: WET 30S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10YR 4/1			Silt Loam

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	8/18/2011
Applicant/Owner:	VDOT	County:	Hampton
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	PFO	Transect ID: A	Plot ID: WET 31S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Royal Fern	*Osmunda regalis*	H	OBL
2.	Red Maple	*Acer rubrum*	T	FAC
3.	American Hornbeam (I	*Carpinus caroliniana*	S	FACW+
4.	Spicebush	*Lindera benzoin*	S	FACW-
5.	Lizard's Tail	*Saururus cernuus*	H	OBL
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: 0 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 4 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 31S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 3/1			Loam

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	8/18/2011
Applicant/Owner:	VDOT	County:	Hampton
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	PEM	Transect ID: A	Plot ID: WET 32S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Royal Fern	*Osmunda regalis*	H	OBL
2.	Broadleaf Cattail	*Typha latifolia*	H	OBL
3.	Highbush Blueberry	*Vaccinium corymbosum*	H	FACW-
4.	Red Maple	*Acer rubrum*	T	FAC
5.	Lizard's Tail	*Saururus cernuus*	H	OBL
6.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
7.	Rice Cutgrass	*Leersia oryzoides*	H	OBL
8.	Sweet Gum	*Liquidambar styraciflua*	T	FAC
9.	American Hornbeam (I	*Carpinus caroliniana*	S	FACW+
10.	American Elderberry	*Sambucus canadensis*	S	FACW-
11.	River Birch	*Betula nigra*	T	FACW
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: 1 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PEM Transect ID: A Plot ID: WET 32S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10YR 4/1	5YR 4/6	10%	Clay Loam

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	8/18/2011
Applicant/Owner:	VDOT	County:	Hampton
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	PEM	Transect ID: A	Plot ID: WET 34S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Smallspike False Nettle	*Boehmeria cylindrica*	H	FACW+
2.	Coastal Sweetpepperbush	*Clethra alnifolia*	S	FAC+
3.	Japanese Stilt Grass	*Microstegium vimineum*	H	FAC
4.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
5.	Fringed Sedge	*Carex crinita*	H	OBL
6.	American Hornbeam (I	*Carpinus caroliniana*	S	FACW+
7.	Red Maple	*Acer rubrum*	T	FAC
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PEM Transect ID: A Plot ID: WET 34S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10YR 5/1	7.5YR 5/6		Sandy Clay Loam

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	8/18/2011
Applicant/Owner:	VDOT	County:	Hampton
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	PFO	Transect ID: A	Plot ID: WET 35S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Lizard's Tail	*Saururus cernuus*	H	OBL
2.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
3.	Smallspike False Nettle	*Boehmeria cylindrica*	H	FACW+
4.	Cinnamon Fern	*Osmunda cinnamomea*	H	FACW
5.	American Hornbeam (I	*Carpinus caroliniana*	S	FACW+
6.	Sweet Gum	*Liquidambar styraciflua*	T	FAC
7.	Red Maple	*Acer rubrum*	T	FAC
8.	Net-Veined Chain Fern	*Woodwardia areolata*	H	FACW+
9.	(Soft) Common Rush	*Juncus effusus*	H	FACW+
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: 0 (in.)
- Depth to Free Water in Pit: 0 (in.)
- Depth to Saturated Soil: 6 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 35S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10YR 5/1			Silty Clay Loam

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	8/18/2011
Applicant/Owner:	VDOT	County:	Hampton
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	PFO	Transect ID: A	Plot ID: WET 36S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Marsh Marigold	*Caltha palustris*	H	OBL
2.	Cinnamon Fern	*Osmunda cinnamomea*	H	FACW
3.	Royal Fern	*Osmunda regalis*	H	OBL
4.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
5.	Coastal Sweetpepperbush	*Clethra alnifolia*	S	FAC+
6.	Red Maple	*Acer rubrum*	T	FAC
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: 3 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 36S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10YR 5/2	7.5YR 5/6	15%	Clay Loam

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	8/18/2011
Applicant/Owner:	VDOT	County:	Hampton
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	PFO	Transect ID: A	Plot ID: WET 37S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Lizard's Tail	*Saururus cernuus*	H	OBL
2.	Cinnamon Fern	*Osmunda cinnamomea*	H	FACW
3.	Royal Fern	*Osmunda regalis*	H	OBL
4.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
5.	Highbush Blueberry	*Vaccinium corymbosum*	H	FACW-
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: 4 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 37S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10YR 2/1			Loam Sand

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	8/18/2011
Applicant/Owner:	VDOT	County:	Hampton
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 38S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Cinnamon Fern	*Osmunda cinnamomea*	H	FACW
2.	Highbush Blueberry	*Vaccinium corymbosum*	H	FACW-
3.	Red Maple	*Acer rubrum*	T	FAC
4.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
5.	Royal Fern	*Osmunda regalis*	H	OBL
6.	Red Maple	*Acer rubrum*	T	FAC
7.	American Sycamore	*Platanus occidentalis*	T	FACW-
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: 3 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 38S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 4/1			Loam

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	8/18/2011
Applicant/Owner:	VDOT	County:	Hampton
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	PFO	Transect ID: A	Plot ID: WET 39S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	River Birch	*Betula nigra*	T	FACW
2.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
3.	Net-Veined Chain Fern	*Woodwardia areolata*	H	FACW+
4.	Smallspike False Nettle	*Boehmeria cylindrica*	H	FACW+
5.	Coastal Sweetpepperbush	*Clethra alnifolia*	S	FAC+
6.	Royal Fern	*Osmunda regalis*	H	OBL
7.	Red Maple	*Acer rubrum*	T	FAC
8.	(Soft) Common Rush	*Juncus effusus*	H	FACW+
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: 3 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 39S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 4/1	5YR 3/4	30%	Loam Sand

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	8/18/2011
Applicant/Owner:	VDOT	County:	Hampton
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	PFO	Transect ID: A	Plot ID: WET 41S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Marsh Marigold	*Caltha palustris*	H	OBL
2.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
3.	Lizard's Tail	*Saururus cernuus*	H	OBL
4.	Red Maple	*Acer rubrum*	T	FAC
5.	Highbush Blueberry	*Vaccinium corymbosum*	H	FACW-
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 80%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: 5 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 41S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10YR 4/1			Sandy Clay Loam

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	8/18/2011
Applicant/Owner:	VDOT	County:	Hampton
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 43S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Rice Cutgrass	*Leersia oryzoides*	H	OBL
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: 3 (in.)
- Depth to Free Water in Pit: (in.)
- Depth to Saturated Soil: (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 43S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10YR 5/1			

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/15/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PSS Transect ID: A Plot ID: WET 96S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X

If needed, explain on reverse

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	River Birch	*Betula nigra*	T	FACW
2.	Red Maple	*Acer rubrum*	T	FAC
3.	Smooth Alder	*Alnus serrulata*	T	OBL
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- X Aerial Photographs
- Other
- No Recorded Data Available

Field Observations:
- Depth of Surface Water: (in.)
- Depth to Free Water in Pit: (in.)
- Depth to Saturated Soil: (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- Water-Stained Leaves
- Local Soil Survey Data
- X FAC-Neutral Test
- Other (Explain in Remarks)

Remarks: Flooded wetland

Community ID: PSS Transect ID: A Plot ID: WET 96S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: PSS
Photo 1501

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/15/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	PFO	Transect ID: A	Plot ID: WET 97S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Red Maple	*Acer rubrum*	T	FAC
2.	Sweet Gum	*Liquidambar styraciflua*	T	FAC
3.	False nettle	*Boehmeria cylindrica*	H	FACW+
4.	Soft Rush	*Juncus effusus*	H	FACW+
5.	Common Elderberry	*Sambucus canadensis*	S	FACW-
6.	Royal Fern	*Osmunda regalis*	H	OBL
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):

- ____ Streams
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: 4 (in.)

Wetland Hydrology Indicators:

Primary Indicators:

- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):

- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 97S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10YR 3/1			Sandy loam

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks:

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/15/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	PEM	Transect ID: A	Plot ID: WET 98S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Deertongue	*Dichanthelium clandestinium*	H	FAC+
2.	Soft Rush	*Juncus effusus*	H	FACW+
3.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
4.	Net-Veined Chain Fern	*Woodwardia areolata*	H	FACW+
5.	False Nettle	*Boehmeria cylindrica*	H	FACW+
6.	Wax Myrtle	*Morella cerifera*	S	FAC
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):

- ____ Streams
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: 4 (in.)

Wetland Hydrology Indicators:

Primary Indicators:

- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):

- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PEM Transect ID: A Plot ID: WET 98S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10YR 3/1			Sandy loam

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: PEM
Photo 1515

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/15/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	PFO	Transect ID: A	Plot ID: WET 99S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
2.	Sweet Gum	*Liquidambar styraciflua*	T	FAC
3.	Red Maple	*Acer rubrum*	T	FAC
4.	Deer Tongue	*Dichanthelium clandestinum*	H	FAC+
5.	Marsh Marigold	*Caltha palustris*	H	OBL
6.	Wax Myrtle	*Morella cerifera*	S	FAC
7.	Halberd Leaved Tearthumb	*Polygonum arifolium*	H	OBL
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):

- ____ Streams
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:

- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):

- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 99S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 3/1			Sandy clay

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1520

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/16/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	PSS	Transect ID: A	Plot ID: WET 100S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Royal Fern	*Osmunda regalis*	H	OBL
2.	Soft Rush	*Juncus effusus*	H	FACW+
3.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
4.	Wax Myrtle	*Morella cerifera*	S	FAC
5.	Smooth Alder	*Alnus serrulata*	T	OBL
6.	Slippery elm	*Ulmus rubra*	T	FAC
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):

- ____ Streams
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:

- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):

- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PSS Transect ID: A Plot ID: WET 100S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10YR 3/1			Loamy sand

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: PSS
Photo 1501

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/16/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	PSS	Transect ID: A	Plot ID: WET 101S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Broadleaf Cattail	*Typha latifolia*	H	OBL
2.	Soft Rush	*Juncus effusus*	H	FACW+
3.	Black Willow	*Salix nigra*	T	FACW+
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):

- ____ Streams
- ____ Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:

- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: 4 (in.)

Wetland Hydrology Indicators:

Primary Indicators:

- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):

- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PSS Transect ID: A Plot ID: WET 101S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10YR 3/1			Loamy sand

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: PSS
Photo 1506

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/16/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 102S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	False Nettle	*Boehmeria cylindrica*	H	FACW+
2.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
3.	Soft Rush	*Juncus effusus*	H	FACW+
4.	Sycamore	*Platanus occidentalis*	T	FACW-
5.	Red Maple	*Acer rubrum*	T	FAC
6.	Sweet Gum	*Liquidambar styraciflua*	T	FAC
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:
- Depth of Surface Water: 1 (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 102S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 2.5/1			Sandy clay loam

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: PFO

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/16/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	PFO	Transect ID: A	Plot ID: WET 103S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Marsh Marigold	*Caltha palustris*	H	OBL
2.	River Birch	*Betula nigra*	T	FACW
3.	Sycamore	*Platanus occidentalis*	T	FACW-
4.	Red Maple	*Acer rubrum*	T	FAC
5.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):

- ____ Streams
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

- Depth of Surface Water: 1 (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:

- X Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):

- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 103S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 5/1			Sandy clay loam

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: PFO
Photo 1512

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/16/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia
Community ID:	PEM	Transect ID: A	Plot ID: WET 104S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Fringed Sedge	*Carex crinita*	H	OBL
2.	Lizards Tail	*Saururus cernuus*	H	OBL
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):

- ____ Streams
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:

- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: 3 (in.)

Wetland Hydrology Indicators:

Primary Indicators:

- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):

- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PEM Transect ID: A Plot ID: WET 104S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 3/1			Sandy loam

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: PEM
Photo 1514

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/16/2011
Applicant/Owner:	VDOT	County:	New Kent
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 105S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	River Birch	*Betula nigra*	T	FACW
2.	Sycamore	*Platanus occidentalis*	T	FACW-
3.	Deer Tongue	*Dichanthelium clandestinum*	H	FAC+
4.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
5.	Royal Fern	*Osmunda regalis*	H	OBL
6.	Red Maple	*Acer rubrum*	T	FAC
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 105S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 4/1			Loamy sand

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: PFO
Photo 1516

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/16/2011
Applicant/Owner:	VDOT	County:	James City
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 106S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Spicebush	*Linder benzoin*	S	FACW-
2.	Marsh Marigold	*Caltha palustris*	H	OBL
3.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
4.	Red Maple	*Acer rubrum*	T	FAC
5.	Ironwood	*Carpinus caroliniana*	T	FACW+
6.	Lizards Tail	*Saururus cernuus*	H	OBL
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:
- Depth of Surface Water: 1 (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 106S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10YR 2/1			Loamy sand

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: PFO
Photo 1519

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/16/2011
Applicant/Owner:	VDOT	County:	James City
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 107S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Black Willow	*Salix nigra*	T/S	FACW+
2.	Red Maple	*Acer rubrum*	T/S	FAC
3.	Deer Tongue	*Dichanthelium clandestinum*	H	FAC+
4.	Soft Rush	*Juncus effusus*	H	FACW+
5.	Sycamore	*Platanus occidentalis*	T	FACW-
6.	Sweet Gum	*Liquidambar styraciflua*	T	FAC
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: 5 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 107S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10YR 5/1			Sandy loam

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1523

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/16/2011
Applicant/Owner:	VDOT	County:	James City
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PEM Transect ID: A Plot ID: WET 108S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	False Nettle	*Boehmeria cylindrica*	H	FACW+
2.	Deer Tongue	*Dichanthelium clandestinum*	H	FAC+
3.	Japanese Stiltgrass	*Microstegium vimineum*	H	FAC
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- X Aerial Photographs
- ____ Other
- ____ No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PEM Transect ID: A Plot ID: WET 108S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10YR 3/1	5YR 4/6	10%	Sandy loam

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: PEM
Photo 1525

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/16/2011
Applicant/Owner:	VDOT	County:	James City
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PEM Transect ID: A Plot ID: WET 109S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- X No Recorded Data Available

Field Observations:
- Depth of Surface Water: 6 (in.)
- Depth to Free Water in Pit: (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- X FAC-Neutral Test
- Other (Explain in Remarks)

Remarks: At the time of investigation, this area was full of water.

Community ID: PEM Transect ID: A Plot ID: WET 109S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
No soils					

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks: Culvert blocked. No soils because inundated.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1526

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/17/2011
Applicant/Owner:	VDOT	County:	James City
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PEM Transect ID: A Plot ID: WET 111S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	False Nettle	*Boehmeria cylindrica*	H	FACW+
2.	Fringed Sedge	*Carex crinita*	H	OBL
3.	Deer Tongue	*Dichanthelium clandestinum*	H	FAC+
4.	Japanese Stiltgrass	*Microstegium viminuem*	H	FAC
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PEM Transect ID: A Plot ID: WET 111S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	10YR 3/2	5YR 4/6	3%	Loamy sand

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: PEM; larger wetland outside of ROW
Photo 1498

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/17/2011
Applicant/Owner:	VDOT	County:	James City
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 112S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Red Maple	*Acer rubrum*	T	FAC
2.	Sycamore	*Platanus occidentalis*	T	FACW-
3.	False Nettle	*Boehmeria cylindrica*	H	FACW+
4.	Sweet Gum	*Liquidambar styraciflua*	T	FAC
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:
- Depth of Surface Water: 2 (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 112S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 4/1	5YR 4/6	5%	Sandy clay loam

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: PFO
Photo 1506

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/17/2011
Applicant/Owner:	VDOT	County:	James City
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 113S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Sycamore	*Platanus occidentalis*	T	FACW-
2.	River Birch	*Betula nigra*	T	FACW
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:
- Depth of Surface Water: 1 (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: 12 (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- X Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks: Cross drains are clogged

Community ID: PFO Transect ID: A Plot ID: WET 113S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
No soils taken					

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks: No soils - inundated

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: PFO
Photo 1507

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/17/2011
Applicant/Owner:	VDOT	County:	York
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 115S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Green Ash	*Fraxinus pennsylvanica*	T	FACW
2.	Sycamore	*Platanus occidentalis*	T	FACW-
3.	Lizards Tail	*Saururus cernuus*	H	OBL
4.	Sensitive Fern	*Onoclea sensibilis*	H	FACW
5.	Marsh Marigold	*Caltha palustris*	H	OBL
6.	Ironwood	*Carpinus caroliniana*	T	FACW+
7.	False Nettle	*Boehmeria cylindrica*	H	FACW+
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 115S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 4/1	5YR 4/6	2%	Loamy sand

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: PFO

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	11/17/2011
Applicant/Owner:	VDOT	County:	York
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PEM Transect ID: A Plot ID: WET 116S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Common Reed	*Phragmites australis*	H	FACW
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- ____ Streams
- ____ Aerial Photographs
- ____ Other
- X No Recorded Data Available

Field Observations:
- Depth of Surface Water: ____ (in.)
- Depth to Free Water in Pit: ____ (in.)
- Depth to Saturated Soil: ____ (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- ____ Inundated
- ____ Saturated in Upper 12 inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12 inches
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- X FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

Community ID: PEM Transect ID: A Plot ID: WET 116S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 5/1			Sandy loam

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: Photo 1528

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	12/7/2011
Applicant/Owner:	VDOT	County:	Newport News
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 123S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Sweet Gum	*Liquidambar styraciflua*	T	FAC
2.	Red Maple	*Acer rubrum*	T	FAC
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):
- Streams
- Aerial Photographs
- Other
- X No Recorded Data Available

Field Observations:
- Depth of Surface Water: 12 (in.)
- Depth to Free Water in Pit: (in.)
- Depth to Saturated Soil: (in.)

Wetland Hydrology Indicators:

Primary Indicators:
- X Inundated
- Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- X Water-Stained Leaves
- Local Soil Survey Data
- X FAC-Neutral Test
- Other (Explain in Remarks)

Remarks: Ponded

Community ID: PFO Transect ID: A Plot ID: WET 123S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	7.5YR 4/1	7.5YR 4/6	3%	Sandy clay

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: PFO
Photo 1544

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	12/7/2011
Applicant/Owner:	VDOT	County:	Newport News
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 124S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Fringed Sedge	*Carex crinita*	H	OBL
2.	Red Maple	*Acer rubrum*	T/S	FAC
3.	Green Ash	*Fraxinus pennsylvanica*	T/S	FACW
4.	Wool Grass	*Scirpus cyperinus*	H	FACW+
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):

	Streams
	Aerial Photographs
	Other
X	No Recorded Data Available

Field Observations:

Depth of Surface Water:	4	(in.)
Depth to Free Water in Pit:	6	(in.)
Depth to Saturated Soil:	0	(in.)

Wetland Hydrology Indicators:

Primary Indicators:

X	Inundated
X	Saturated in Upper 12 inches
	Water Marks
	Drift Lines
	Sediment Deposits
	Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):

	Oxidized Root Channels in Upper 12 inches
X	Water-Stained Leaves
	Local Soil Survey Data
X	FAC-Neutral Test
	Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 124S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-4	A	10YR 5/1			Sandy clay loam
4-16	E	10YR 5/1	7/5YR 4/6	5%	Sandy clay loam

Hydric Soil Indicators: Yes X No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: PFO
Photo 1546

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	12/7/2011
Applicant/Owner:	VDOT	County:	Newport News
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 125S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Fringed Sedge	*Carex crinita*	H	OBL
2.	Wool Grass	*Scirpus cyperinus*	H	FACW+
3.	Green Ash	*Fraxinus pennsylvanica*	T/S	FACW
4.	Red Maple	*Acer rubrum*	T/S	FAC
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-): 100%

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):

	Streams
	Aerial Photographs
	Other
X	No Recorded Data Available

Field Observations:

Depth of Surface Water:		(in.)
Depth to Free Water in Pit:		(in.)
Depth to Saturated Soil:		(in.)

Wetland Hydrology Indicators:

Primary Indicators:

X	Inundated
	Saturated in Upper 12 inches
	Water Marks
	Drift Lines
	Sediment Deposits
	Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):

	Oxidized Root Channels in Upper 12 inches
X	Water-Stained Leaves
	Local Soil Survey Data
X	FAC-Neutral Test
	Other (Explain in Remarks)

Remarks: Do not know depth of inundation. Cannot access.

Community ID: PFO Transect ID: A Plot ID: WET 125S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:
Field Observations Confirm Mapped Type? Yes No
Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
No soils					

Hydric Soil Indicators: Yes No
(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks: No soils - could not access beyond fence

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: PFO
Photo 1547

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site:	I-64 Peninsula	Date:	12/8/2011
Applicant/Owner:	VDOT	County:	
Investigator:	Scot Aitkenhead	State:	Virginia

Community ID: PFO Transect ID: A Plot ID: WET 133S

Do Normal Conditions exist on the site?	Yes X	No
Is the site significantly disturbed (Atypical situation)?	Yes	No X
Is the area a potential Problem Area?	Yes	No X
If needed, explain on reverse		

VEGETATION

Dominant Plant Species

	Common Name	Scientific Name	Stratum	Indicator
1.	Red Maple	*Acer rubrum*	T	FAC
2.	Green Ash	*Fraxinus pennsylvanica*	T	FACW
3.	Sycamore	*Platanus occidentalis*	T	FACW-
4.	False Nettle	*Boehmeria cylindrica*	H	FACW+
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				

Percent of dominant species that are OBL, FACW or FAC (excluding FAC-)

Remarks:

HYDROLOGY

Recorded Data (Describe in Remarks):

- Streams
- Aerial Photographs
- Other
- X No Recorded Data Available

Field Observations:

Depth of Surface Water:	1	(in.)
Depth to Free Water in Pit:	6	(in.)
Depth to Saturated Soil:	0	(in.)

Wetland Hydrology Indicators:

Primary Indicators:

- X Inundated
- X Saturated in Upper 12 inches
- Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):

- Oxidized Root Channels in Upper 12 inches
- Water-Stained Leaves
- Local Soil Survey Data
- X FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:

Community ID: PFO Transect ID: A Plot ID: WET 133S

SOILS

Map Unit Name
(Series and Phase): Drainage Class:

Field Observations Confirm Mapped Type? Yes No

Taxonomy (Subgroup):

Depth (in)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Textures, Concretions, Structures, etc.
0-16	A	G1/4N	--	--	Sandy loam

Hydric Soil Indicators: Yes X No

(If yes, check them)

	Histosol		Concretions
	Histic Epidon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
X	Gleyed or Low-Chroma Colors		Other (explain in remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	Yes X	No	Is this Sampling Point Within a Wetland
Wetland Hydrology Present?	Yes X	No	
Hydric Soils Present?	Yes X	No	Yes X No

Remarks: 50% PFO / 50% PEM

Stream Assessment Form (Form 1)

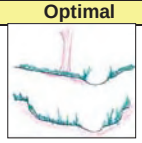
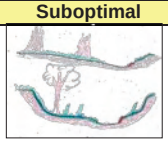
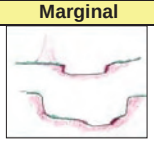
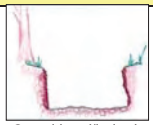
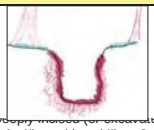
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Newport News		02080108	6-28-11		266	

Name(s) of Evaluator(s)	Stream Name and Information
Bode / Doucette	WUS 10N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	0.6									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	0.60	CI
	Score >	0.6							Lt Bank CI >	0.60	0.60

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.00**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

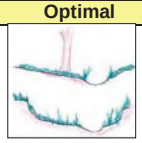
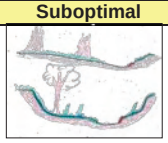
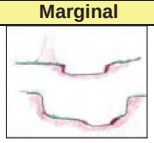
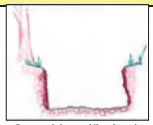
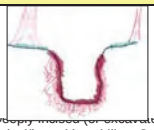
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Newport News		02080206	6-29-11		636	

Name(s) of Evaluator(s)	Stream Name and Information
Bode / Doucette	WUS 12N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	0.6									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	20%	80%					100%	Rt Bank CI >	0.60	CI
	Score >	0.75	0.6						Lt Bank CI >	0.63	0.62

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.92**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

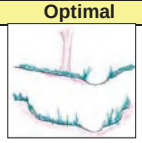
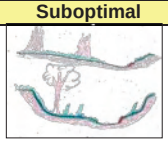
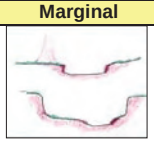
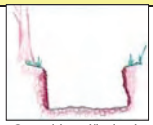
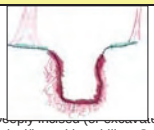
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Newport News		02080206	6-29-11		97	

Name(s) of Evaluator(s)	Stream Name and Information
Bode / Doucette	WUS 13N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	50%	50%					100%		
	Score >	0.5	0.85							
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	70%	30%					100%	Rt Bank CI > 0.68	CI
	Score >	0.5	0.85						Lt Bank CI > 0.61	0.64

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.70**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.85**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

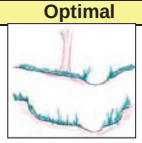
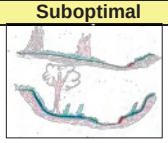
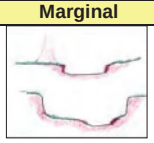
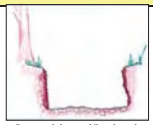
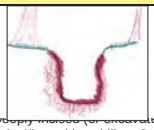
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Newport News		02080206	6-29-11		782	

Name(s) of Evaluator(s)	Stream Name and Information
Bode / Doucette	WUS 14N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	70%	30%					100%		
	Score >	0.5	0.85							
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	50%	50%					100%	Rt Bank CI > 0.61	CI
	Score >	0.5	0.85						Lt Bank CI > 0.68	0.64

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.70**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.85**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

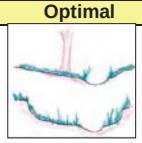
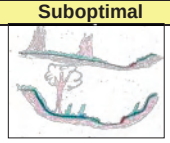
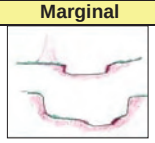
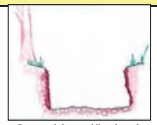
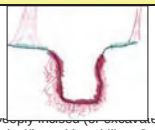
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Newport News		02080206	6-29-11		500	

Name(s) of Evaluator(s)	Stream Name and Information
Bode	WUS 15N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	0.85									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	0.85	CI
	Score >	0.85							Lt Bank CI >	0.85	0.85

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.99**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

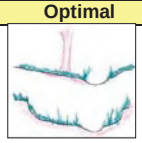
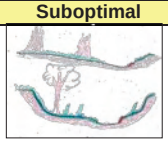
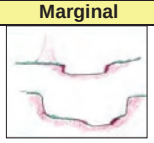
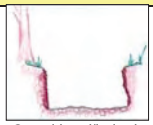
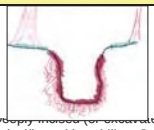
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Newport News		02080206	6-29-11		2314	

Name(s) of Evaluator(s)	Stream Name and Information
Doucette	WUS 16N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	1.6
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	30%	70%					100%		
	Score >	1.5	0.5							
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	30%	70%					100%	Rt Bank CI > 0.80	CI
	Score >	1.5	0.5						Lt Bank CI > 0.80	0.80

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.68**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

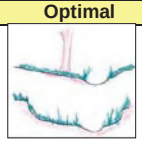
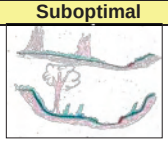
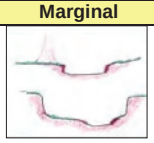
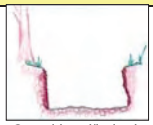
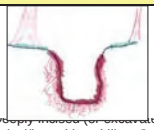
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Newport News		02080206	6-29-11		42	

Name(s) of Evaluator(s)	Stream Name and Information
Bode	WUS 17N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							
	Optimal	Suboptimal		Marginal		Poor		NOTES>> Reach is +/- 40' long and originates from BMP at parking lot - flows through forest.
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

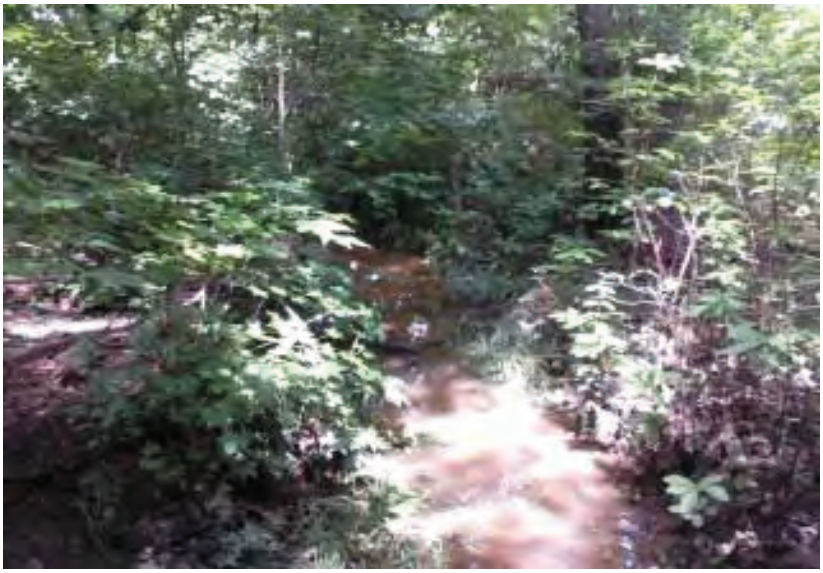
	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.18**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

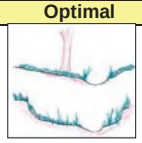
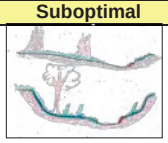
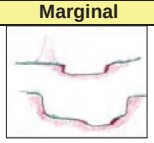
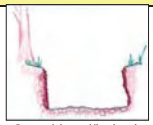
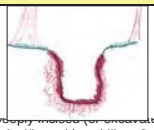
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Newport News		02080206	6-29-11		1203	

Name(s) of Evaluator(s)	Stream Name and Information
Bode	WUS 18N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	70%	30%					100%			
	Score >	1.2	0.6								
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	70%	30%					100%	Rt Bank CI >	1.02	CI
	Score >	1.2	0.5						Lt Bank CI >	0.99	1.01

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.96**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

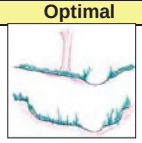
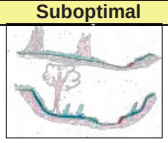
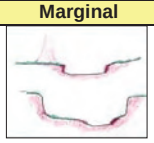
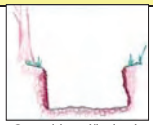
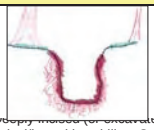
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Newport News		02080206	6-29-11		22	

Name(s) of Evaluator(s)	Stream Name and Information
Bode	WUS 19N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.12**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

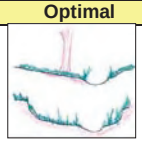
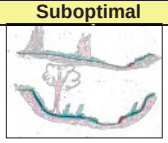
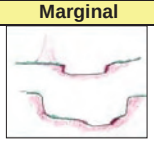
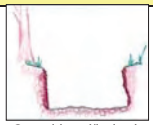
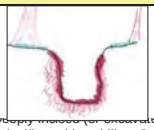
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Hampton	R1UB2	02080108	6-27-11		4073	

Name(s) of Evaluator(s)	Stream Name and Information
Doucette	WUS 1N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	50%	50%					100%	Rt Bank CI >	1.50	CI
	Score >	1.5	0.5						Lt Bank CI >	1.00	1.25

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.45**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Pic 1580

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

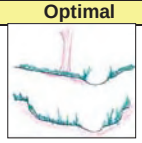
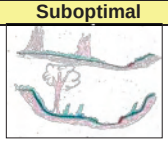
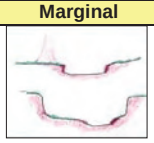
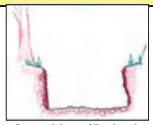
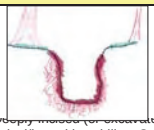
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Newport News		02080206	6-30-11		43	

Name(s) of Evaluator(s)	Stream Name and Information
Bode	WUS 20N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.70**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.96**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

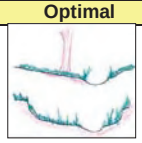
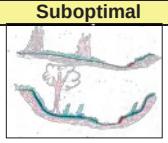
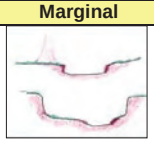
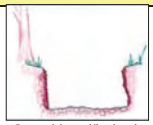
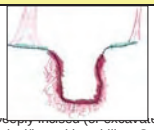
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Newport News		02080206	6-30-11			1

Name(s) of Evaluator(s)	Stream Name and Information
Bode	WUS 21N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							
	Optimal	Suboptimal		Marginal		Poor		NOTES>> Reach is 20' from culvert outlet to ROW fence - forested on buffer.
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	NOTES>>
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.14**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

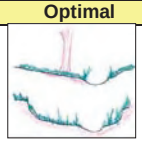
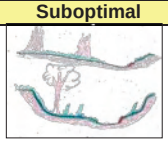
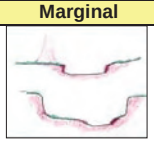
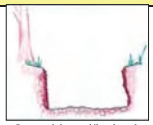
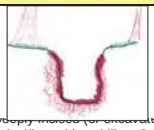
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Newport News		02080206	6-30-11		81	

Name(s) of Evaluator(s)	Stream Name and Information
Doucette	WUS 23N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>	Reach length is concrete lined - not eroding.					

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.84**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

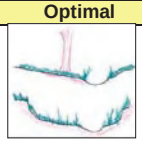
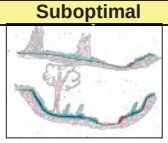
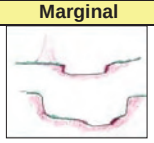
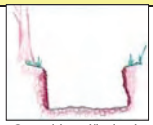
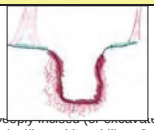
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Newport News		02080206	6-30-11		92	

Name(s) of Evaluator(s)	Stream Name and Information
Bode	WUS 24N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.38**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

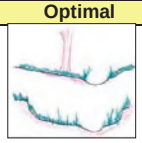
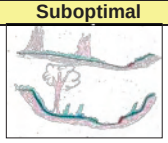
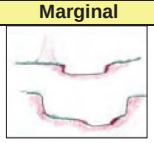
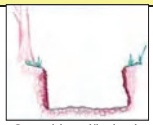
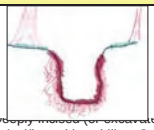
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	York		02080206	6-30-11		509	

Name(s) of Evaluator(s)	Stream Name and Information
Doucette	WUS 27N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	0.85									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	0.85	CI
	Score >	0.85							Lt Bank CI >	0.85	0.85

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.37**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

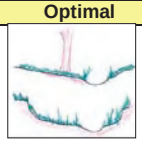
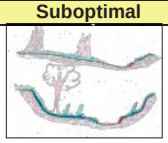
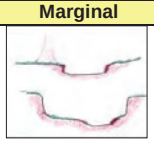
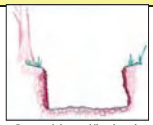
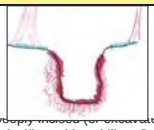
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	York		02080107	7-1-11		158	

Name(s) of Evaluator(s)	Stream Name and Information
Doucette	WUS 28N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	75%	25%					100%	Rt Bank CI >	1.50	CI
	Score >	0.5	1.5						Lt Bank CI >	0.75	1.13

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.03**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

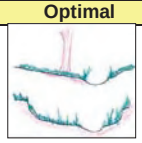
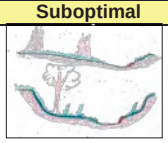
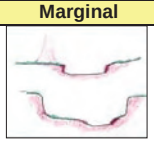
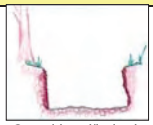
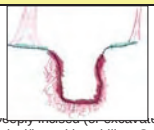
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Hampton	R2UB3	02080108	6-27-11		3181	

Name(s) of Evaluator(s)	Stream Name and Information
Doucette	WUS 2N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category

	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	20%	20%	60%				100%		
	Score >	1.5	0.6	0.5						
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>							0%	Rt Bank CI >	0.72
	Score >								Lt Bank CI >	0.00

CI: 0.36

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	NOTES>>
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	CI: 1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5	0.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.87**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

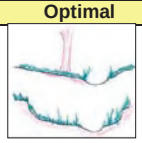
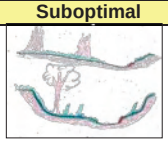
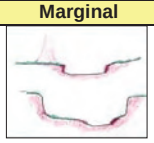
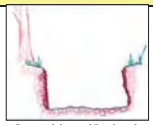
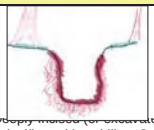
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Hampton		02080108	6-27-11		791	

Name(s) of Evaluator(s)	Stream Name and Information
Bode / Doucette	WUS 3N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	20%	20%	60%				100%	
	Score >	1.5	0.6	0.5					
								CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>						0%	Rt Bank CI >	0.72
	Score >							Lt Bank CI >	0.00

CI: 0.36

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.83**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Pic 1585, 1586

Stand of typha at WUS 3N4 (Photo 1587)

Stand of Typha (pic 1587)

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

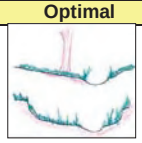
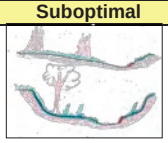
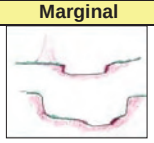
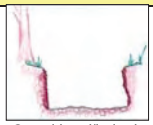
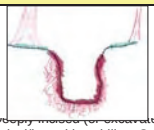
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Hampton		02080108	6-28-11		1068	

Name(s) of Evaluator(s)	Stream Name and Information
Bode / Doucette	WUS 4N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	1.6
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.84**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

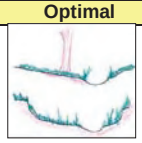
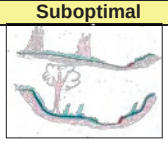
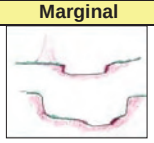
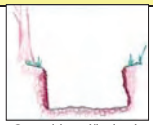
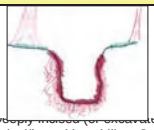
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Hampton		02080108	6-28-11		290	

Name(s) of Evaluator(s)	Stream Name and Information
Bode / Doucette	WUS 5N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	20%	20%	60%				100%		
	Score >	1.2	0.6	0.5						
								CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	20%	20%	60%				100%	Rt Bank CI >	0.66
	Score >	1.2	0.6	0.5					Lt Bank CI >	0.66

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.95**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

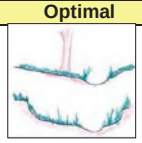
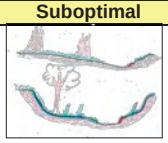
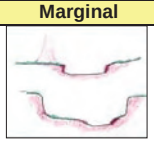
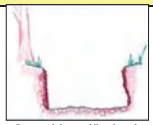
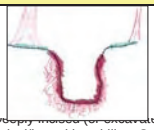
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Hampton		02080108	6-28-11		114	

Name(s) of Evaluator(s)	Stream Name and Information
Bode / Doucette	WUS 6N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	1.6
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.84**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

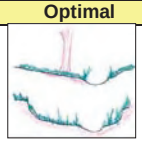
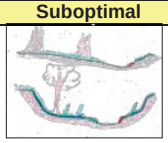
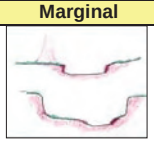
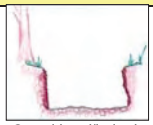
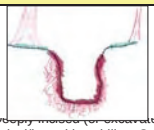
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Hampton		02080108	6-28-11		9869	

Name(s) of Evaluator(s)	Stream Name and Information
Doucette	WUS 7N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	1.6
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	10%	90%					100%		
	Score >	1.5	0.5							
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	70%	30%					100%	Rt Bank CI > 0.60	CI
	Score >	1.2	0.5						Lt Bank CI > 0.99	0.80

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.88**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

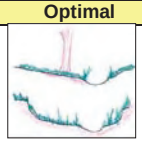
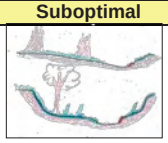
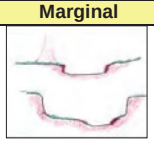
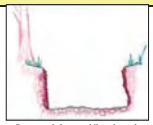
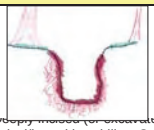
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Newport News		02080108	6-28-11		4524	

Name(s) of Evaluator(s)	Stream Name and Information
Bode / Doucette	WUS 8N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	50%	50%					100%		
	Score >	0.6	0.5							
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	50%	50%					100%	Rt Bank CI > 0.55	CI
	Score >	0.6	0.5						Lt Bank CI > 0.55	0.55

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.85**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

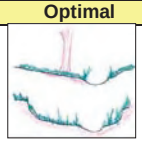
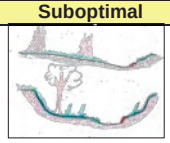
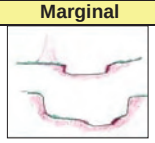
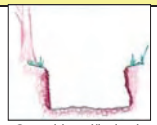
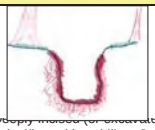
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Newport News		02080108	6-28-11		75	

Name(s) of Evaluator(s)	Stream Name and Information
Bode / Doucette	WUS 9N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	90%	10%					100%		
	Score >	0.6	1.1							
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	0.65
	Score >	0.6							Lt Bank CI >	0.60

CI
CI
0.63

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.70**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.05**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

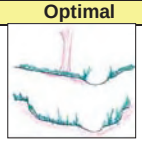
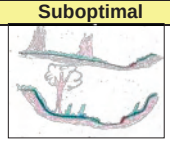
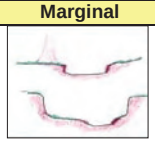
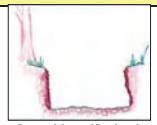
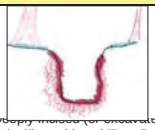
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	York		02080107	7-1-11		343	

Name(s) of Evaluator(s)	Stream Name and Information
Doucette	WUS 35N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	50%	50%					100%		
	Score >	1.5	0.85							
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	50%	50%					100%	Rt Bank CI > 1.18	CI
	Score >	1.5	1.5						Lt Bank CI > 1.50	1.34

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.03**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

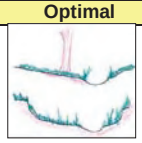
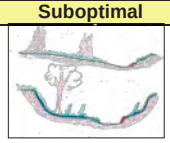
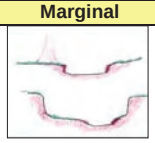
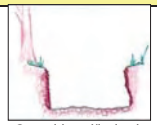
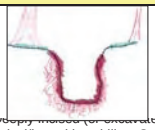
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	James City		02080107	7-5-11			1

Name(s) of Evaluator(s)	Stream Name and Information
Sekula	WUS 38N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							
	Optimal	Suboptimal		Marginal		Poor		NOTES>> Highway located upslope on LT bank side
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	70%	30%					100%	Rt Bank CI >	1.20	CI
	Score >	1.5	0.5						Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>> 80% of stream substrate is sand sediment deposit / Beaver activity observed.	
Instream Habitat/ Available Cover	Optimal	Suboptimal	Marginal	Poor		CI
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.32**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

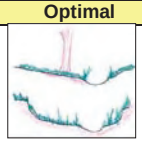
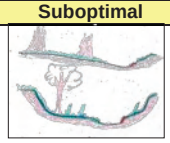
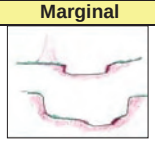
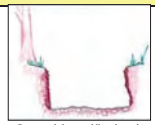
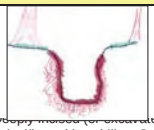
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	James City		02080107	7-5-11		155	

Name(s) of Evaluator(s)	Stream Name and Information
Doucette	WUS 39N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	70%	30%					100%	Rt Bank CI >	1.50	CI
	Score >	1.5	0.5						Lt Bank CI >	1.20	1.35

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.35**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

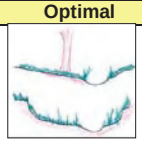
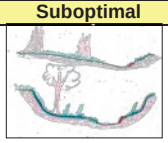
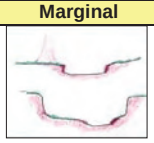
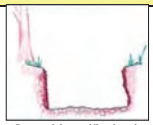
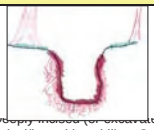
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	James City		02080107	7/5/11			1

Name(s) of Evaluator(s)	Stream Name and Information
Sekula	WUS 41N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category

	Optimal	Suboptimal		Marginal		Poor		NOTES>> Road on right bank. Wetland on left bank.
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	80%	20%					100%		
	Score >	1.2	0.5							
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	80%	20%					100%	Rt Bank CI >	1.06
	Score >	1.5	0.5						Lt Bank CI >	1.30

CI: 1.18

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>sand sediment deposits

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>> Culvert under both roads.

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.00**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

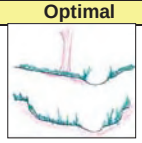
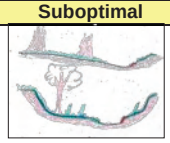
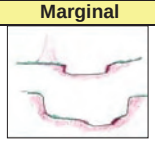
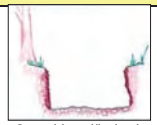
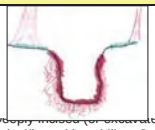
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	James City		02080107	7/5/11		12	

Name(s) of Evaluator(s)	Stream Name and Information
Sekula	WUS 42N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%		
	Score >	1.2								
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI > 1.20	CI
	Score >	1.2							Lt Bank CI > 1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>Sand deposition

	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>Culvert at both ends. Daylights for approximately 50'

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.00**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

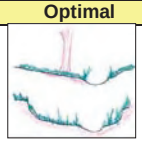
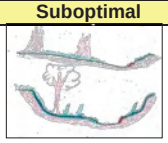
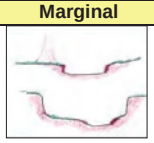
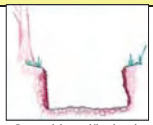
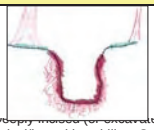
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	James City		02080206	7/5/11			1

Name(s) of Evaluator(s)	Stream Name and Information
Sekula	WUS 46N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%		
	Score >	1.2								
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI > 1.20	CI
	Score >	1.2							Lt Bank CI > 1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>> Sand sediment deposit.

	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>> Stream enters culvert under road

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.24**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

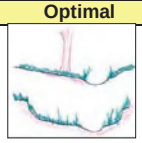
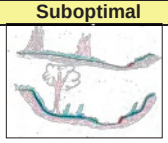
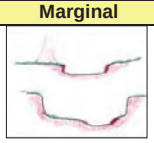
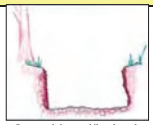
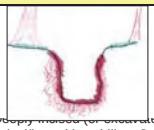
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	James City		02080206	7/6/11		61	

Name(s) of Evaluator(s)	Stream Name and Information
Doucette	WUS 47N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category

	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.34**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

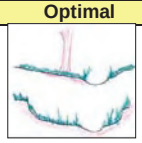
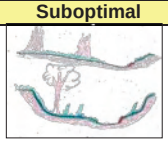
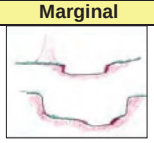
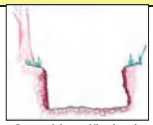
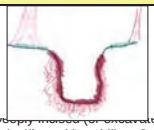
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	New Kent		02080206	7/6/11		65	

Name(s) of Evaluator(s)	Stream Name and Information
Sekula	WUS 48N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>> Drains into culvert under road

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5	1.10

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.30**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

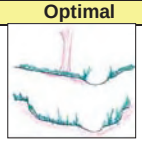
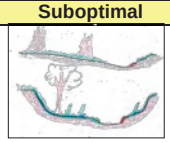
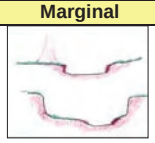
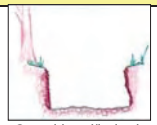
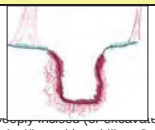
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	New Kent		02080206	7/6/11		19	

Name(s) of Evaluator(s)	Stream Name and Information
Sekula	WUS 49N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>> Wetland starts beyond ROW fence.
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>> Culvert

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.18**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

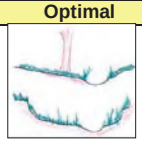
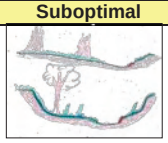
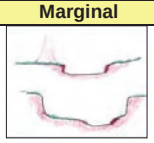
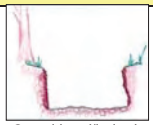
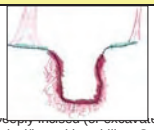
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	New Kent		02080206	7/6/11		308	

Name(s) of Evaluator(s)	Stream Name and Information
Sekula	WUS 50N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	1.6
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>> Highway on LT bank.
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	80%	20%					100%	Rt Bank CI >	1.20	CI
	Score >	1.2	0.5						Lt Bank CI >	1.06	1.13

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>> Sand sediment deposit.

	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.99**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

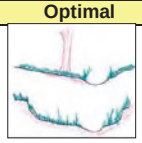
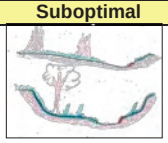
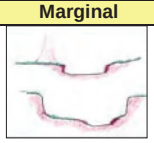
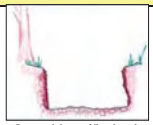
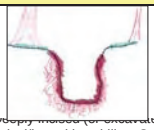
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	New Kent		02080206	7/6/11		54	

Name(s) of Evaluator(s)	Stream Name and Information
Sekula	WUS 54N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%		
	Score >	1.2								
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI > 1.20	CI
	Score >	1.2							Lt Bank CI > 1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>> Some sand sediment / Iron oxidizing bacteria.

	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>> Culvert under road.

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.30**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

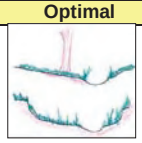
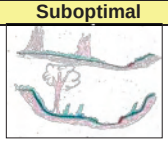
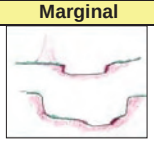
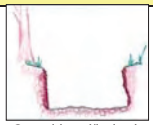
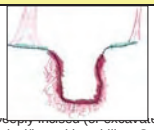
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	New Kent		02080206	7/6/11			1

Name(s) of Evaluator(s)	Stream Name and Information
Sekula	WUS 56N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>> Culvert

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.30**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

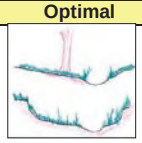
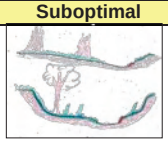
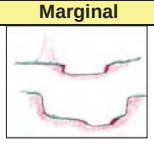
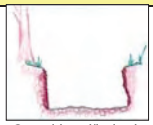
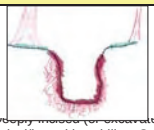
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	New Kent		02080206	7/6/11		87	

Name(s) of Evaluator(s)	Stream Name and Information
Sekula	WUS 57N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>> Highway along left bank.		
	Optimal	Suboptimal		Marginal		Poor				
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.			
		High	Low	High	Low	High	Low			
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5			

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	50%	50%					100%	Rt Bank CI >	1.50	CI
	Score >	1.5	0.5						Lt Bank CI >	1.00	1.25

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>> Sand sediment deposit

	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>> Sandy sediment deposit.

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.33**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

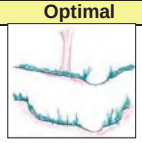
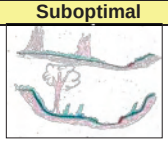
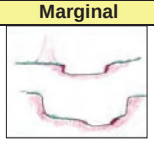
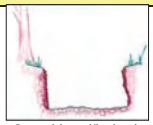
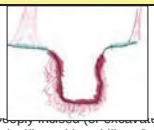
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	New Kent		02080206	7/7/11		218	

Name(s) of Evaluator(s)	Stream Name and Information
Doucette	WUS 59N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	30%	70%					100%	Rt Bank CI >	1.50	CI
	Score >	1.5	0.5						Lt Bank CI >	0.80	1.15

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.29**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Concrete lined in some sections, but has begin to naturalize over these areas.

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

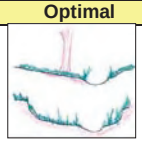
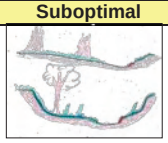
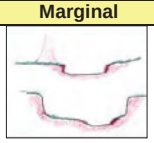
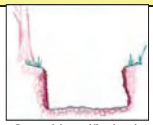
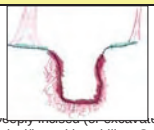
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	New Kent		02080206	7/7/11		19	

Name(s) of Evaluator(s)	Stream Name and Information
Doucette	WUS 60N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.32**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

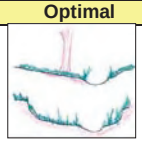
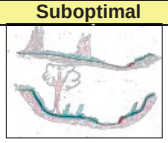
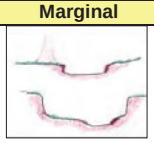
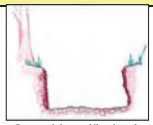
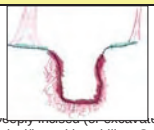
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	New Kent		02080206	7/7/11		77	

Name(s) of Evaluator(s)	Stream Name and Information
Doucette	WUS 62N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	30%	70%					100%		
	Score >	1.5	0.5							
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	0.80
	Score >	1.5							Lt Bank CI >	1.50

CI

1.15

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.37**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

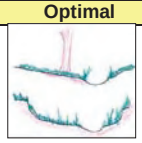
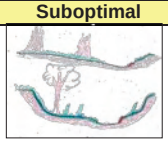
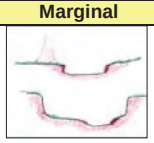
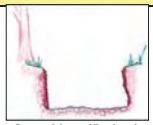
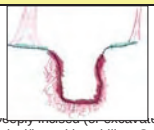
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	New Kent		02080206	7/7/11		215	

Name(s) of Evaluator(s)	Stream Name and Information
Sekula	WUS 64N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	50%	50%					100%			
	Score >	1.2	0.5								
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	0.85	CI
	Score >	1.2							Lt Bank CI >	1.20	1.03

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.23**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

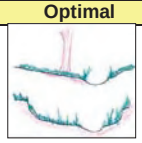
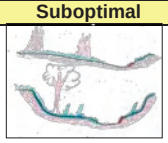
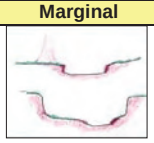
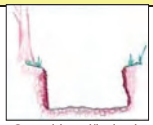
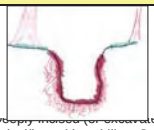
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	New Kent		02080206	7/7/11		779	

Name(s) of Evaluator(s)	Stream Name and Information
Sekula	WUS 66N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							
	Optimal	Suboptimal		Marginal		Poor		NOTES>> Highway along right bank / Residential lawn along left bank.
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	30%	70%					100%			
	Score >	1.2	0.5								
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	75%	25%					100%	Rt Bank CI >	0.71	CI
	Score >	1.2	0.6						Lt Bank CI >	1.05	0.88

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.32**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

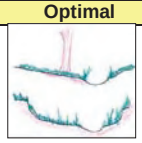
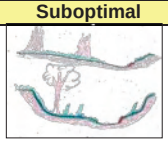
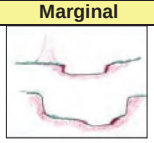
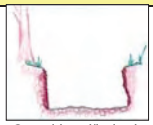
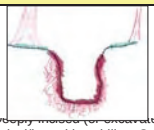
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Henrico		02080206	7/11/11		3033	

Name(s) of Evaluator(s)	Stream Name and Information
Doucette	WUS 68N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							
	Optimal	Suboptimal		Marginal		Poor		NOTES>> Railroad on right bank, highway on left bank.
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	20%	80%					100%			
	Score >	1.1	0.5								
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	20%	20%	60%				100%	Rt Bank CI >	0.62	CI
	Score >	1.5	0.6	0.5					Lt Bank CI >	0.72	0.67

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	NOTES>>
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.81**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

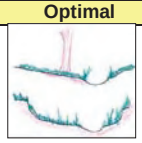
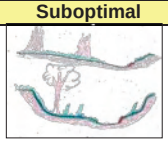
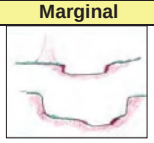
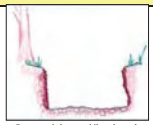
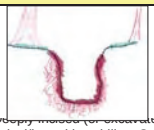
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Henrico		02080206	7/1//1		856	

Name(s) of Evaluator(s)	Stream Name and Information
Sekula	WUS 69N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>> Slow flow.

	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>> Culverts on both ends.

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.06**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

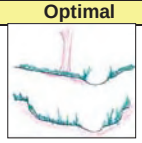
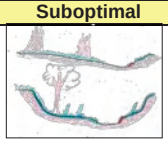
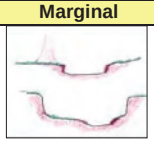
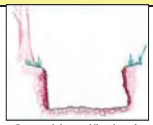
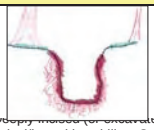
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Henrico		02080206	7/11/11		156	

Name(s) of Evaluator(s)	Stream Name and Information
Doucette	WUS 70N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.38**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

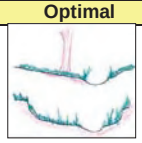
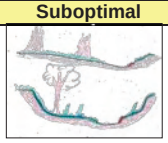
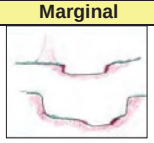
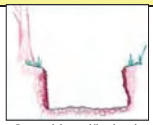
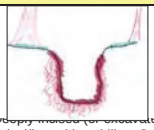
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Henrico		02080206	7/11/11		299	

Name(s) of Evaluator(s)	Stream Name and Information
Doucette	WUS 72N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.42**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

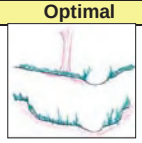
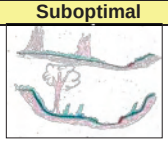
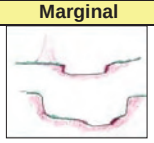
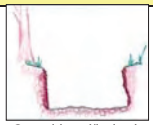
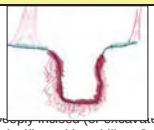
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Henrico		02080206	7/11/11		388	

Name(s) of Evaluator(s)	Stream Name and Information
Doucette	WUS 73N

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	10%	90%					100%		
	Score >	1.2	0.5							
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	0.57
	Score >	1.2							Lt Bank CI >	1.20

CI

0.89

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

	Conditional Category			
	Optimal	Suboptimal	Marginal	Poor
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.
Score	1.5	1.2	0.9	0.5

CI

1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.92**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

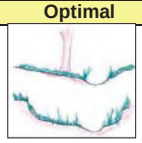
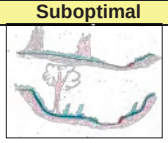
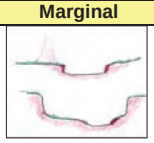
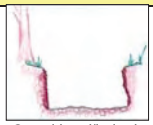
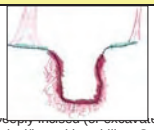
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/1/11		76	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 70M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.50**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

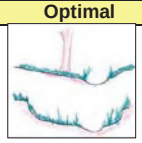
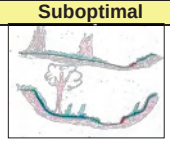
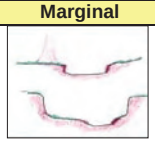
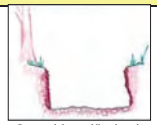
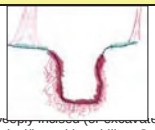
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/1/11		57	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 71M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	0.75									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	0.75	CI
	Score >	0.75							Lt Bank CI >	0.75	0.75

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.13**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

Downstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

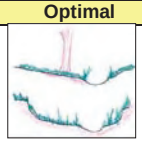
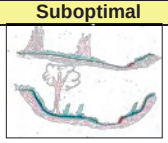
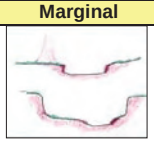
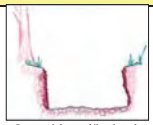
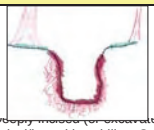
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/1/11		79	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS72M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category

	Optimal	Suboptimal		Marginal		Poor	
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.
		High	Low	High	Low	High	Low
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	40%	60%					100%	
	Score >	1.1	0.75						
								CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	40%	60%					100%	Rt Bank CI > 0.89
	Score >	1.1	0.75						Lt Bank CI > 0.89

NOTES>>

CI: 0.89

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.50

NOTES>>

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.38**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Downstream

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

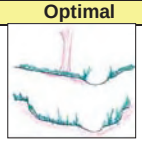
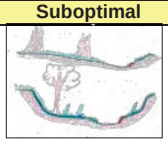
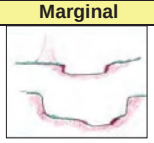
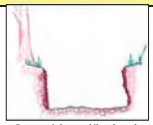
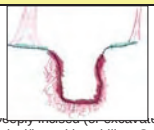
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB	02080206	11/1/11		64	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 73M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>	This is a stable concrete channel					

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.84**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

Downstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

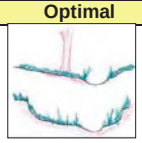
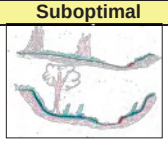
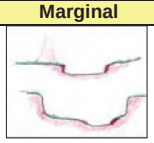
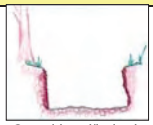
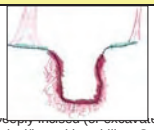
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/1/11		68	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 74M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.32**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Downstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

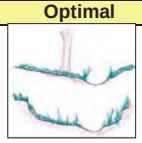
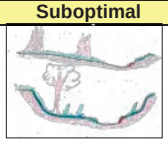
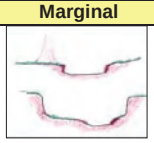
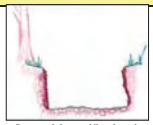
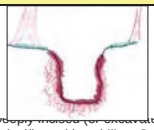
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB3	02080206	11/1/11		65	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 75M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.20**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Downstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

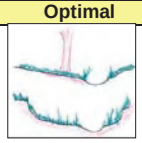
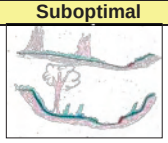
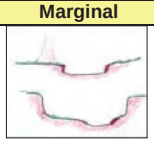
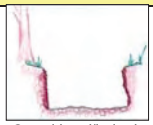
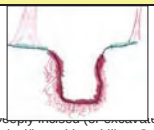
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/1/11		79	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 76M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

Conditional Category	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.00**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

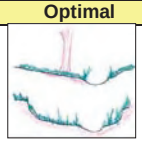
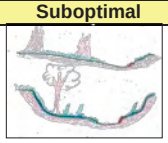
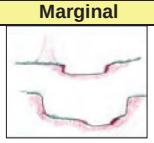
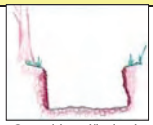
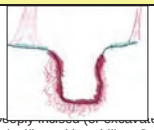
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB3	02080206	11/1/11		32	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 77M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.00**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

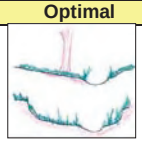
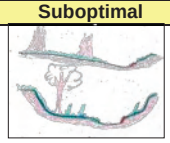
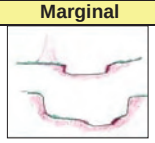
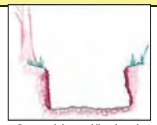
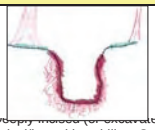
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/1/11		105	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 78M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.10**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Downstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

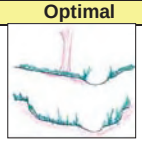
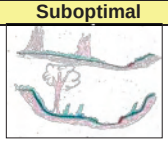
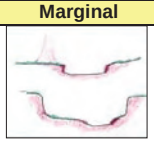
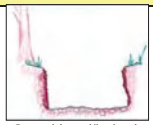
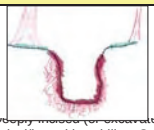
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/1/11		69	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 79M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.40**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

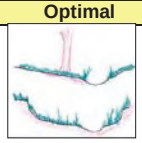
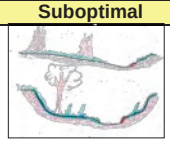
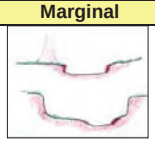
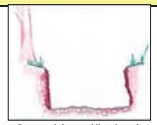
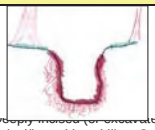
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB3	02080206	11/1/11		83	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 80M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

Conditional Category	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.34**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

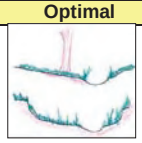
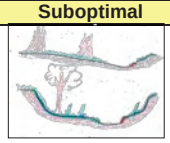
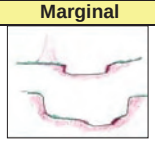
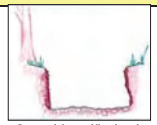
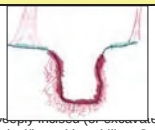
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/1/11		28	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 81M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

Conditional Category	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.34**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

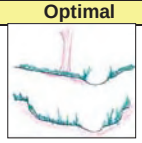
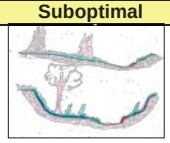
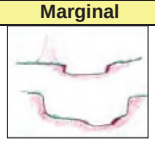
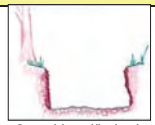
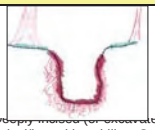
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/1/11		30	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 82M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

Conditional Category	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.14**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

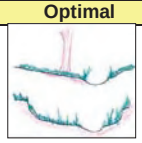
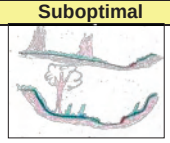
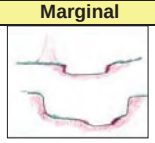
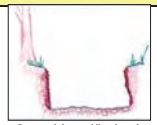
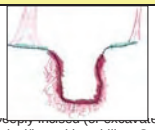
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R4UB2	02080206	11/1/11		102	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 83M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	**CI**
Score	**3**	**2.4**	**2**	**1.6**	**1**	**2.4**
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category

	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	**Low**	**High**	**Low**	**High**	**Low**	
Condition Scores	**1.5**	**1.2**	**1.1**	**0.85**	**0.75**	**0.6**	**0.5**	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	**20%**	**15%**	**65%**				**100%**	
	Score >	**1.1**	**0.75**	**0.5**					
								CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	**20%**	**15%**	**65%**				**100%**	**Rt Bank CI >** **0.66** **CI**
	Score >	**1.1**	**0.75**	**0.5**					**Lt Bank CI >** **0.66** **0.66**

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		**CI**
Score	**1.5**	**1.2**	**0.9**	**0.5**		**0.50**

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.89**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

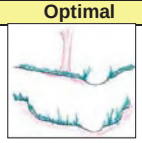
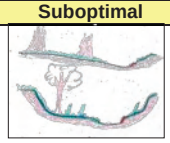
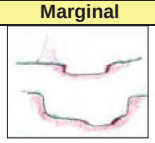
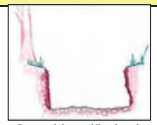
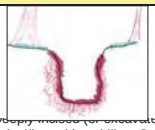
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB3	02080206	11/2/11		101	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 84M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.24**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

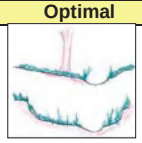
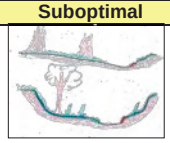
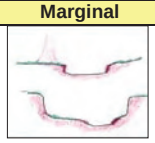
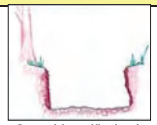
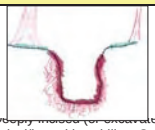
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/2/11		157	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 85M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.1									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.10	CI
	Score >	1.1							Lt Bank CI >	1.10	1.10

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.10**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Downstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

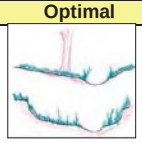
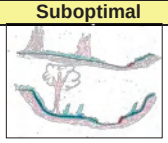
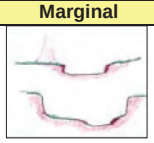
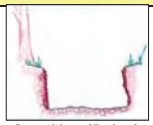
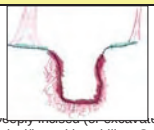
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/2/11		136	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 86M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.24**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

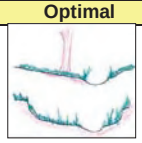
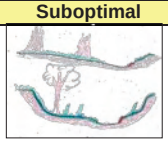
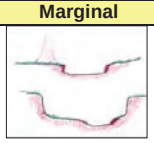
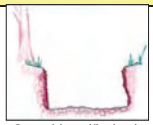
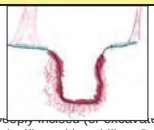
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/2/11		112	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 87M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%		
	Score >	1.5								
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI > 1.50	CI
	Score >	1.5							Lt Bank CI > 1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.36**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Down Stream

DESCRIBE PROPOSED IMPACT:

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent		02080206	11/2/11		151	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 88M

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	60%	10%	30%				100%		
	Score >	1.1	0.6	0.5						
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI > 0.87	CI
	Score >	1.1							Lt Bank CI > 1.10	0.99

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	0.50

RCI= (Riparian CI)/2

COMPENSATION REQUIREMENT (CR) >>	0

CR = RCI X LF X IF

INSERT PHOTOS:

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

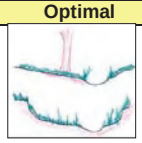
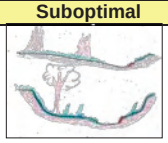
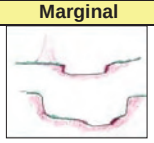
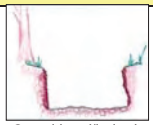
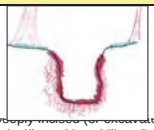
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	New Kent	R2UB3	02080206	11/2/11		72	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 89M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.18**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

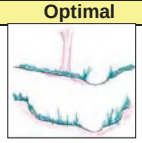
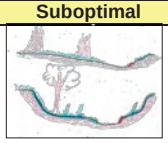
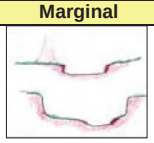
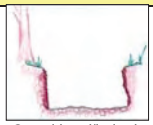
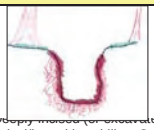
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	New Kent	R4UB2	02080206	11/2/11		106	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 90M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	40%	10%	50%				100%		
	Score >	1.1	0.6	0.5						
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	40%	10%	50%				100%	Rt Bank CI >	0.75
	Score >	1.1	0.6	0.5					Lt Bank CI >	0.75

		CI
		0.75

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	CI 0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.70**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.79**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

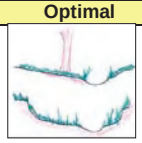
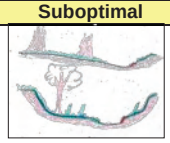
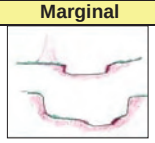
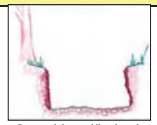
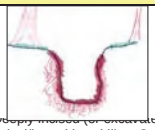
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R4UB2	02080206	11/2/11		113	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 91M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	1.6
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.1									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.10	CI
	Score >	1.1							Lt Bank CI >	1.10	1.10

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

Conditional Category	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.82**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

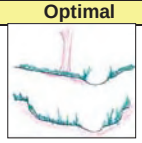
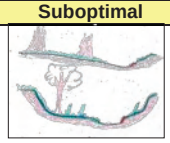
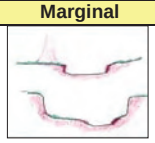
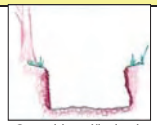
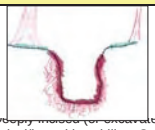
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R4UB2	02080206	11/2/11		42	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 92M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category

	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.1									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.10	CI
	Score >	1.1							Lt Bank CI >	1.10	1.10

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.02**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

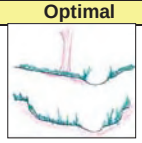
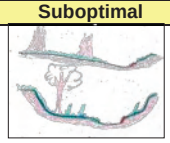
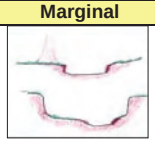
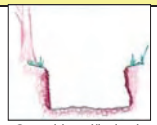
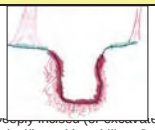
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB3	02080206	11/2/11		70	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 93M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	1.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.84**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

DESCRIBE PROPOSED IMPACT:

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent		02080206	11/2/11		179	

Name(s) of Evaluator(s)	Stream Name and Information
	WUS 95M

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category								NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	0.60

RCI= (Riparian CI)/2

COMPENSATION REQUIREMENT (CR) >>	0

CR = RCI X LF X IF

INSERT PHOTOS:

UPSTREAM

DOWNSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

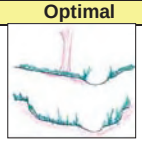
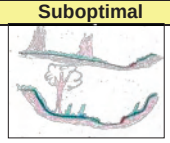
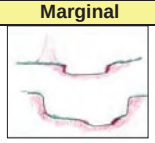
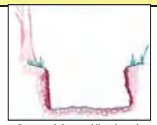
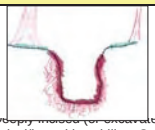
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/2/11		60	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 96M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.18**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

DESCRIBE PROPOSED IMPACT:

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent		02080206	11/2/11		134	

Name(s) of Evaluator(s)	Stream Name and Information
	WUS 97M

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category								NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

THE REACH CONDITION INDEX (RCI) >>	0.60
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	0
CR = RCI X LF X IF	

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

INSERT PHOTOS:

UPSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

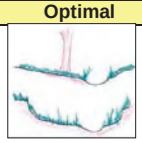
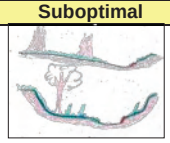
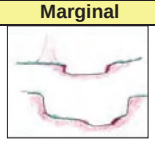
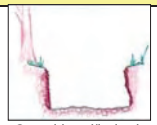
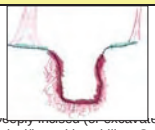
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
	I-64 Peninsula							

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category

	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>							0%	
	Score >								
									CI= (Sum % RA * Scores*0.01)/2
Left Bank	% Riparian Area>							0%	Rt Bank CI > 0.00 / CI
	Score >								Lt Bank CI > 0.00 / 0.00

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.00**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

Downstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

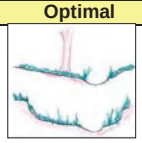
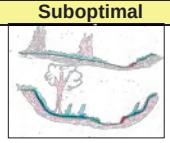
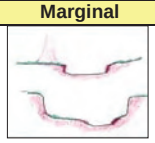
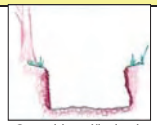
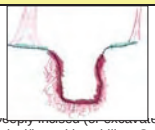
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/2/11		267	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 99M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	1.6
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.96**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

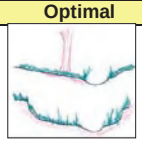
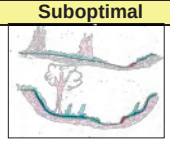
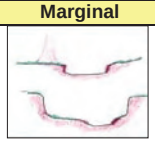
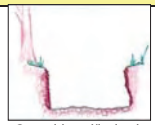
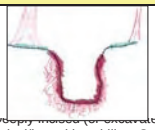
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/2/11		804	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 100M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	1.6
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

Conditional Category	Optimal	Suboptimal	Marginal	Poor	
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Score	1.5	1.2	0.9	0.5	1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.02**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

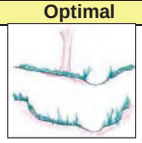
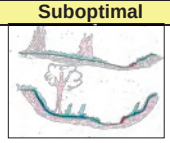
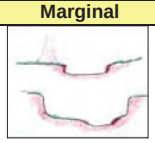
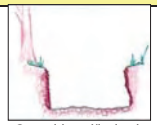
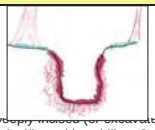
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/2/11		78	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 101M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	1.6
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
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		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
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Score	1.5	1.2	0.9	0.5		0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

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	Conditional Category						
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SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.88**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Downstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

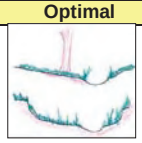
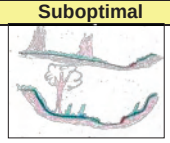
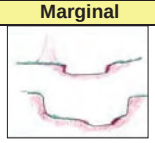
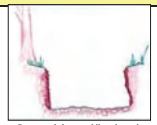
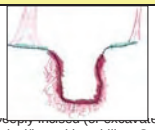
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/2/11		275	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 102M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	1.6
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

Conditional Category	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.88**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Downstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

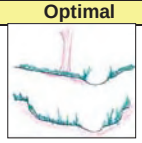
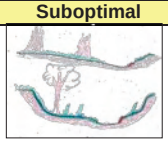
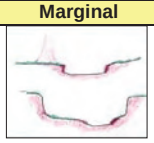
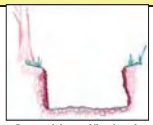
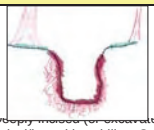
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/2/11		78	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 103M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	1.6
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

Conditional Category	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.88**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

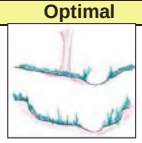
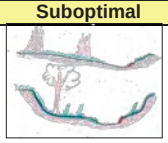
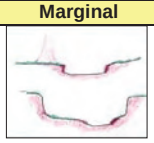
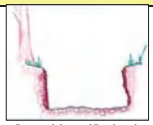
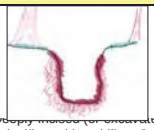
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/2/11		1165	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 104M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
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Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.36**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

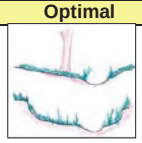
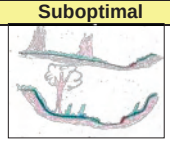
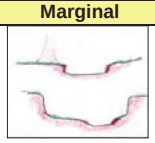
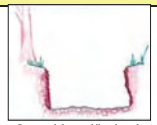
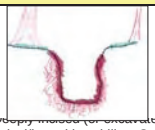
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/2/11		188	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 105M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.36**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

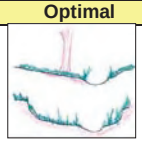
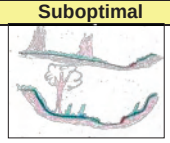
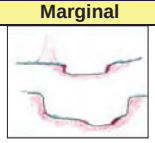
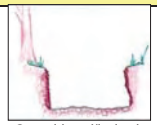
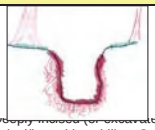
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB3	02080206	11/2/11		77	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 106M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
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		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
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3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
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Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
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SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.34**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Downstream

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

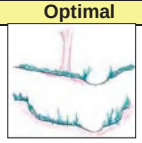
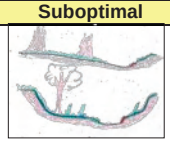
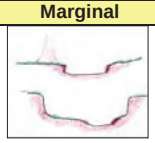
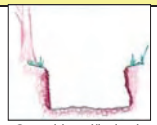
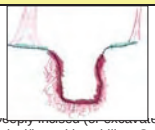
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/3/11		182	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 107M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
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NOTES>>						

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		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
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									CI= (Sum % RA * Scores*0.01)/2		
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Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

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	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.36**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

Downstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

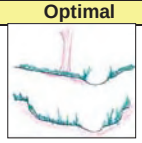
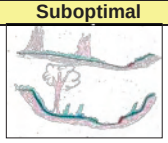
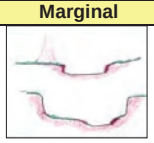
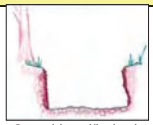
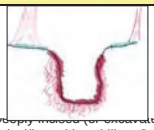
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/2/11		398	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS108M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.04**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

Downstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

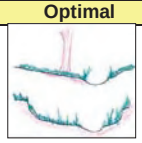
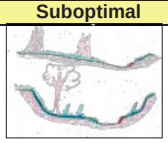
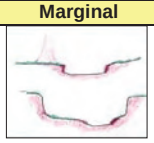
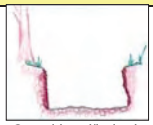
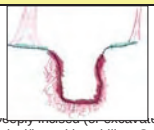
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/3/11		189	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 109M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.18**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Downstream

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

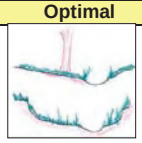
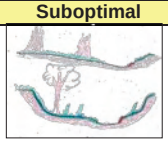
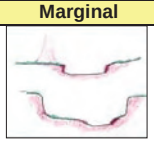
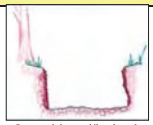
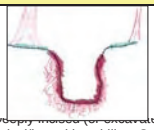
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/3/11		1382	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS110M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	20%	20%	60%				100%	Rt Bank CI >	1.20	CI
	Score >	1.2	0.6	0.5					Lt Bank CI >	0.66	0.93

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.23**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Downstream

Upstream

DESCRIBE PROPOSED IMPACT:

Unified Stream Methodology for use in Virginia

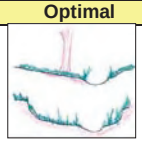
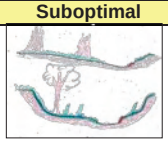
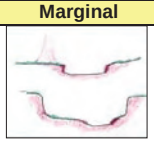
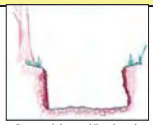
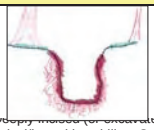
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/3/11		298	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 111M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category

	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

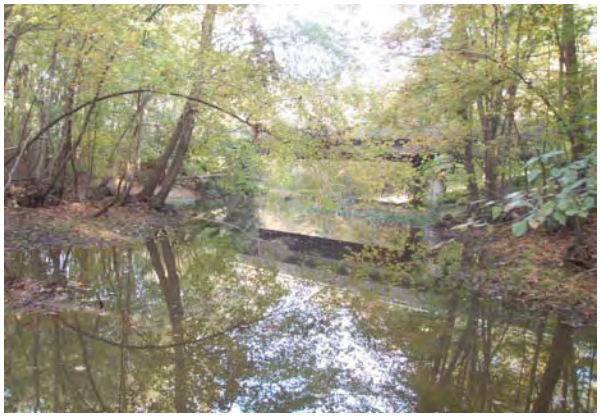
NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.46**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Downstream

Upstream



DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

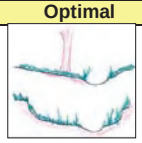
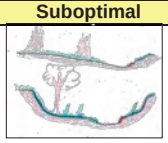
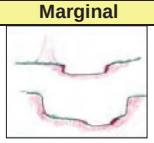
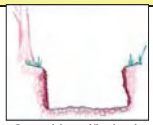
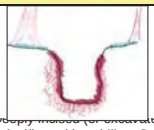
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/3/11		98	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 112M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	50%	20%	30%				100%		
	Score >	1.1	0.6	0.5						
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	50%	20%	30%				100%	Rt Bank CI >	0.82
	Score >	1.1	0.6	0.5					Lt Bank CI >	0.82

CI: 0.82

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	CI: 1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.02**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

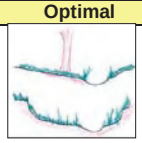
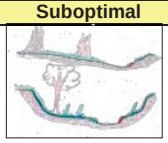
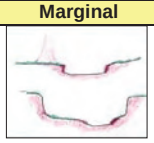
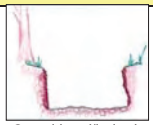
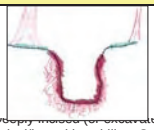
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/3/11		47	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 113M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	1.6
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	10%	20%	70%				100%		
	Score >	1.2	0.6	0.5						
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	80%	10%	10%				100%	Rt Bank CI >	0.59
	Score >	1.2	0.6	0.5					Lt Bank CI >	1.07

CI: 0.83

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

	Conditional Category			
	Optimal	Suboptimal	Marginal	Poor
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.
Score	1.5	1.2	0.9	0.5

CI: 0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.89**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

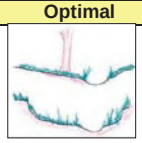
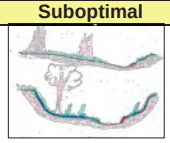
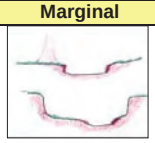
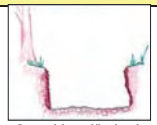
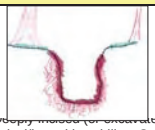
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/3/11		109	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 114M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.24**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Downstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

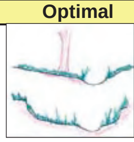
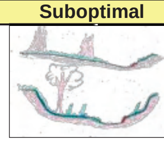
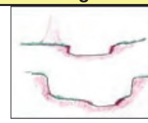
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R4UB2	02080206	11/3/11		333	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 115M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	Severe	
						
Channel Condition	Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category

	Optimal	Suboptimal		Marginal		Poor	
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.
		High	Low	High	Low	High	Low
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5

NOTES>>

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	10%	20%	70%				100%
	Score >	1.1	0.6	0.5				
Left Bank	% Riparian Area>	90%	10%					100%
	Score >	1.2	0.6					

CI= (Sum % RA * Scores*0.01)/2

		CI
Rt Bank CI >	0.58	
Lt Bank CI >	1.14	0.86

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embedeness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	CI
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.13**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Downstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

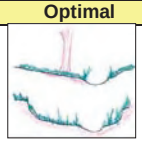
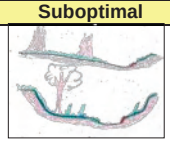
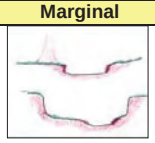
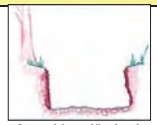
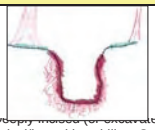
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/3/11		111	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 116M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

Conditional Category	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.16**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

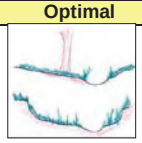
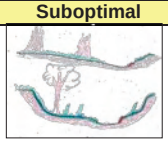
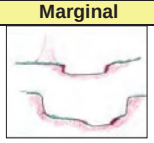
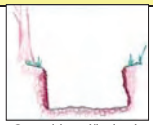
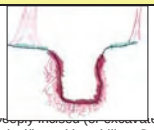
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/3/11		326	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 117M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.30**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Downstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

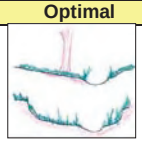
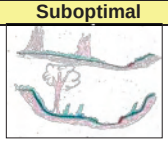
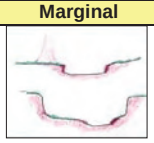
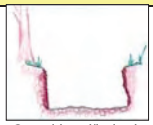
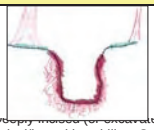
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/3/11		188	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 118M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category

	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	50%	50%					100%			
	Score >	1.1	0.6								
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	0.85	CI
	Score >	1.1							Lt Bank CI >	1.10	0.98

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.70**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.52**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

UPSTREAM

DOWNSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

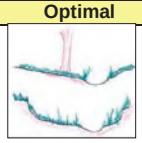
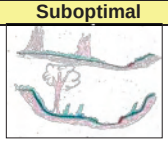
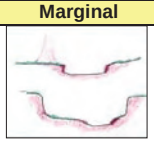
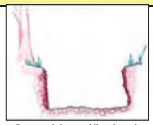
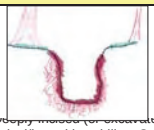
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/3/11		265	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 119M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.30**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

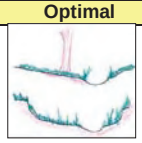
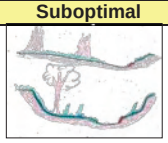
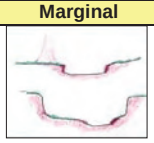
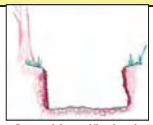
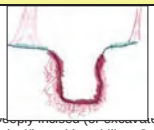
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/3/11		195	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 120M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.40**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

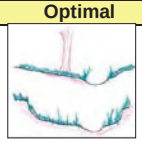
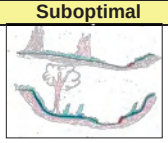
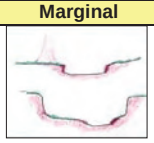
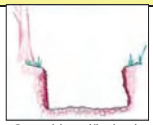
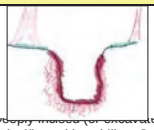
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/3/11		365	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 121M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

Instream Habitat/ Available Cover	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.50**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

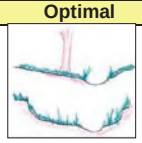
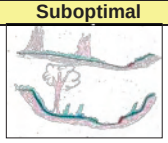
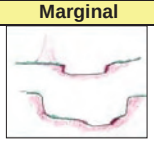
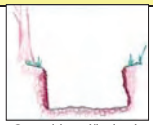
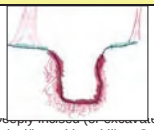
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	November '11		1633	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 122M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%		
	Score >	1.5								
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	20%	10%	70%				100%	Rt Bank CI >	1.50
	Score >	1.2	0.6	0.5					Lt Bank CI >	0.65

CI
1.08

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.26**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

UPSTREAM

DOWNSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

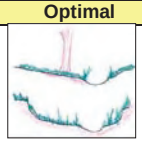
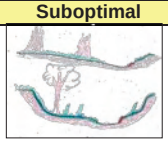
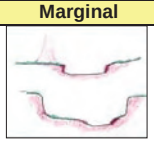
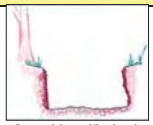
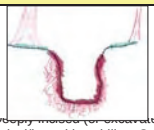
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/3/11		141	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 123M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.34**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

UPSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

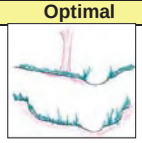
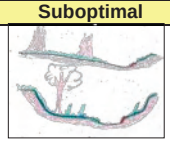
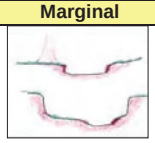
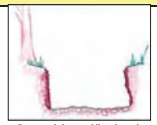
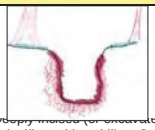
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/3/11		472	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 124M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.14**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

UPSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

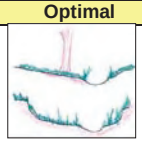
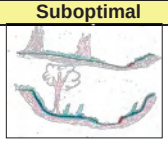
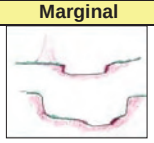
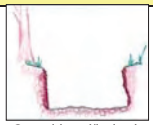
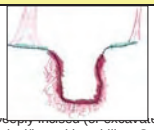
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/3/11		443	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 125M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.22**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DOWNSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

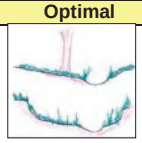
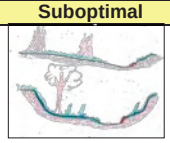
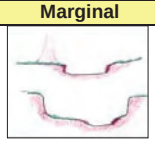
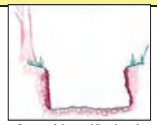
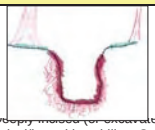
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/8/11		118	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 126M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.20**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

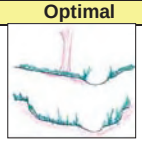
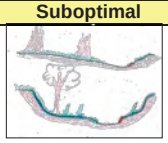
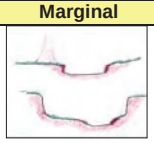
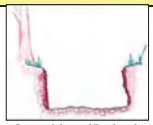
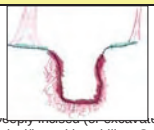
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R2UB2	02080206	11/3/11		294	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 127M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	40%	20%	40%				100%		
	Score >	1.1	0.6	0.5						
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	0.76
	Score >	1.1							Lt Bank CI >	1.10

CI
0.93

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	CI 0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.87**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

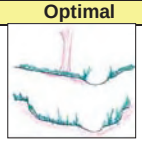
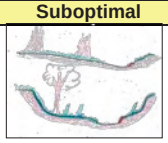
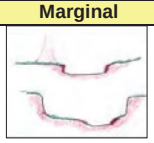
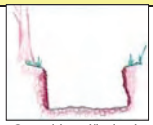
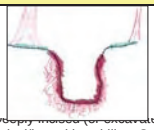
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R2UB2	02080206	11/3/11		165	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 128M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.00**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

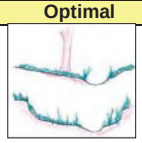
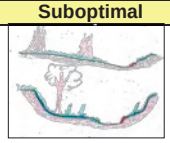
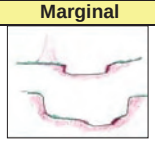
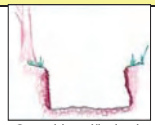
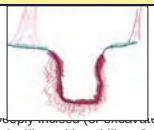
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R2UB2	02080206	11/3/11		91	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 129M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.00**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

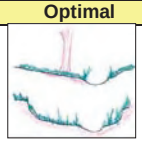
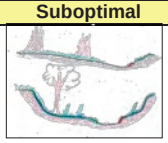
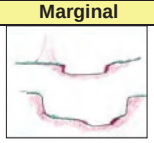
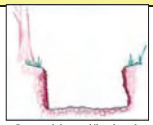
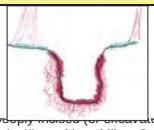
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R4UB2	02080206	11/3/11		142	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 130M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	50%	15%	35%				100%		
	Score >	1.2	0.6	0.5						
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	0.87
	Score >	1.2							Lt Bank CI >	1.20

CI
CI
1.03

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	CI 0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.70**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.93**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

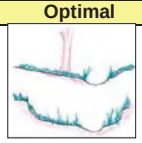
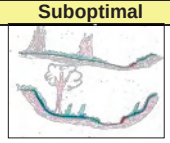
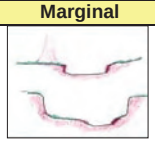
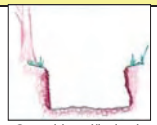
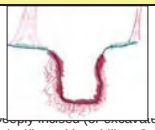
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R2UB2	02080206	11/3/11		143	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 131M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.18**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

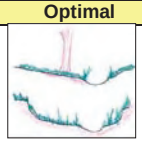
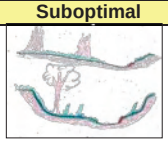
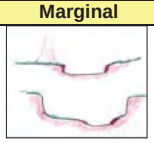
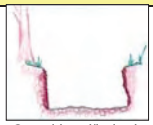
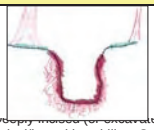
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R2UB2	02080206	11/3/11		724	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 132M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	50%	20%	30%				100%		
	Score >	1.2	0.6	0.5						
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	50%	20%	30%				100%	Rt Bank CI >	0.87
	Score >	1.2	0.6	0.5					Lt Bank CI >	0.87

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.09**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

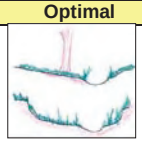
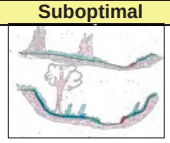
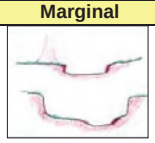
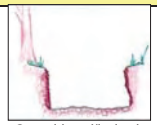
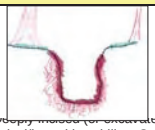
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R2UB2	02080206	Nov. '11		48	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 133M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.04**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

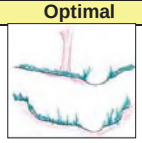
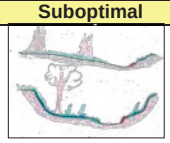
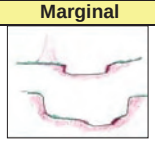
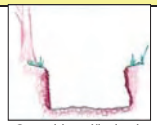
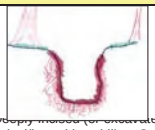
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R4UB2	02080206	Nov. '11		39	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 134M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.96**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

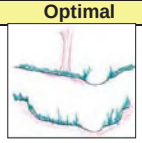
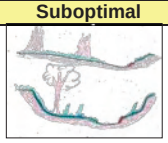
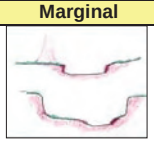
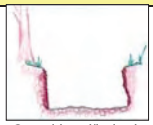
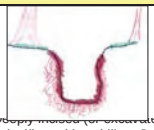
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R4UB2	02080206	Nov. '11		148	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 135M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.16**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

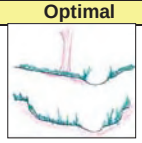
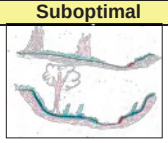
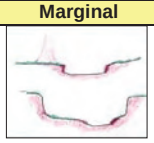
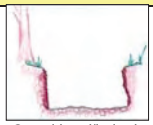
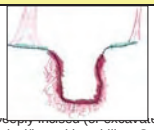
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R2UB2	02080206	Nov. '11		744	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 136M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%		
	Score >	1.2								
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	1000%	10%	80%				1090%	Rt Bank CI > 1.20	CI
	Score >	1.2	0.6	0.5					Lt Bank CI > 12.46	6.83

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**2.13**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

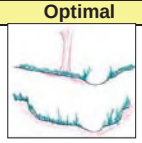
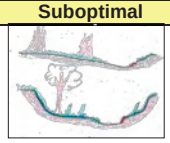
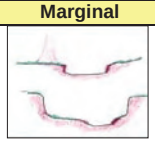
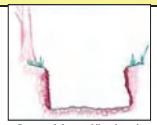
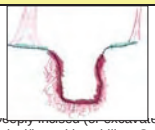
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R2UB2	02080206	11/9/11		691	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 137M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	1.6
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	50%	20%	30%				100%		
	Score >	1.2	0.6	0.5						
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	50%	20%	30%				100%	Rt Bank CI >	0.87
	Score >	1.2	0.6	0.5					Lt Bank CI >	0.87

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.69**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

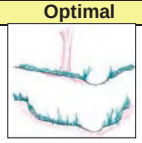
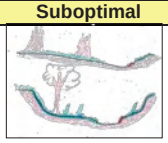
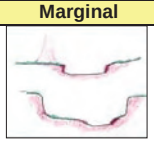
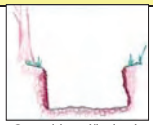
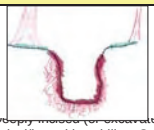
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R2UB2	02080206	11/9/11		126	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 138M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.28**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

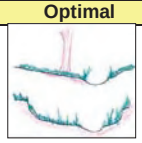
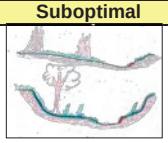
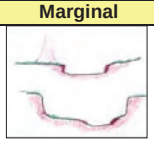
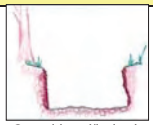
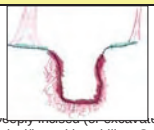
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R2UB2	02080206	11/9/11		129	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 139M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.24**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

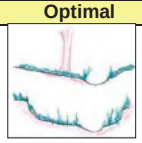
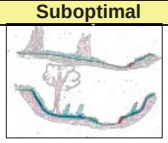
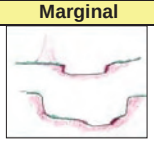
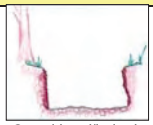
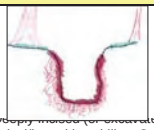
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R4UB2	02080206	11/9/11		175	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 140M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.16**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

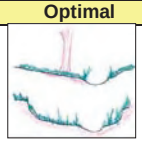
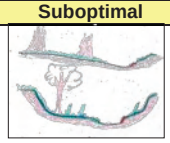
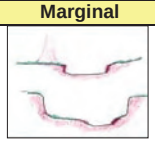
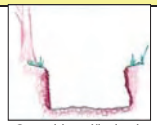
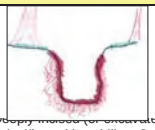
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R2UB2	02080206	11/9/11		182	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 141M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
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Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.26**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

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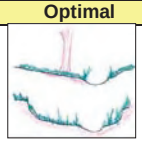
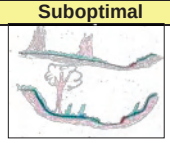
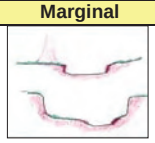
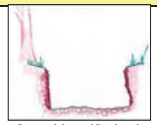
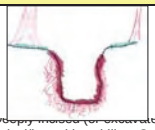
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R2UB2	02050107	11/9/11		326	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 142M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

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Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.24**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

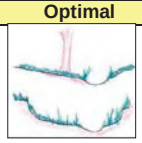
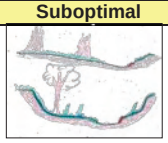
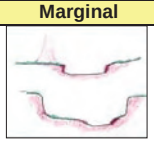
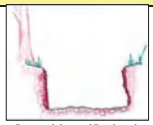
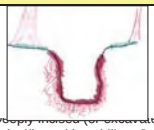
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R2UB2	02080107	11/9/11		252	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 143M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.08**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

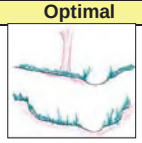
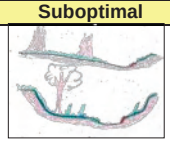
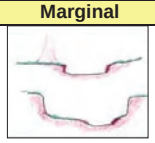
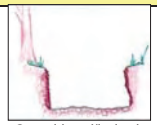
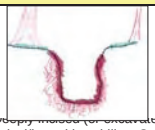
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R2UB2	02080107	11/9/11		206	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 144M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.20**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

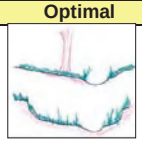
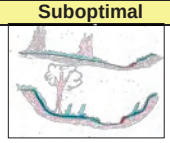
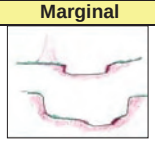
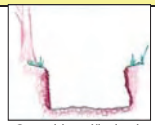
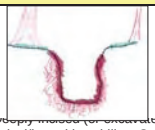
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R2UB2	02080107	11/9/11		229	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 145M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
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Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.30**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

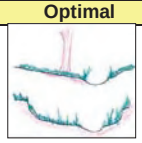
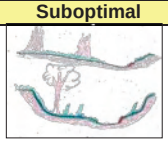
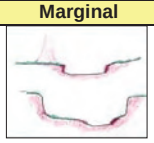
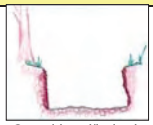
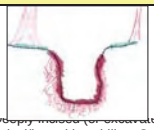
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R2UB2	02080107	11/9/11		118	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 146M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.12**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

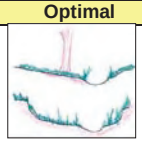
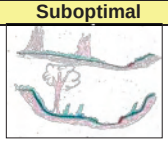
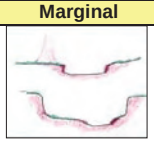
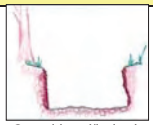
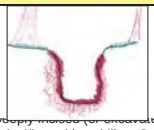
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R2UB2	02080107	11/9/11		484	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 148M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.36**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

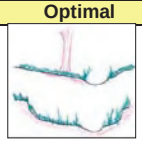
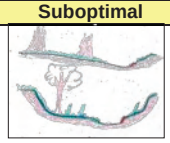
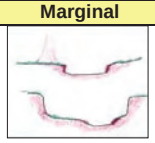
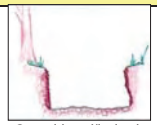
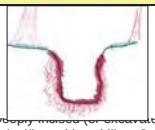
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R2UB2	02080107	11/9/11		97	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 149M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
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Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.24**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

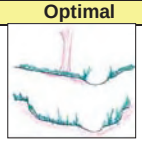
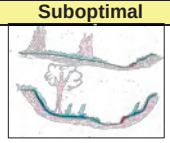
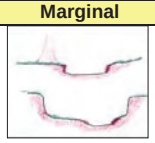
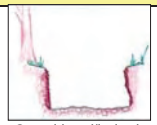
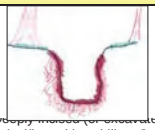
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R2UB2	02080107	11/9/11		118	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 150M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.20**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

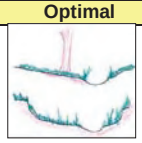
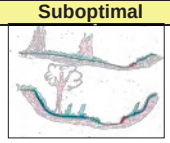
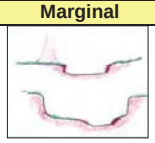
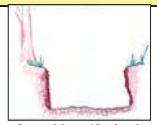
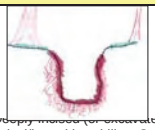
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	York	R2UB2	02080107	11/9/11		36	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 151M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.70**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.96**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

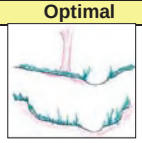
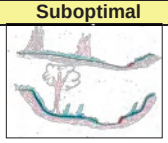
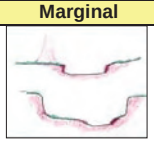
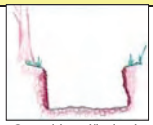
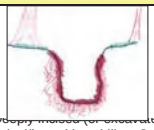
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	York	R2UB2	02080107	11/9/11		123	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 152M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	1.6
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category

	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	50%	10%	40%				100%		
	Score >	1.1	0.5	0.6						
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	50%	40%	10%				100%	Rt Bank CI >	0.84
	Score >	1.1	0.6	0.5					Lt Bank CI >	0.84

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.77**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

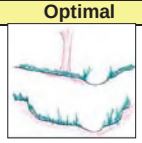
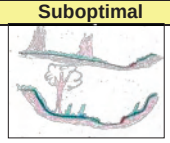
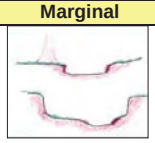
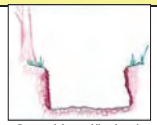
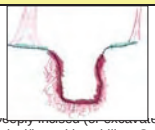
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	York	R2UB2	02080107	11/9/11		19	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 153M

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	0.85									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	0.85	CI
	Score >	0.85							Lt Bank CI >	0.85	0.85

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.70**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.97**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

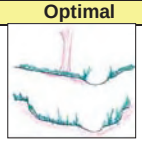
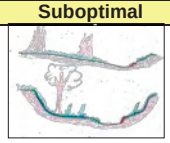
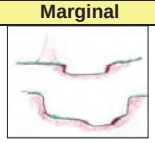
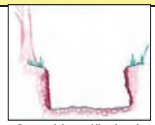
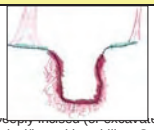
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	New Kent	R2UB3	02080206	July '11		161	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 10S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	1.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	40%	60%					100%		
	Score >	1.2	0.6							
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI > 0.84	CI
	Score >	1.2							Lt Bank CI > 1.20	1.02

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.60**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Downstream

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

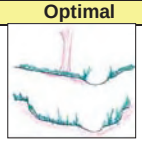
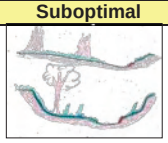
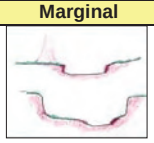
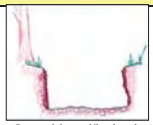
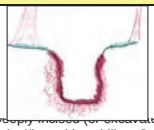
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	New Kent	R2UB2	02080206	July '11		35	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 11S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%		
	Score >	1.5								
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI > 1.50	CI
	Score >	1.5							Lt Bank CI > 1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>> Shallow, substrate is not diverse.

	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.14**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Downstream

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

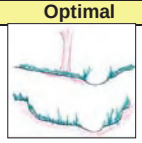
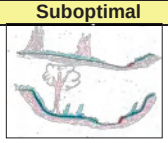
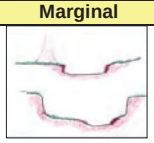
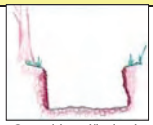
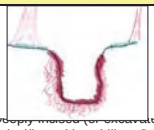
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	New Kent	R2UB3	02080206	July '11		65	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 12S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>	Channel is influenced by possible beaver dam.					

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.46**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Downstream

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

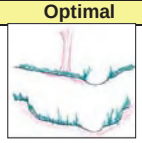
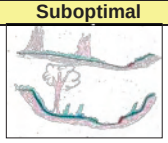
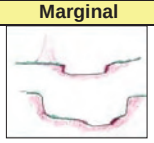
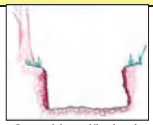
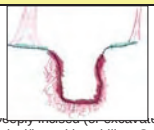
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	New Kent	R2UB2	02080206	July '11		599	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 13S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%		
	Score >	1.2								
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI > 1.20	CI
	Score >	1.2							Lt Bank CI > 1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>> Not a lot of flow.

	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.08**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

Downstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

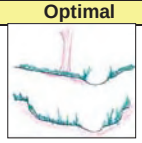
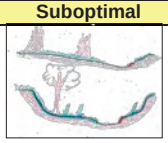
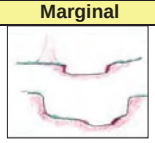
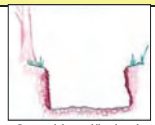
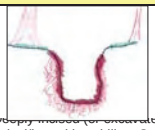
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	New Kent	R2UB2	02080206	July '11		36	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 14S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	**Suboptimal**	**Marginal**	**Poor**	**Severe**	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	**CI**
Score	**3**	**2.4**	**2**	**1.6**	**1**	**3.0**
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	**Suboptimal**		**Marginal**		**Poor**		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	**Low**	**High**	**Low**	**High**	**Low**	
Condition Scores	**1.5**	**1.2**	**1.1**	**0.85**	**0.75**	**0.6**	**0.5**	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	**100%**						**100%**	
	Score >	**1.5**							
								CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	**100%**						**100%**	**Rt Bank CI >** **1.50** **CI**
	Score >	**1.5**							**Lt Bank CI >** **1.50** **1.50**

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>> Not a lot of flow.

	Conditional Category				
	Optimal	**Suboptimal**	**Marginal**	**Poor**	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	**CI**
Score	**1.5**	**1.2**	**0.9**	**0.5**	**0.50**

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	1.5	1.3	1.1	0.9	0.7	0.5	1.30

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.26**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

Downstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

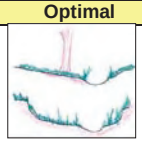
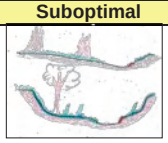
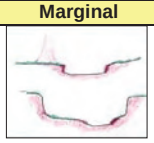
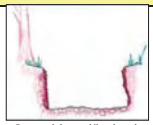
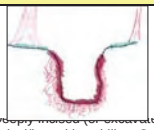
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	New Kent	R2UB2	02080206	July '11		54	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 15S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>> Not a lot of flow. Sand channel substrate.

	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.26**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Upstream

Downstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

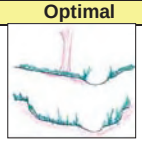
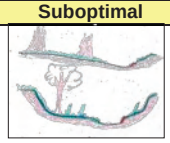
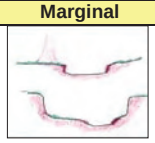
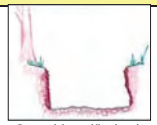
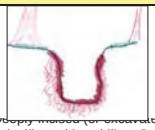
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	New Kent	R2UB2	02080206	July '11		91	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 16S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	1.6
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%		
	Score >	1.2								
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI > 1.20	CI
	Score >	1.2							Lt Bank CI > 1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.84**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Downstream

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

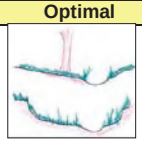
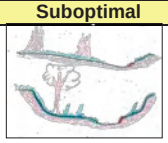
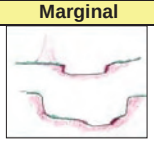
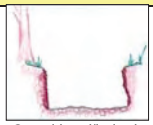
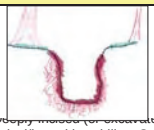
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	New Kent	R2UB2	02080206	July '11		108	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 17S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%		
	Score >	1.2								
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	30%	70%					100%	Rt Bank CI > 1.20	CI
	Score >	1.2	0.6						Lt Bank CI > 0.78	0.99

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>> Mud channel, but drains wetland outside of ROW.

	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.88**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

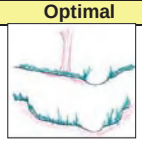
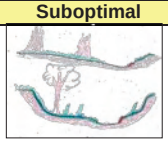
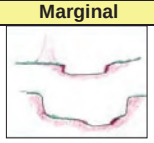
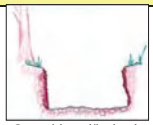
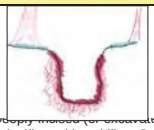
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	New Kent	R2UB2	02080206	July '11		75	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 18S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.12**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

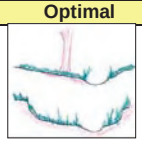
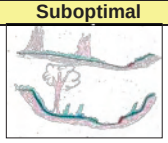
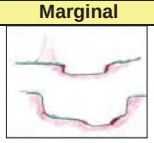
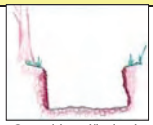
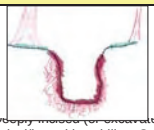
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	James City	R2UB2	02080206	July '11		122	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 19S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	1.6
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.88**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

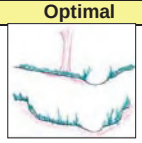
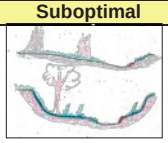
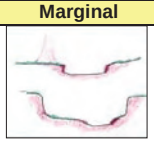
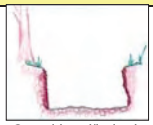
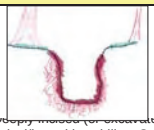
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	Richmond	R2UB1	02080206	6/27/11		1388	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 1S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	1.6
NOTES>>	Concrete channel - has sediment sorting					

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>> Bamboo present.
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	30%	20%	50%				100%		
	Score >	0.85	0.6	0.5						
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	70%	30%					100%	Rt Bank CI >	0.63
	Score >	0.85	0.6						Lt Bank CI >	0.78

					CI
					0.70

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.66**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

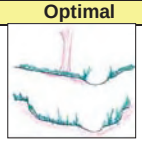
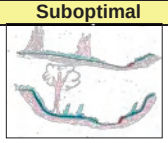
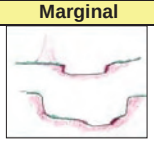
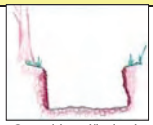
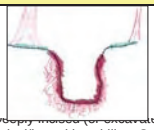
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	James City	R2UB2	02080206	July '11		43	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 20S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.08**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

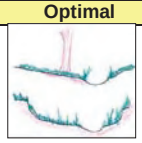
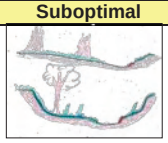
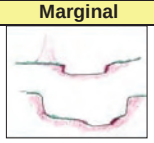
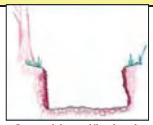
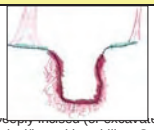
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	James City	R2UB2	02080107	July '11		69	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 21S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.92**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

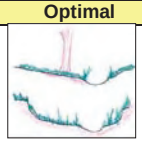
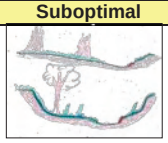
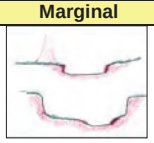
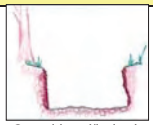
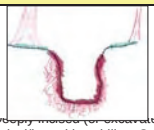
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	James City	R2UB2	02080107	July '11		129	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 22S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.14**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

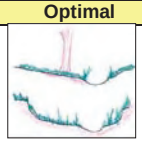
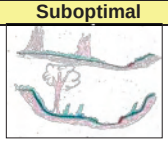
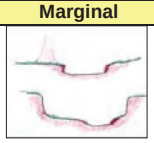
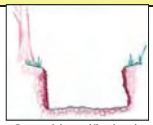
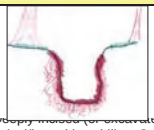
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	James City	R2UB2	020800107	July '11		115	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 23S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.12**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

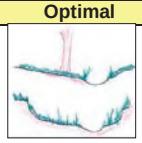
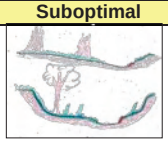
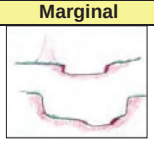
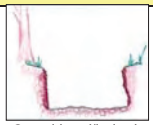
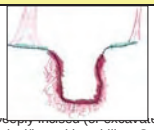
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	James City	R2UB2	02080107	July '11		86	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 24S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
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		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
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Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.00**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

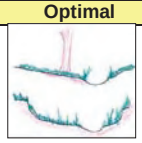
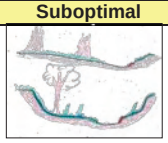
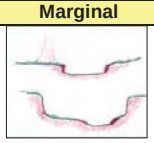
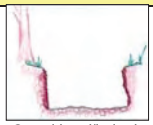
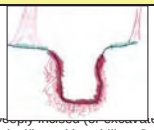
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	York	R1UB2	02080107	July'11		120	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 25S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.50**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

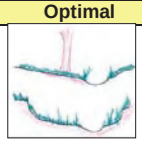
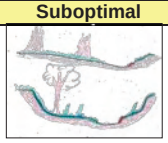
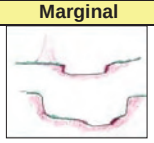
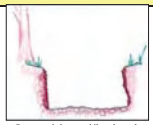
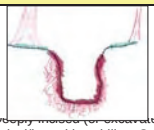
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	York	R2UB3	02080107	July '11		931	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 26S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	0.75									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	0.75	CI
	Score >	0.75							Lt Bank CI >	0.75	0.75

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.11**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

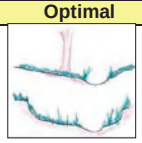
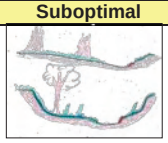
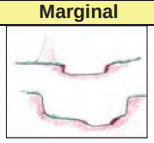
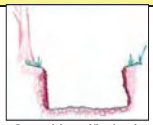
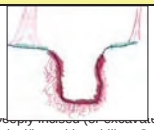
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	James City	R2UB2	02080206	July '11		79	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 27S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	0.85									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	0.85	CI
	Score >	0.85							Lt Bank CI >	0.85	0.85

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.70**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.97**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

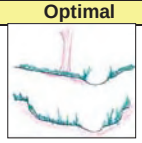
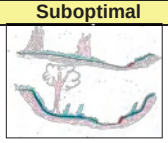
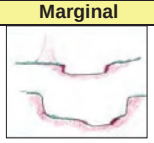
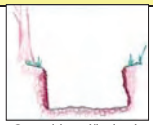
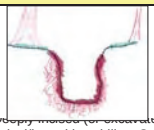
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City		02080206	July 2011		352	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 28S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.50**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

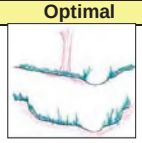
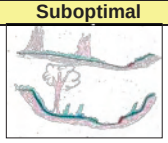
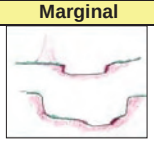
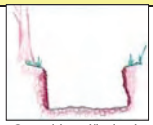
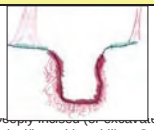
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	Newport News	R2UB2	02080206	July '11		784	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 29S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	20%	30%	50%				100%		
	Score >	0.85	0.6	0.5						
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	0.60
	Score >	1.2							Lt Bank CI >	1.20

CI
0.90

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>> Fish and turtles. Stinkpot and snapping turtles.

	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.70**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.96**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

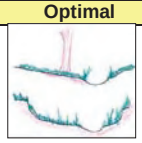
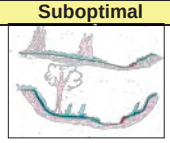
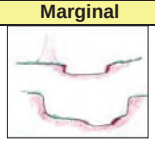
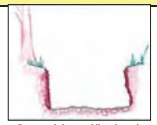
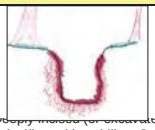
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	Henrico	R2UB1	02080206	July '11		41	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 2S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	1.6
NOTES>>	Concrete channel					

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	30%	20%	50%				100%		
	Score >	0.85	0.75	0.5						
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	30%	70%					100%	Rt Bank CI >	0.66
	Score >	0.85	0.75						Lt Bank CI >	0.78

CI
0.72

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	CI 0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.66**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

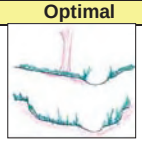
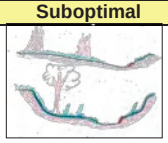
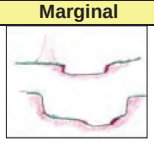
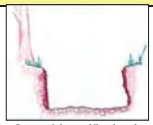
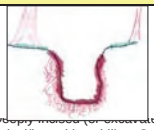
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Newport News	R2UB2	02080206	July '11		557	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 30S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.1									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.10	CI
	Score >	0.5							Lt Bank CI >	0.50	0.80

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.04**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

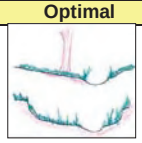
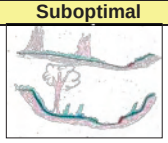
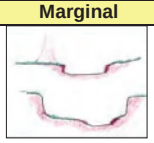
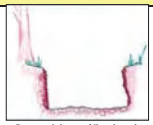
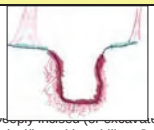
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Henrico	R2UB1	02080206	July '11		39	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 3S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>> Steep Slopes
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.00**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

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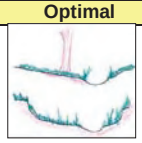
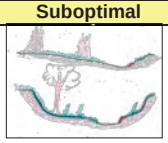
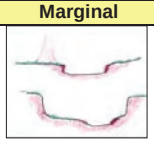
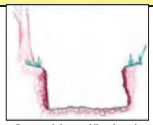
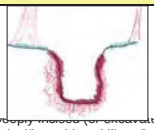
Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Henrico	R2UB3	02080206	July '11		65	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 4S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	20%	80%					100%	Rt Bank CI >	1.20	CI
	Score >	1.2	0.85						Lt Bank CI >	0.92	1.06

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
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Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
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SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.11**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

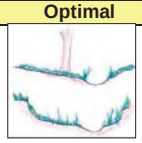
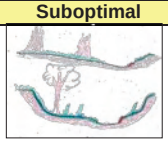
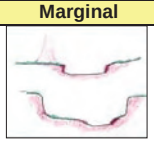
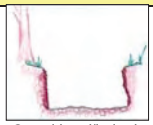
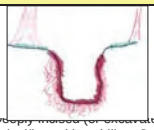
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Henrico	R2UB1	02080206	July '11		157	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 5S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.16**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

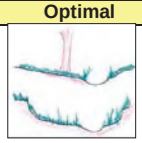
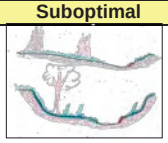
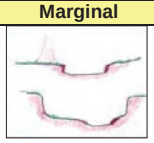
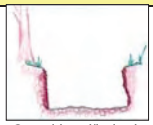
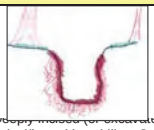
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Henrico	R2UB1	02080206	July '11		41	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 6S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
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		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
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Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
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Score	1.5	1.2	0.9	0.5	0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
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SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.16**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

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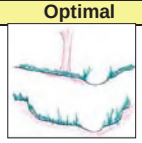
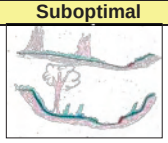
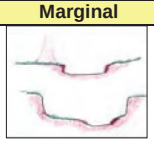
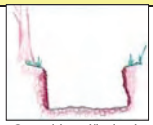
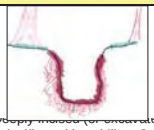
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Henrico	R2UB3	02080206	July '11		70	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 7S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
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		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
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Score	1.5	1.2	0.9	0.5		1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
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SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.46**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

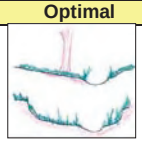
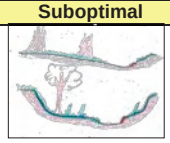
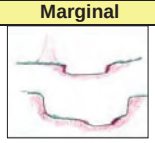
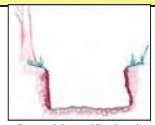
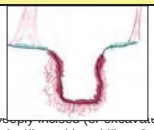
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	New Kent	R2UB1	02080206	July '11		443	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 8S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>> Channel has been altered by a road up and downstream of the reach.

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.06**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

Downstream

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

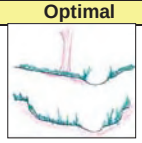
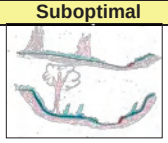
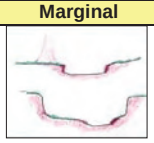
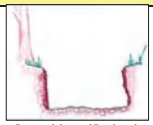
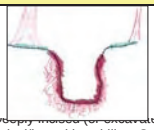
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	New Kent	R2UB3	02080206	July '11		44	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 9S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.08**

RCI= (Sum of all CI's)/5

COMPENSATION REQUIREMENT (CR) >>	**0**

CR = RCI X LF X IF

INSERT PHOTOS:

Downstream

Upstream

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

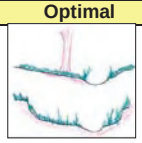
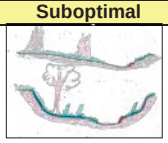
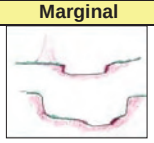
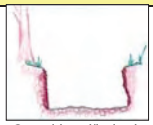
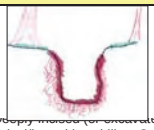
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	York	R2UB2	02080107	11/9/11		474	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 154S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.00**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

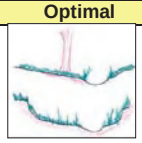
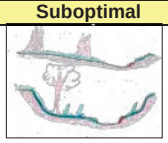
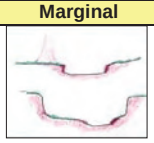
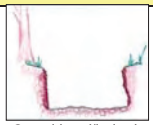
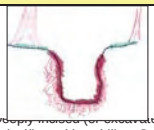
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	York	R2UB2	02080107	11/9/11		53	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 155S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.1									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.10	CI
	Score >	0.75							Lt Bank CI >	0.75	0.93

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.01**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

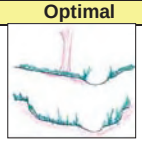
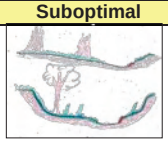
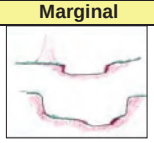
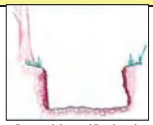
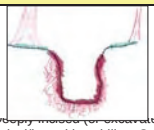
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	Henrico	R2UB1	02080206	11/15/11		85	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 156S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	1.6
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	0.85									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	0.85	CI
	Score >	0.85							Lt Bank CI >	0.85	0.85

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.85**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

UPSTREAM

DOWNSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

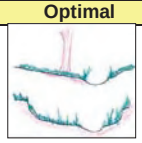
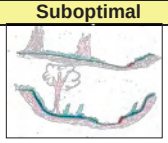
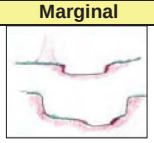
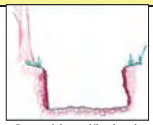
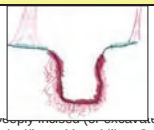
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	Henrico	R2UB2	02080206	11/15/11		49	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 157S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.1									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.10	CI
	Score >	0.85							Lt Bank CI >	0.85	0.98

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.70**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.92**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

NO PHOTOS

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

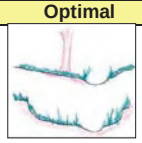
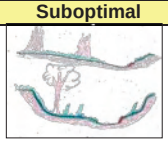
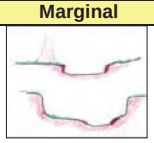
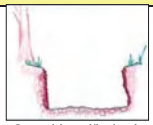
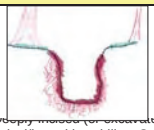
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	Henrico	R2UB2	02080206	11/15/11		182	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 158S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.1									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.10	CI
	Score >	1.1							Lt Bank CI >	1.10	1.10

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.70**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.00**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

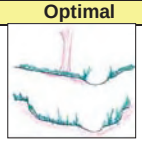
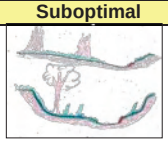
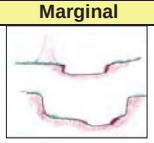
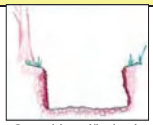
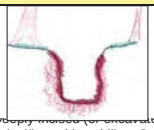
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	Henrico	R2UB2	02080206	11/15/11		97	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 159S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.08**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

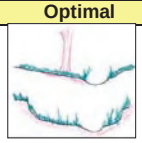
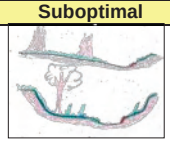
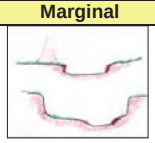
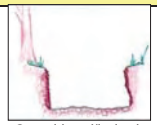
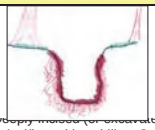
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	Henrico	R2UB2	02080206	11/15/11		42	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 160S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category

	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.22**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

UPSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

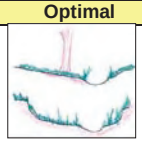
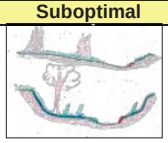
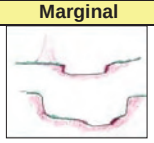
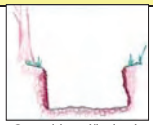
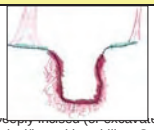
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/15/11		41	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 162S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	0.85									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	0.85	CI
	Score >	0.85							Lt Bank CI >	0.85	0.85

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.19**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

UPSTREAM

DOWNSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

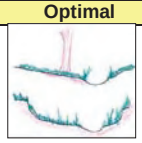
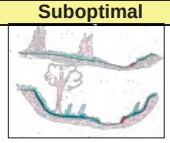
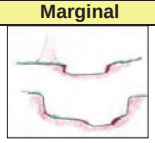
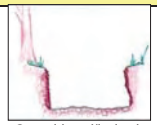
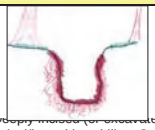
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/15/11		77	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 163S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.44**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

UPSTREAM

DOWNSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

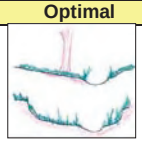
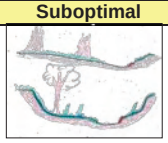
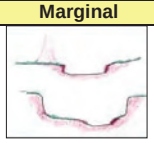
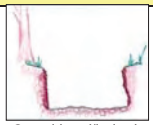
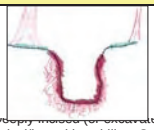
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/15/11		33	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 164S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.44**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DOWNSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

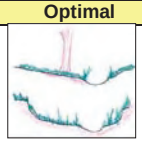
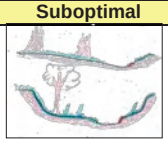
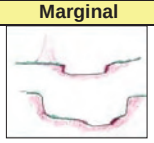
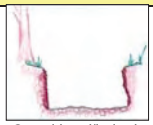
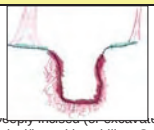
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/15/11		17	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 165S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.50**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DOWNSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

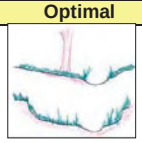
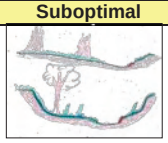
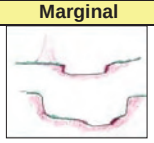
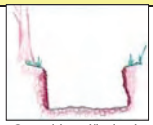
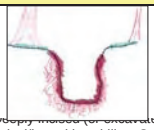
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/15/11		43	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 166S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.50**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

UPSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

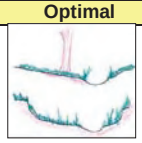
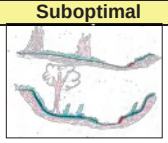
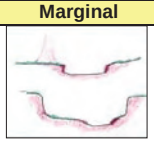
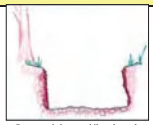
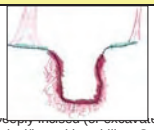
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/15/11		34	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 167S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.44**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

UPSTREAM

DOWNSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

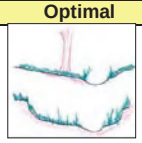
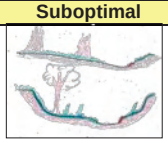
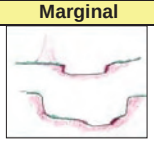
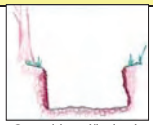
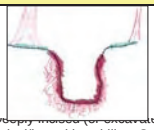
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/15/11		52	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 168S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

Instream Habitat/ Available Cover	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.38**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

UPSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

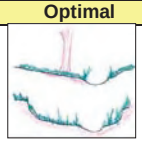
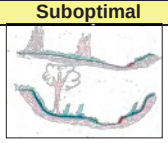
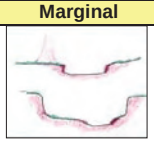
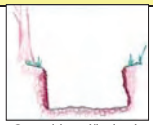
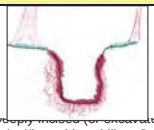
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/15/11		542	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 169S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	1.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.1									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.10	CI
	Score >	1.1							Lt Bank CI >	1.10	1.10

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

Conditional Category	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.62**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

UPSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

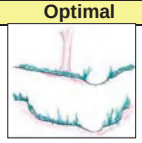
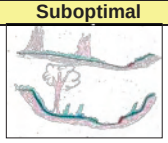
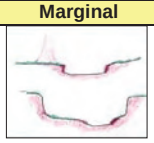
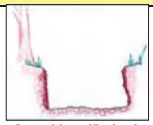
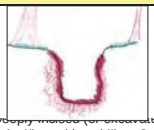
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Newport News	R2UB2	02080206	July '11		124	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 33S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.06**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

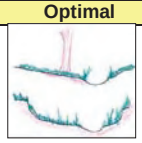
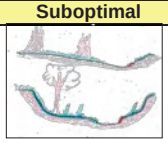
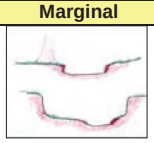
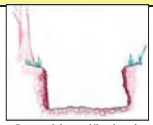
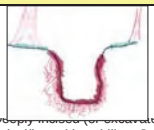
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Newport News	R2UB2	02080108	July '11		59	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 34S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	1.6
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	0.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	0.50	CI
	Score >	0.5							Lt Bank CI >	0.50	0.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.76**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

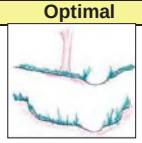
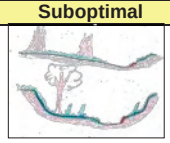
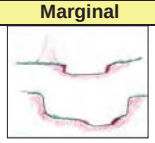
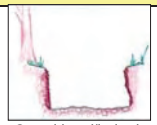
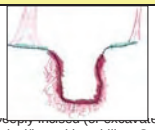
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Newport News	R2UB2	02080101	July '11		949	

Stream Name and Information	
Aitkenhead	WUS 35S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	1.6
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	0.6									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	10%	90%					100%	Rt Bank CI >	0.60	CI
	Score >	0.6	0.5						Lt Bank CI >	0.51	0.56

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

Conditional Category	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.70**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.75**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

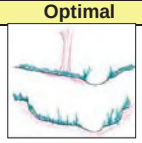
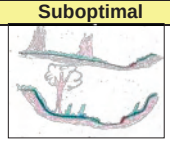
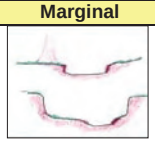
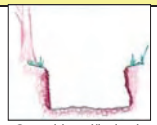
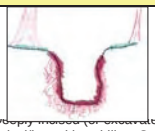
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Hampton	R2UB2	02080108	July '11		465	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 36S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	**CI**
Score	**3**	**2.4**	**2**	**1.6**	**1**	**2.0**
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category

	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	**Low**	**High**	**Low**	**High**	**Low**	
Condition Scores	**1.5**	**1.2**	**1.1**	**0.85**	**0.75**	**0.6**	**0.5**	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	**100%**						**100%**			
	Score >	**0.75**									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	**100%**						**100%**	**Rt Bank CI >**	**0.75**	**CI**
	Score >	**0.75**							**Lt Bank CI >**	**0.75**	**0.75**

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		**CI**
Score	**1.5**	**1.2**	**0.9**	**0.5**		**0.50**

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.70**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.79**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

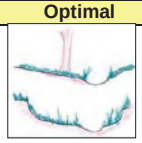
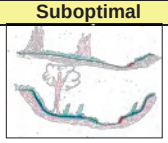
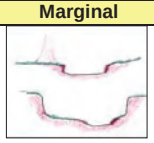
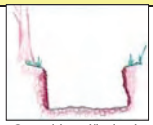
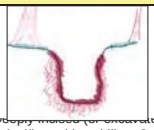
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Hampton	R2UB2	02080108	July '11		562	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 37S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	0.75									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	0.75	CI
	Score >	0.75							Lt Bank CI >	0.75	0.75

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.70**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.79**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

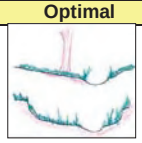
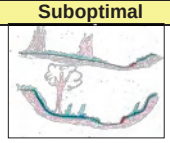
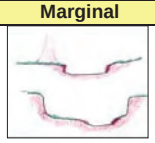
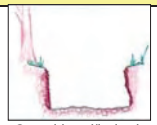
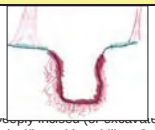
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Hampton	R2UB2	02080108	July '11		613	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 38S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	**CI**
Score	**3**	**2.4**	**2**	**1.6**	**1**	**2.0**
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category

	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	**Low**	**High**	**Low**	**High**	**Low**	
Condition Scores	**1.5**	**1.2**	**1.1**	**0.85**	**0.75**	**0.6**	**0.5**	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	**100%**						**100%**			
	Score >	**0.75**									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	**100%**						**100%**	**Rt Bank CI >**	**0.75**	**CI**
	Score >	**0.75**							**Lt Bank CI >**	**0.75**	**0.75**

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
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Score	**1.5**	**1.2**	**0.9**	**0.5**		**0.50**

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.75**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

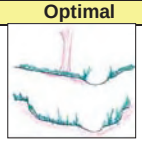
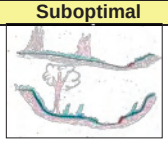
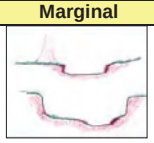
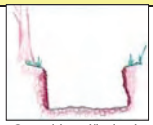
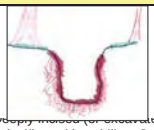
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Newport News	R2UB2	02080108	July '11		209	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 40S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category

	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	0.6									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	0.60	CI
	Score >	0.6							Lt Bank CI >	0.60	0.60

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.80**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

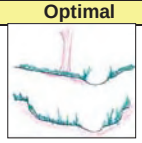
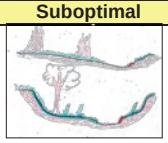
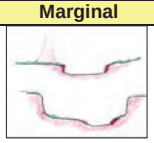
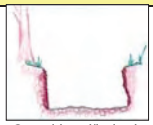
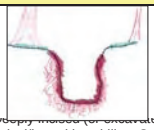
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Newport News	R2UB1	02080108	July '11		628	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 41S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	1.6
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category

	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	50%	50%					100%		
	Score >	0.85	0.6							
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	20%	80%					100%	Rt Bank CI > 0.73	CI
	Score >	0.6	0.5						Lt Bank CI > 0.52	0.62

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.64**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

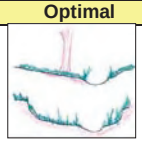
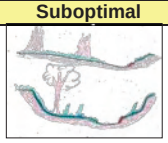
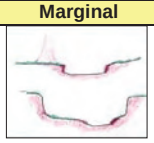
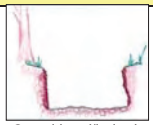
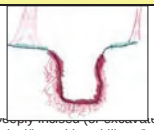
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Newport News	R2UB2	02080108	July '11		3679	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 42S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	1.6
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	20%	80%					100%		
	Score >	0.6	0.5							
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	20%	80%					100%	Rt Bank CI > 0.52	CI
	Score >	0.85	0.6						Lt Bank CI > 0.65	0.59

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.64**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

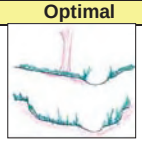
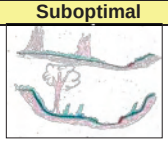
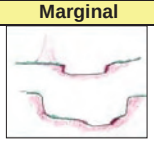
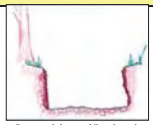
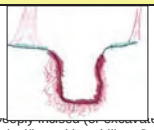
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Newport News	R2UB2	02080108	July '11		14596	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 43S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category

	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	50%	50%					100%			
	Score >	0.75	0.6								
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	20%	80%					100%	Rt Bank CI >	0.68	CI
	Score >	0.75	0.6						Lt Bank CI >	0.63	0.65

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.73**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

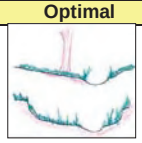
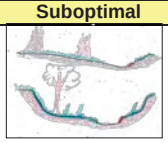
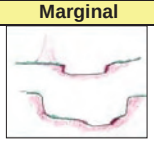
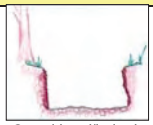
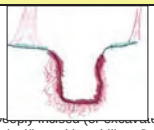
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Hampton	R2UB3	02080108	July '11		3577	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 44S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	0.6									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	20%	80%					100%	Rt Bank CI >	0.60	CI
	Score >	0.6	0.5						Lt Bank CI >	0.52	0.56

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.70**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.89**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

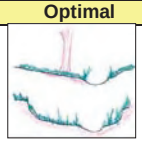
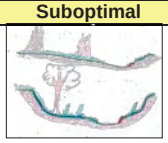
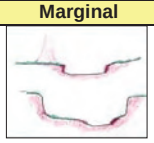
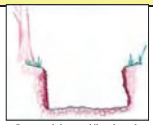
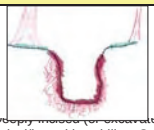
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Hampton	R2UB3	02080108	July '11		3230	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 46S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	1.6
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	0.6									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	0.60	CI
	Score >	0.6							Lt Bank CI >	0.60	0.60

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.70**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.68**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

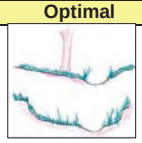
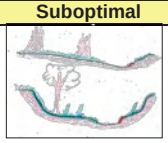
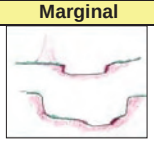
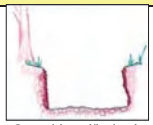
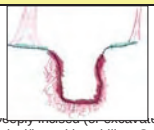
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Hampton	R2UB1	02080108	July '11		956	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 47S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	1.6
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	0.6									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	0.60	CI
	Score >	0.6							Lt Bank CI >	0.60	0.60

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

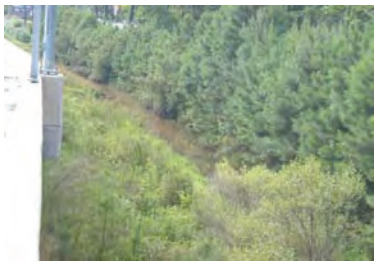
	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.64**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

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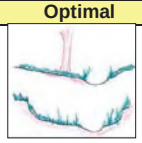
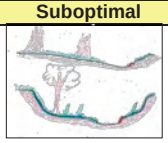
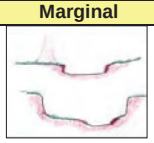
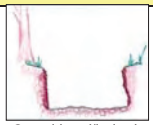
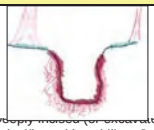
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	Hampton	R2UB3	02080108	July '11		1921	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 49S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	1.6
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

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		High	Low	High	Low	High	Low	
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1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
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Right Bank	% Riparian Area>	100%						100%			
	Score >	0.6									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	10%	90%					100%	Rt Bank CI >	0.60	CI
	Score >	0.6	0.5						Lt Bank CI >	0.51	0.56

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
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Score	1.5	1.2	0.9	0.5	0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
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REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.71**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

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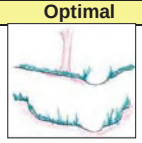
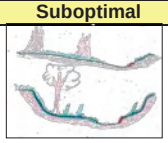
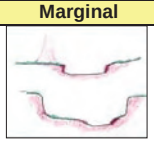
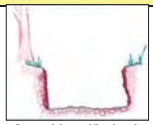
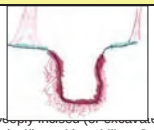
Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	James City		02080206	July '11		37	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 51S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

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		High	Low	High	Low	High	Low	
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	Score >	0.95									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	0.95	CI
	Score >	0.75							Lt Bank CI >	0.75	0.85

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Score	1.5	1.2	0.9	0.5		0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

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	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.85**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

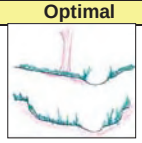
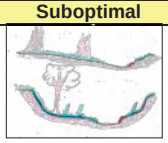
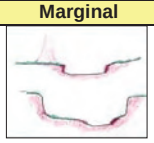
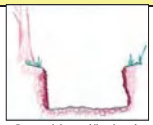
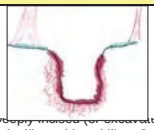
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula Study	New Kent	R2UB2	02080206	July '11		92	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead	WUS 52S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	0.75									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	0.75	CI
	Score >	0.75							Lt Bank CI >	0.75	0.75

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.83**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

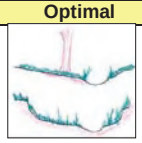
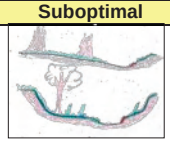
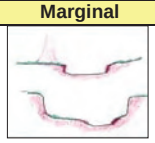
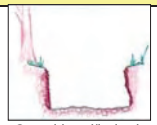
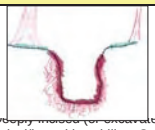
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/15/11		62	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 170S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

Instream Habitat/ Available Cover	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.50**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

UPSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

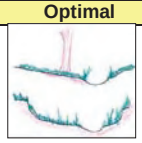
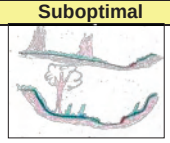
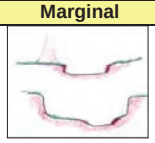
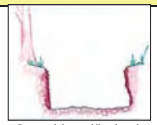
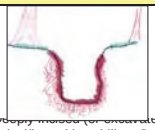
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/15/11		108	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 171S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.1									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.10	CI
	Score >	1.1							Lt Bank CI >	1.10	1.10

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

Conditional Category	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.20**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DOWNSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

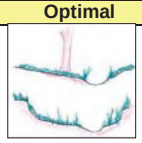
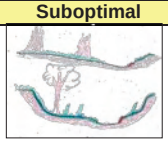
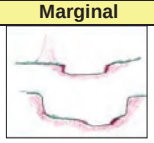
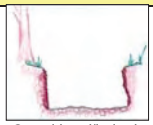
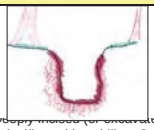
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R4UB2	02080206	11/15/11		338	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 172S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	
NOTES>>	INTERMITTENT					

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%		
	Score >	1.2								
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	50%	50%					100%	Rt Bank CI >	1.20
	Score >	1.1	0.6						Lt Bank CI >	0.85

CI

1.03

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.53**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DOWNSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

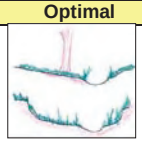
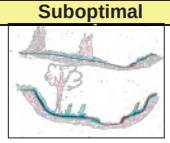
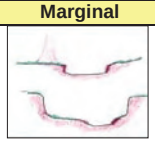
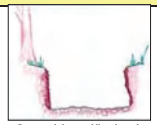
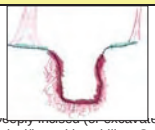
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/15/11		47	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 173S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

Instream Habitat/ Available Cover	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.50**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

UPSTREAM

DOWNSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

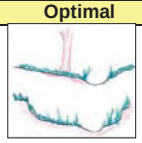
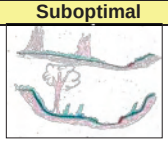
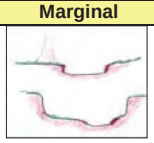
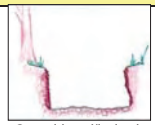
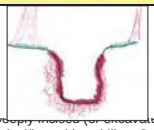
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	Henrico	R2UB1	02080206	11/16/11		2743	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 174S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	50%	50%					100%		
	Score >	0.6	0.5							
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	50%	50%					100%	Rt Bank CI >	0.55
	Score >	0.6	0.5						Lt Bank CI >	0.55

CI: 0.55

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.70**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.75**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DOWNSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

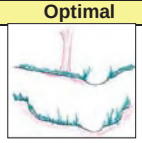
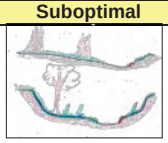
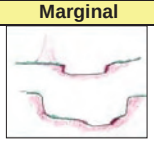
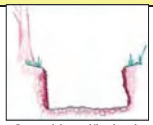
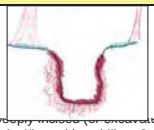
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	Henrico	R2UB2	02080206	11/16/11		72	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 175S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.44**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DOWNSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

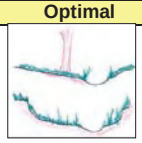
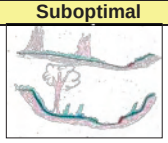
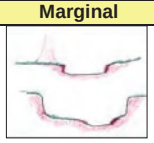
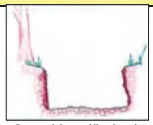
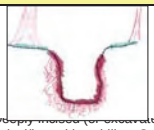
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/16/11		47	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 177S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.50**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DOWNSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

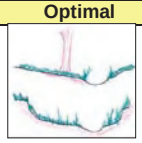
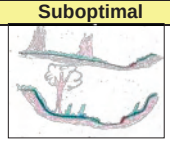
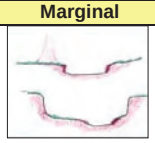
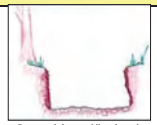
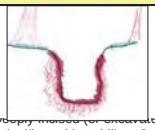
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/16/11		23	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 178S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.50**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DOWNSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

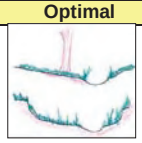
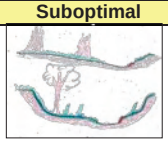
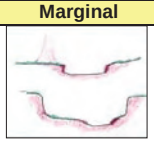
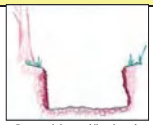
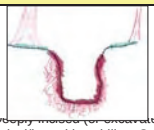
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/16/11		10	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 179S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	0.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	0.50	CI
	Score >	0.5							Lt Bank CI >	0.50	0.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.70**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DOWNSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

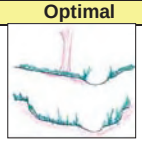
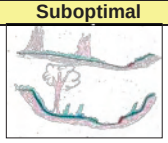
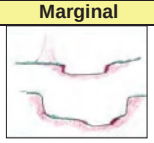
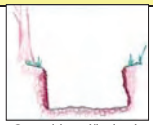
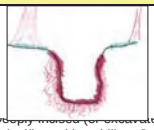
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/16/11		51	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 180S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	0.75									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	0.75	CI
	Score >	0.75							Lt Bank CI >	0.75	0.75

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**0.99**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DOWNSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

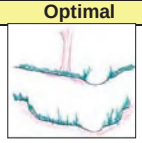
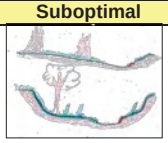
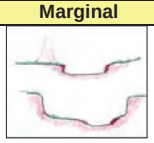
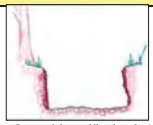
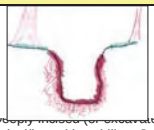
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/16/11		97	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 183S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

NOTES>>

Instream Habitat/ Available Cover	Conditional Category				
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.50**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

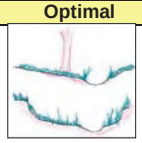
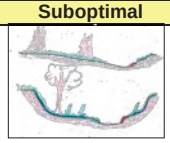
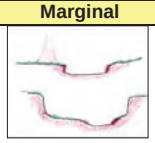
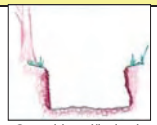
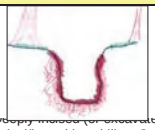
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/16/11		104	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 184S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category

	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category

	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.08**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DOWNSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

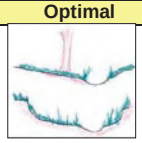
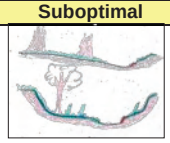
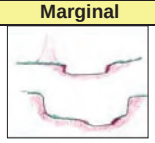
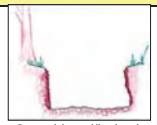
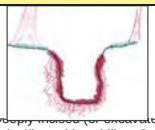
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	11/16/11		89	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 185S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.28**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

UPSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

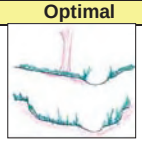
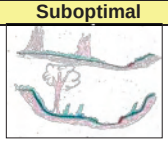
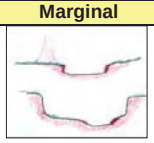
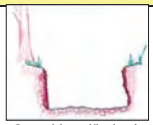
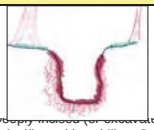
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	New Kent	R2UB2	02080206	November 2011		100	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 187S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category	Optimal	Suboptimal		Marginal		Poor		NOTES>>
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

Conditional Category	Optimal	Suboptimal	Marginal	Poor	NOTES>>	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.50**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

UPSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

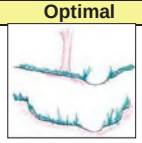
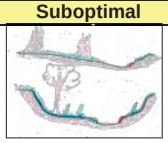
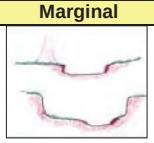
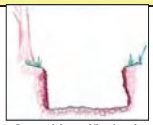
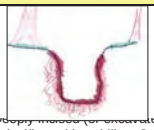
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R2UB2	02080206	11/16/11		76	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 188S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.28**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DOWNSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

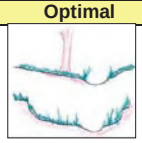
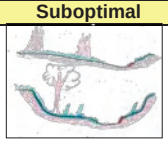
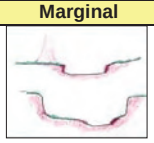
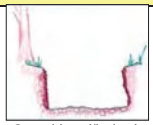
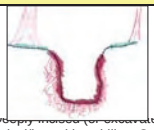
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R2UB2	02080206	11/16/11		379	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 189S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.24**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

UPSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

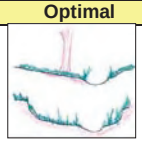
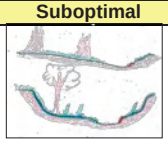
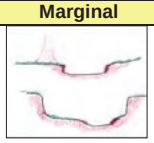
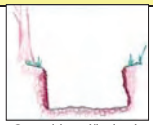
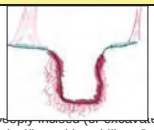
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R4UB2	02080206	11/16/11		111	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 190S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.08**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

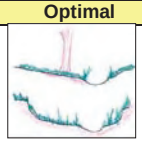
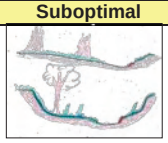
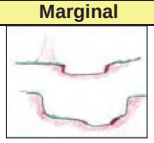
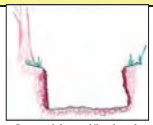
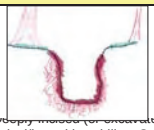
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R2UB2	02080206	11/16/11		36	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 191S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%		
	Score >	1.5								
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI > 1.50	CI
	Score >	1.5							Lt Bank CI > 1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.40**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

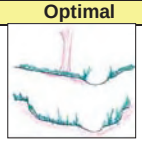
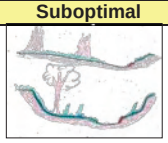
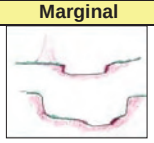
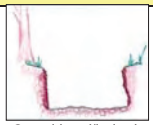
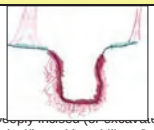
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R2UB2	02080206	11/16/11		72	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 192S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.34**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

UPSTREAM

DESCRIBE PROPOSED IMPACT:

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	York		02080107	11/16/11		46	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 193S

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	0.60

RCI= (Riparian CI)/2

COMPENSATION REQUIREMENT (CR) >>	0

CR = RCI X LF X IF

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

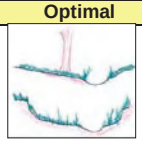
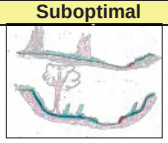
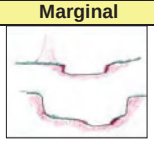
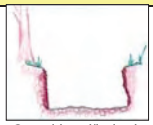
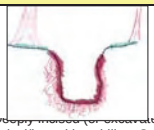
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R4UB2	02080107	11/16/11		83	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 195S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.24**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DOWNSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

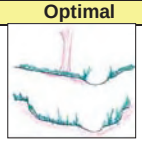
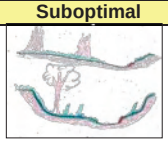
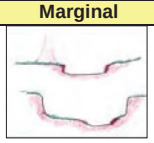
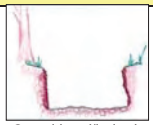
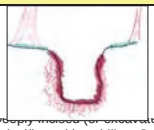
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R4UB2	02080107	11/16/11		79	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 196S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%		
	Score >	1.5								
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI > 1.50	CI
	Score >	1.5							Lt Bank CI > 1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>
	Optimal	Suboptimal	Marginal	Poor	
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	CI
Score	1.5	1.2	0.9	0.5	0.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.10**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.10**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

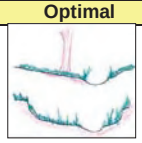
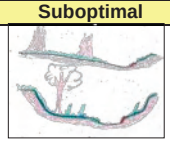
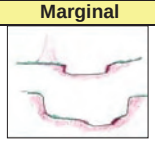
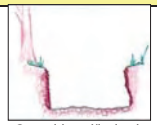
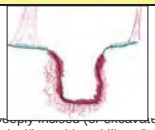
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R2UB2	02080107	11/16/11		182	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 197S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.32**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

UPSTREAM

DOWNSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

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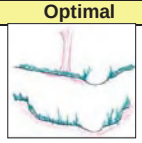
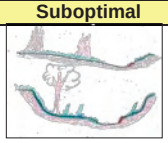
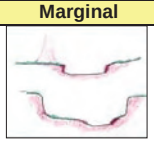
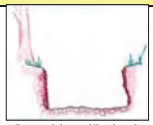
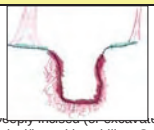
For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R2UB2	02080107	11/16/11		65	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 198S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.28**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DOWNSTREAM

UPSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

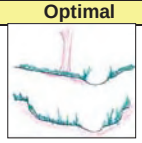
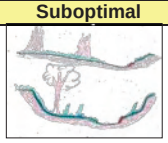
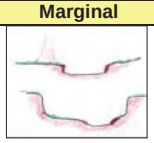
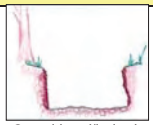
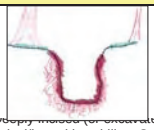
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	James City	R2UB2	02080107	11/16/11		104	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 199S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.50**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

UPSTREAM

DESCRIBE PROPOSED IMPACT:

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	York		02080107	11/16/11		37	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 200S

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	0.60

RCI= (Riparian CI)/2

COMPENSATION REQUIREMENT (CR) >>	0

CR = RCI X LF X IF

INSERT PHOTOS:

DOWNSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

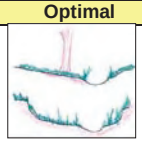
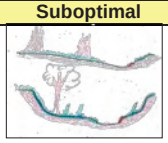
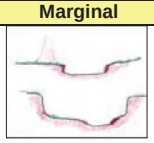
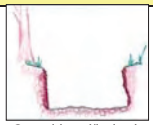
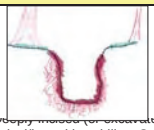
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	York	R2UB2	02080107	1/16/11			1

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 201S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.5									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50	CI
	Score >	1.5							Lt Bank CI >	1.50	1.50

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		1.20

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.50**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.32**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DOWNSTREAM

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

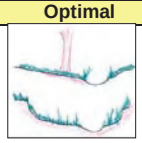
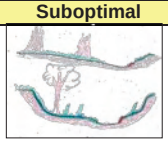
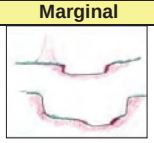
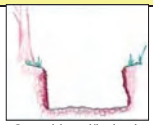
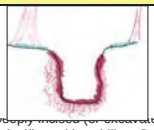
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	York	R4UB2	02080107	11/1611			1

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 202S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	3.0
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**0.90**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.20**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

DOWNSTREAM

DESCRIBE PROPOSED IMPACT:

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	York		02080107	11/16/11			1

Name(s) of Evaluator(s)	Stream Name and Information
	WUS 203S

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category								NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	0.60

RCI= (Riparian CI)/2

COMPENSATION REQUIREMENT (CR) >>	0

CR = RCI X LF X IF

INSERT PHOTOS:

DESCRIBE PROPOSED IMPACT:

Stream Assessment Form (Form 1)

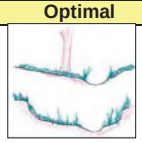
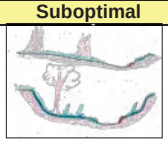
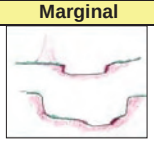
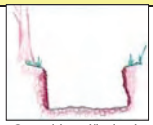
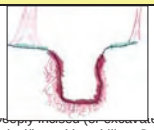
Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
5337	I-64 Peninsula	York	R2UB2	02080107	11/16/11		36	

Name(s) of Evaluator(s)	Stream Name and Information
Aitkenhead / Nies	WUS 204S

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

	Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe	
Channel Condition	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.	 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may bevertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which	 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.	 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.	CI
Score	3	2.4	2	1.6	1	2.4
NOTES>>						

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

	Conditional Category							NOTES>>
	Optimal	Suboptimal		Marginal		Poor		
Riparian Buffers	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	**High Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	**Low Suboptimal:** Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	**High Marginal:** Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	**Low Marginal:** Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	**High Poor:** Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	**Low Poor:** Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	100%						100%			
	Score >	1.2									
									CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.20	CI
	Score >	1.2							Lt Bank CI >	1.20	1.20

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.

	Conditional Category				NOTES>>	
	Optimal	Suboptimal	Marginal	Poor		
Instream Habitat/ Available Cover	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.		CI
Score	1.5	1.2	0.9	0.5		0.90

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
							500	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

	Conditional Category						
	Negligible	Minor		Moderate		Severe	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
SCORE	**1.5**	**1.3**	**1.1**	**0.9**	**0.7**	**0.5**	**1.30**

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: **The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.**

THE REACH CONDITION INDEX (RCI) >>	**1.16**
RCI= (Sum of all CI's)/5	
COMPENSATION REQUIREMENT (CR) >>	**0**
CR = RCI X LF X IF	

INSERT PHOTOS:

UPSTREAM

DESCRIBE PROPOSED IMPACT:

INTERSTATE 64 PENINSULA STUDY

APPENDIX E

Waters of the United States, Including Wetlands, Summary Tables

Surface Water Summary Table – Wetlands (North)

Wetland Number	Location (Map No.)	HUC	Cowardin Classification	Acreage in Study Area	Dominant Vegetation	
					Common Name	Scientific Name
WET 1N Newmarket Creek	43	02080108	E2EM1P	4.19	Common Reed Japanese Honeysuckle Eastern Baccharis	*Phragmittes australis* *Lonicera japonica* *Baccharis halimifolia*
WET 2N	42 / 43	02080108	PSS	0.97	Common Reed Soft Rush Black Willow Goldenrod Eastern Baccharis	*Phragmittes austrailis* *Juncus effusus* *Salix nigra* *Solidago sp.* *Baccharis halimifolia*
WET 3N	42 / 43	02080108	PEM	1.64	Broadleaf Cattail Soft Rush Canadian Rush Eastern Baccharis Blunt Spikerush Pennsylvania Smartweed	*Typha latifolia* *Juncus effusus* *Juncus canadensis* *Baccharis halimifolia* *Eleocharis obtusa* *Polygonum pensylvanicum*
WET 5N	42	02080108	PEM	0.19	Black Willow Broadleaf Cattail Common Rush Eastern Baccharis	*Salix nigra* *Typha latifolia* *Juncus effusus* *Baccharis halimifolia*
WET 9N	40	02080108	PEM	0.13	Blunt Spikerush Deer Tongue Gray's Sedge	*Eleocharis obtusa* *Dichanthelium clandestinum* *Carex grayi*
WET 12N	39	02080108	PEM	0.56	Common Rush Deer Tongue Sweetgum Blunt Spikerush	*Juncus effusus* *Dichanthelium clandestinum* *Liquidambar styraciflua* *Eleocharis obtusa*
WET 14N	35 /36	02080206	PFO	0.10	Red Maple Willow Oak Sweetgum Poison Ivy Roundleaf Greenbriar	*Acer rubrum* *Quercus phellos* *Liquidambar styraciflua* *Toxicodendron radicans* *Smilax rotundifolia*
WET 16N	35	02080206	PEM	2.94	Red Maple Sweetgum Loblolly Pine Black Gum Poison Ivy Roundleaf Greenbriar Common Rush	*Acer rubrum* *Liquidambar styraciflua* *Pinus taeda* *Nyssa sylvatica* *Toxicodendron radicans* *Smilax rotundifolia* *Juncus effusus*
WET 17N	35	02080206	PFO	0.87	Sweetgum Black Gum Loblolly Pine Red Maple Poison Ivy Willow Oak Roundleaf Greenbriar	*Liquidambar styraciflua* *Nyssa sylvatica* *Pinus taeda* *Acer rubrum* *Toxicodendron radicans* *Quercus phellos* *Smilax rotundifolia*
WET 18N	35	02080206	PFO	1.65	Sweetgum Black Gum Loblolly Pine Red Maple Poison Ivy Willow Oak Roundleaf Greenbrier Soft Rush	*Liquidambar styraciflua* *Niza sylvatica* *Pinus taeda* *Acer rubrum* *Toxicodendron radicans* *Quercus phellos* *Smilax rotundifolia* *Juncos effusus*
WET 19N	34 /35	02080206	PFO	0.04	American Hornbeam Lizard's Tail Red Maple Sweetgum	*Carpinus caroliniana* *Saururus cernuus* *Acer rubrum* *Liquidambar styraciflua*
WET 20N Newport News/ Lee Hall Reservoir	34	02080206	PFO	0.46	Slippery Elm Red Maple Black Gum Loblolly Pine Poison Ivy	*Ulmus rubra* *Acer rubrum* *Nyssa sylvatica* *Pinus taeda* *Toxicodendron radicans*
WET 21N Newport News/ Lee Hall	34	02080206	PFO	0.25	Green Ash Sweetgum Red Maple	*Fraxinus pennsylvanica* *Liquidambar styraciflua* *Acer rubrum*

Surface Water Summary Table – Wetlands (North)

Wetland Number	Location (Map No.)	HUC	Cowardin Classification	Acreage in Study Area	Dominant Vegetation	
					Common Name	Scientific Name
Reservoir					Loblolly Pine American Hornbeam	*Pinus taeda* *Carpinus caroliniana*
WET 22N	34	02080206	PFO	0.11	Red Maple American Hornbeam Tuliptree Hazel Alder Sweetgum	*Acer rubrum* *Carpinus caroliniana* *Liriodendron tulipifera* *Alnus serrulata* *Liquidambar styraciflua*
WET 23N	34	02080206	PFO	0.10	Red Maple Sweetgum Swamp Chestnut Oak American Sycamore Roundleaf Greenbriar	*Acer rubrum* *Liquidambar styraciflua* *Quercus michauxii* *Platanus occidentalis* *Smilax rotundifolia*
WET 24N	33	02080206	PEM	0.08	Poison Ivy Red Maple Lizard's Tail Sweetgum Virginia Creeper Pawpaw	*Toxicodendron radicans* *Acer rubrum* *Saururus cernuus* *Liquidambar styraciflua* *Parthenocissus quinquefolii* *Asimina triloba*
WET 25N Tributary to Skiffes Creek Reservoir	33	02080206	PEM	0.04	Hazel Alder Red Maple Lizard's Tail Sweetgum Scaldweed	*Alnus serrulata* *Acer rubrum* *Saururus cernuus* *Liquidambar styraciflua* *Cuscuta gronovii*
WET 26N Tributary to Skiffes Creek	32	02080206	PFO	0.02	Poison Ivy Pawpaw Green Ash Red Maple	*Toxicodendron radicans* *Asimina triloba* *Fraxinus pennsylvanica* *Acer rubrum*
WET 27N King Creek	31	02080107	PEM	0.96	Broadleaf Cattail Lizard's Tail Polygonum American Sycamore Arrowleaf Tearthumb	*Typha latifolia* *Saururus cernuus* *Polygonum sp.* *Platanus occidentalis* *Polygonum sagittatum*
WET 30N Queen Creek	29	02080107	E2EM1P	2.96	Alkalai bulrush	*Scirpus alterniflora*
WET 31N	23	02080107	PFO	0.05	Lizard's Tail Poison Ivy Christmas Fern American Holly American Hornbeam Pawpaw Spicebush Tuliptree Red Maple Sweetgum Blackgum Virginia Creeper	*Saururus cernuus* *Toxicodendron radicans* *Polystichum acrostichiodes* *Ilex opaca* *Carpinus caroliniana* *Asmina triloba* *Lindera benzoin* *Liriodendron tulipifera* *Acer rubrum* *Liquidambar styraciflua* *Nyssa sylvatica* *Parthenocissus quinquefolia*
WET 32N	23	02080107	PFO	0.08	Lizard's Tail Shallow Sedge Japanese Stilt Grass Sensitive Fern Golden Ragwort Sweetgum Hazel Alder Red Maple Black Gum Black Willow	*Saururus cernuus* *Carex lurida* *Microstegium vimineum* *Onoclea sensibilis* *Senecio aureus* *Liquidambar styraciflua* *Alnus serrulata* *Acer rubrum* *Nyssa sylvatica* *Salex nigra*
WET 33N	23	02080107	PFO	0.31	Smallspike False Nettle Lizard's Tail Japanese Stilt Grass Christmas Fern Shallow Sedge Golden Ragwort Pawpaw Red Maple	*Boehmeria cylindrica* *Saururus cernuus* *Microstegium vimineum* *Polystichum acrostichoides* *Carex lurida* *Senecio aureus* *Asimino triloba* *Acer rubrum*

Surface Water Summary Table – Wetlands (North)

Wetland Number	Location (Map No.)	HUC	Cowardin Classification	Acreage in Study Area	Dominant Vegetation	
					Common Name	**Scientific Name**
					American Sycamore Poison Ivy	*Platanus occidentalis* *Toxicodendron radicans*
WET 34N	23	02080107	PFO	0.07	Japanese Stilt Grass Lizard's Tail Sweetgum Smallspike False Nettle American Hornbeam Red Maple	*Microstegium vimineum* *Saururus cernuus* *Liquidambar styraciflua* *Boehmeria cylindrica* *Carpinus caroliniana* *Acer rubrum*
WET 36N	23	02080107	PEM	0.02	Lizard's Tail Smallspike False Nettle Common Rush Arrowleaf Tearthumb Swamp Smartweed Sensitive Fern American Elderberry	*Saururus cernuus* *Boehmeria cylindrica* *Juncus effusus* *Polygonum sagittatum* *Polygonum hydropiperoides* *Onoclea sensibilis* *Sarnbucus canadensis*
WET 37N	22	02080107	PFO	0.04	Christmas Fern Lizard's Tail Smallspike False Nettle Jewelweed Tuliptree Pawpaw Spicebush Virginia Creeper Poison Ivy American Holly Red Maple American Sycamore	*Polystichum acrostichoides* *Saururus cernuus* *Boehmeria cylindrica* *Impatiens capensis* *Lirodendron tulipifera* *Asimina triloba* *Lindera benzoin* *Parthenocissus quinquefolia* *Toxicodendron radicans* *Ilex opaca* *Acer rubrum* *Platanus occidentalis*
WET 38N	21	02080206	PEM	0.03	Shallow Sedge Arrowleaf Tearthumb Smallspike False Nettle Common Rush Common Boneset Hazel Alder American Sycamore	*Carex lurida* *Polygonum sagittatum* *Boehmeria cylindrica* *Juncus effusus* *Eupatorium perfoliaturx* *Alnus serrulata* *Platanus occidentalis*
WET 39N Barnes Swamp	20	02080206	PFO	0.05	Broadleaf Arrowhead Cinnamon Fern Smallspike False Nettle Sensitive Fern Polygonum Sweetgum Red Maple Black Willow American Sycamore Poison Ivy	*Sagittaria latifolia* *Osmunda cinnamomea* *Boehmeria cylindrica* *Onoclea sensibilis* *Polygonum sp.* *Liquidambar styraciflua* *Acer rubrum* *Salix nigra* *Platanus occidentalis* *Toxicodendron radicans*
WET 40N	20	02080206	PFO	0.03	Lizard's Tail Sensitive Fern Coastal Sweetpepperbush Red Maple Sweetgum Blackgum	*Saururus cernuus* *Onoclea sensibilis* *Clethra alnifolia* *Acer rubrum* *Liquidambar styraciflua* *Nyssa sylvatica*
WET 41N Diascund Creek Reservoir	20	02080206	PFO	0.59	--	--
WET 46N	16	02080206	PFO	0.13	Lizard's Tail Sensitive Fern Arrowleaf Tearthumb Polygonum Hazel Alder Red Maple Blackgum	*Saururus cernuus* *Onoclea sensibilis* *Polygonum sagittatum* *Polygonum sp.* *Alnus serrulata* *Acer rubrum* *Nyssa sylvatica*
WET 48N Rumley Marsh	14	02080206	PFO	1.81	Lizard's Tail Green Arrow Arum Japanese Stilt Grass	*Saururus cernuus* *Peltandra virginica* *Microstegium vimineum*

Surface Water Summary Table – Wetlands (North)

Wetland Number	Location (Map No.)	HUC	Cowardin Classification	Acreage in Study Area	Dominant Vegetation	
					Common Name	**Scientific Name**
					Red Maple Blackgum	*Acer rubrum* *Nyssa sylvatica*
WET 55N Higgins Swamp	9	02080206	PEM	0.51	Smallspike False Nettle Common Rush Green Arrow Arum Common Buttonbush Red Maple Sensitive Fern	*Boehmeria cylindrica* *Juncus effusus* *Peltandra virginica* *Cephalanthus occidentalis* *Acer rubrum* *Onoclea sensibilis*
WET 56N	9	02080206	PFO	0.09	Red Maple Willow Oak Blackgum Sweetgum	*Acer rubrum* *Quercus phellos* *Nyssa sylvatica* *Liquidambar styraciflua*
WET 57N Chickahominy River	9	02080206	PFO	2.10	Red Maple Blackgum	*Acer rubrum* *Nyssa sylvatica*
WET 58N	6	02080206	PEM	0.17	Common Rush Broadleaf Cattail	*Juncus effusus* *Typha latifolia*
WET 60N	6	02080206	PEM	0.10	Lizard's Tail Cinnamon Fern Deertongue	*Saururus cernuus* *Osmunda cinnamomea* *Dichanthelium clandestinum*
WET 62N	5	02080206	PFO	0.10	Sedge Eastern Baccharis Possumhaw Red Maple Blackgum	*Carex sp.* *Baccharis halimifolia* *Viburnum nudum* *Acer rubrum* *Nyssa sylvatica*
WET 63N	5	02080206	PFO	1.34	Sedge Sensitive Fern Red Maple Willow Oak Loblolly Pine Sweetgum Blackgum	*Carex sp.* *Onoclea sensibilis* *Acer rubrum* *Quercus phellos* *Pinus taeda* *Liquidambar styraciflua* *Nyssa sylvatica*
WET 64N Tributary to Gillies Creek	4	02080206	PEM	0.05	Deertongue Pennsylvania Smartweed Japanese Stilt Grass Common Rush Willow Oak	*Dichanthelium clandestinum* *Polygonum pensylvanicum* *Microstegium vimineum* *Juncus effusus* *Quercus phellos*
WET 110N	30	02080107	PFO	0.28	Red Maple Willow Oak Sweetgum Blackgum	*Acer rubrum* *Quercus phellos* *Liquidambar styraciflua* *Nyssa sylvatica*
WET117N	12	02080206	PFO	0.01	Red Maple Sycamore Lizards Tail Sweetgum Sensitive Fern	*Acer rubrum* *Platanus occidentalis* *Saururus cernuus* *Liquidambar styraciflua* *Onoclea sensibilis*
WET118N	9	02080206	PFO	0.21	Netted-Veined Chain Fern Sensitive Fern Soft Rush Coastal Sweetpepperbush Sweetgum Red Maple	*Woodwardia areolata* *Onoclea sensibilis* *Juncus effuses* *Clethra alnifolia* *Liquidambar styraciflua* *Acer rubrum*
WET119N	9	02080206	PEM	0.53	Soft Rush Willow Oak Green Ash Sensitive Fern Woolgrass Smallspike False Nettle	*Juncus effuses* *Quercus phellos* *Fraxinus pennsylvanica* *Onoclea sensibilis* *Scirpus cyperinus* *Boehmeria cylindrica*
WET120N	7	02080206	PEM	0.21	Soft Rush Smallspike False Nettle Woolgrass	*Juncus effuses* *Boehmeria cylindrica* *Scirpus cyperinus*
WET121N	7	02080206	PSS	1.09	Pin Oak Button Bush Soft Rush	*Quercus palustris* *Cephalanthus occidentalis* *Juncus effusus*

Surface Water Summary Table – Wetlands (North)

Wetland Number	Location (Map No.)	HUC	Cowardin Classification	Acreage in Study Area	Dominant Vegetation	
					Common Name	Scientific Name
					River Birch Woolgrass Jewelweed Smooth Alder Coastal Sweetpepperbush	*Betula nigra* *Scirpus cyperinus* *Impatiens capensis* *Alnus serrulata* *Clethra alnifolia*
WET122N	7	02080206	PEM	0.06	Boradleaf Cattail Soft Rush	*Typha latifolia* *Juncus effusus*
WET126N Old Mill Pond	25	02080107	PSS	0.46	Red Maple Broad-leaved Cattail River Birch Smooth Alder False Nettle	*Acer rubrum* *Typha latifolia* *Betula nigra* *Alnus serrulata* *Boehmeria cylindrica*
WET128N Diascund Creek	15	02080206	PEM	0.03	Woolgrass Halberd Leaved Tearthumb Fringed Sedge	*Scirpus cyperinus* *Polygonum arifolium* *Carex crinita*
WET129N Tributary to Chickahominy River	10	02080206	PEM	0.08	Woolgrass Soft Rush Japanese Stiltgrass False Nettle Northern Bugleweed	*Scirpus cyperinus* *Juncus effuses* *Microstegium vimineum* *Boehmeria cylindrical* *Lycopus uniflorus*
WET130N Tributary to Chickahominy River	10	02080206	PSS	0.22	River Birch Red Maple Smooth Alder	*Betula nigra* *Acer rubrum* *Alnus serrulata*
WET131N Tributary to Chickahominy River	6	02080206	PFO	0.05	Red Maple Black Willow	*Acer rubrum* *Nyssa sylvatica*
WET132N Whiteman Swamp	30	02080107	PEM	0.65	Broadleaved Cattail Japanese Stiltgrass Woolgrass	*Typha latifolia* *Microstegium vimineum* *Scirpus cyperinus*
WET 136N	5	02080206	PEM	0.24	--	--
WET 137N	5	02080206	PFO	1.90	--	--
WET 138N	18	02080206	PFO	0.08	--	--
WET 139N	30	02080107	PFO	0.32	--	--
WET 140N	30	02080107	PFO	0.67	--	--
WET 141N	30	02080107	PEM	0.38	--	--
WET 150N	40	02080108	PFO	0.41	--	--
WET 151N	39	02080108	PEM	2.10	--	--

Surface Water Summary Table – Wetlands (Median)

Wetland Number	Location (Map No.)	HUC	Cowardin Classification	Acreage within Study Area	Dominant Vegetation	
					Common Name	Scientific Name
WET 14M	36	02080206	PFO	0.14	Red Maple Willow Oak Sweetgum Poison Ivy	*Acer rubrum* *Quercus phellos* *Liquidambar styraciflua* *Toxicodendron radicans*
WET 50M Boar Swamp	8 / 9	02080206	PEM	0.22	Broadleaf Cattail Woolgrass	*Typha latifolia* *Scirpus cyperinus*
WET 51M	11	02080206	PFO	0.30	Net-Veined Chain Fern Sensitive Fern Spicebush Common Elderberry Lizard's Tail Cinnamon Fern Hornbeam	*Woodwardia areolata* *Onoclea sensibilis* *Lindera benzoin* *Sambucus Canadensis* *Saururus cernuus* *Osmunda cinnamomea* *Carpinus caroliniana*
WET 52M Tributary to Toe Ink Swamp	11	02080206	PFO	0.51	Water Smartweed Red Maple Spicebush Lizard's Tail Slippery Elm Sensitive Fern False Nettle River Birch Common Elderberry	*Polygonum amphibium* *Acer rubrum* *Lindera benzoin* *Saururus cernuus* *Ulmus rubra* *Onoclea sensibilis* *Boehmeria cylindrica* *Betula nigra* *Sambucus canadensis*
WET 53M Toe Ink Swamp	12	02080206	PFO	0.10	Net-Veined Chain Fern Red Maple False Nettle Sweetgum Sycamore	*Woodwardia areolata* *Acer rubrum* *Boehmeria cylindrica* *Liquidambar styraciflua* *Platanus occidentalis*
WET 54M	13	02080206	PFO	0.01	Sensitive Fern Cinnamon Fern Highbush Blueberry Ironwood American Sycamore Slippery Elm Spicebush	*Onoclea sensibilis* *Osmunda cinnamomea* *Vaccinium corymbosum* *Carpinus caroliana* *Platanus occidentalis* *Ulmus rubra* *Lindera benzoin*
WET 55M	13	02080206	PFO	0.04	Sensitive Fern Net-Veined Chain Fern Highbush Blueberry Cinnamon Fern Red Maple Sweet Bay Sycamore	*Onoclea sensibilis* *Woodwardia areolata* *Vaccinium coryumbosum* *Osmunda cinnamomea* *Acer rubrum* *Magnolia virginiana* *Platanus occidentalis*
WET 56M Schiminoe Creek	13	02080206	PFO	0.36	Royal Fern Red Maple Sensitive Fern Sweetgum Net-Veined Chain Fern Green Ash Lizard's Tail	*Osumunda regalis* *Acer rubrum* *Onoclea sensibilis* *Liquidambar styraciflua* *Woodwardia areolata* *Fraxinus pennsylvanica* *Saururus cernuus*
WET 57M Rumley Marsh	14	02080206	PFO – 50% PSS – 50%	1.28	Sensitive Fern Lizard's Tail Royal Fern Red Maple Sweet Bay Buttonbush Rice Cutgrass Sycamore Ironwood Highbush Blueberry Silky Dogwood	*Onoclea sensibilis* *Saururus cernuus* *Osmunda regalis* *Acer rubrum* *Magnolia virginiana* *Cephalanthus occidentalis* *Leersia oryzoides* *Platanus occidentalis* *Carpinus caroliniana* *Vaccinium corymbosum* *Cornus amomum*
WET 58M Tributary to Rumley Marsh	14	02080206	PFO	0.07	Net-Veined Chain Fern Sensitive Fern False Nettle Red Maple Royal Fern	*Woodwardia areolata* *Onoclea sensibilis* *Boehmeria cylindrica* *Acer rubrum* *Osmunda regalis*

Surface Water Summary Table – Wetlands (Median)

Wetland Number	Location (Map No.)	HUC	Cowardin Classification	Acreage within Study Area	Dominant Vegetation	
					Common Name	**Scientific Name**
					Highbush Blueberry Sweetgum	*Vaccinium corymbosum* *Liquidambar styraciflua*
WET 59M	15	02080 206	PFO	0.09	Sensitive Fern Net-Veined Chain Fern Red Maple	*Onoclea sensibilis* *Woodwardia areolata* *Acer rubrum*
WET 60M	17	02080 206	PFO	0.07	Sensitive Fern Royal Fern Red Maple Marsh Marigold Highbush Blueberry Spicebush Common Elderberry	*Onoclea sensibilis* *Osmunda regalis* *Acer rubrum* *Caltha palustris* *Vaccinium corymbosum* *Lindera benzoin* *Sambucus canadensis*
WET 61M	18	02080 206	PFO	0.16	Coastal Sweetpepperbush Sensitive Fern Red Maple Ironwood Royal Fern Blackgum	*Clethra alnifolia* *Onoclea sensibilis* *Acer rubrum* *Carpinus caroliniana* *Osmunda regalis* *Nyssa sylvatica*
WET 63M	18	02080 206	PFO	0.10	Sensitive Fern River Birch Royal Fern	*Onoclea sensibilis* *Betula nigra* *Osmunda regalis*
WET 64M	18	02080 206	PFO	3.90	Sycamore Silky Dogwood Ironwood Sweetgum Sensitive Fern Lizard's Tail Coastal Sweetpepperbush	*Platanus occidentalis* *Cornus amomum* *Carpinus caroliniana* *Liquidambar styraciflua* *Onoclea sensibilis* *Saururus cernuus* *Clethra alnifolia*
WET 65M	18	02080 206	PSS	0.06	Sensitive Fern Coastal Sweetpepperbush Ironwood Spicebush	*Onoclea sensibilis* *Clethra alnifolia* *Carpinus caroliniana* *Lindera benzoin*
WET 66M	18	02080 206	PFO	0.28	Lizard's Tail Sensitive Fern Red Maple Spicebush Cinnamon Fern Royal Fern Ironwood	*Saururus cernuus* *Onoclea sensibilis* *Acer rubrum* *Lindera benzoin* *Osmunda cinnamomea* *Osmunda regalis* *Carpinus caroliniana*
WET 67M	18	02080 206	PFO	0.12	Ironwood Sensitive Fern Highbush Blueberry Red Maple Sweetgum	*Carpinus caroliniana* *Onoclea sensibilis* *Vaccinium corymbosum* *Acer rubrum* *Liquidambar styraciflua*
WET 68M Beaver Dam Creek	18 / 19	02080 206	PFO	2.27	Lizard's Tail River Birch Sycamore Red Maple Ironwood Highbush Blueberry Sensitive Fern	*Saururus cernuus* *Betula nigra* *Platanus occidentalis* *Acer rubrum* *Carpinus caroliniana* *Vaccinium corymbosum* *Onoclea sensibilis*
WET 69M	18	02080 206	PFO	0.37	Royal Fern Sensitive Fern Ironwood Sycamore Cinnamon Fern Red Maple River Birch Highbush Blueberry	*Osmunda regalis* *Onoclea sensibilis* *Carpinus caroliniana* *Platanus occidentalis* *Osmunda cinnamomea* *Acer rubrum* *Betula nigra* *Vaccinium corymbosum*
WET 70M	19	02080 206	PFO	0.19	River Birch Sycamore Red Maple Sensitive Fern Ironwood	*Betula nigra* *Platanus occidentalis* *Acer rubrum* *Onoclea sensibilis* *Carpinus caroliniana*

Surface Water Summary Table – Wetlands (Median)

Wetland Number	Location (Map No.)	HUC	Cowardin Classification	Acreage within Study Area	Dominant Vegetation	
					Common Name	**Scientific Name**
					Virginia Knotweed	*Polygonum virginianum*
WET 71M Wahrani Swamp	19	02080206	PFO	0.45	Sycamore Lizard's Tail Marsh Marigold Virginia Knotweed Red Maple Sensitive Fern Royal Fern Highbush Blueberry	*Platanus occidentalis* *Saururus cernuus* *Caltha palustris* *Polygonum virginianum* *Acer rubrum* *Onoclea sensibilis* *Osmunda regalis* *Vaccinium corymbosum*
WET 72M	19	02080206	PFO	0.03	Sensitive Fern River Birch Ironwood Slippery Elm Green Ash Sweetgum	*Onoclea sensibilis* *Betula nigra* *Carpinus caroliniana* *Ulmus rubra* *Fraxinus pennsylvanica* *Liduidambar styraciflua*
WET 73M	19	02080206	PFO	0.08	Red Maple Ironwood Slippery Elm Green Ash Sensitive Fern	*Acer rubrum* *Carpinus caroliniana* *Ulmus rubra* *Fraxinus pennsylvanica* *Onoclea sensibilis*
WET 74M	19	02080206	PFO	0.01	Lizard's Tail Sensitive Fern Ironwood Red Maple	*Saururus cernuus* *Onoclea sensibilis* *Carpinus caroliniana* *Acer rubrum*
WET 75M	19	02080206	PFO	0.03	Sensitive Fern Red Maple Blackgum Sweetgum Cinnamon Fern Ironwood	*Onoclea sensibilis* *Acer rubrum* *Nyssa sylvatica* *Liquidambar styraciflua* *Osmunda cinnamomea* *Carpinus caroliniana*
WET 76M	20	02080206	PFO	0.08	River Birch Coastal Sweetpepperbush Sensitive Fern Ironwood Red Maple Highbush Blueberry	*Betula nigra* *Clethra alnifolia* *Onoclea sensibilis* *Carpinus caroliniana* *Acer rubrum* *Vaccinium corymbosum*
WET 77M Diascund Creek Reservoir	20	02080206	PFO	0.46	River Birch Black Willow Sensitive Fern Royal Fern Smooth Alder Red Maple Lizard's Tail	*Betula nigra* *Salix nigra* *Onoclea sensibilis* *Osmunda regalis* *Alnus serrulata* *Acer rubrum* *Saururus cernuus*
WET 78M	20	02080206	PFO	1.64	Lizard's Tail River Birch Highbush Blueberry Cinnamon Fern Sycamore Royal Fern Red Maple	*Saururus cernuus* *Betula nigra* *Vaccinium corymbosum* *Osmunda cinnamomea* *Platanus occidentalis* *Osmunda regalis* *Acer rubrum*
WET 79M	20	02080206	PFO	0.10	Sphagnum Moss Coastal Sweetpepperbush Red Maple Sensitive Fern Royal Fern Lizard's Tail	*Sphagnum* *Clethra alnifolia* *Acer rubrum* *Onoclea sensibilis* *Osmunda regalis* *Saururus cernuus*
WET 80M	20	02080206	PFO	0.05	River Birch Coastal Sweetpepperbush Red Maple Sweetgum Ironwood	*Betula nigra* *Clethra alnifolia* *Acer rubrum* *Liquidambar styraciflua* *Carpinus caroliniana*
WET 81M	20	02080	PFO	0.24	Sensitive Fern Ironwood	*Onoclea sensibilis* *Carpinus caroliniana*

Surface Water Summary Table – Wetlands (Median)

Wetland Number	Location (Map No.)	HUC	Cowardin Classification	Acreage within Study Area	Dominant Vegetation	
					Common Name	**Scientific Name**
		206			Red Maple Lizard's Tail Common Elderberry Sweetgum Net-Veined Chain Fern Cinnamon Fern	*Acer rubrum* *Saururus cernuus* *Sambucus Canadensis* *Liquidambar styraciflua* *Woodwardia areolata* *Osmunda cinnamomea*
WET 82M	20	02080 206	PFO	0.17	Lizard's Tail Sweetgum Sensitive Fern Cinnamon Fern Red Maple Royal Fern	*Saururus cernuus* *Liquidambar styraciflua* *Onoclea sensibilis* *Osmunda cinnamomea* *Acer rubrum* *Osmunda regalis*
WET 83M Barnes Swamp	20	02080 206	PFO	0.41	River Birch Net-Veined Chain Fern Sensitive Fern Royal Fern Lizard's Tail Red Maple Highbush Blueberry	*Betula nigra* *Woodwardia areolata* *Onoclea sensibilis* *Osmunda regalis* *Saururus cernuus* *Acer rubrum* *Vaccinium corymbosum*
WET 84M	21	02080 206	PFO	0.13	Lizard's Tail Halberd Leaved Tearthumb Ironwood American Sycamore Sensitive Fern Highbush Blueberry Smooth Alder Wax Myrtle	*Saururus cernuus* *Polygonum arifolium* *Carpinus caroliniana* *Platanus occidentalis* *Onoclea sensibilis* *Vaccinium corymbosum* *Alnus serrulata* *Morella cerifera*
WET 85M Tributary to Diascund Creek Reservoir	21	02080 206	PFO	0.67	Ironwood Spice bush Sensitive fern Red maple Green ash Marsh marigold Ironwood	*Carpinus caroliniana* *Lindera benzoin* *Onoclea sensibilis* *Acer rubrum* *Fraxinus pennsylvanica* *Caltha palustris* *Carpinus caroliniana*
WET 86M	21	02080 206	PFO	0.19	Ironwood Spicebush Sensitive Fern Lizard's Tail Sweetgum American Sycamore	*Carpinus caroliniana* *Lindera benzoin* *Onoclea sensibilis* *Saururus cernuus* *Liquidambar styraciflua* *Platanus occidentalis*
WET 87M	22	02080 107	PFO	0.06	Ironwood Blackgum Highbush Blueberry Red Maple Sensitive Fern Net-Veined Chain Fern	*Carpinus caroliniana* *Nyssa sylvatica* *Vaccinium corymbosum* *Acer rubrum* *Onoclea sensibilis* *Woodwardia areolata*
WET 88M	22	02080 107	PFO	0.12	Sensitive Fern Net-Veined Chain Fern Green Ash Lizard's Tail Ironwood Spicebush Red Maple Marsh Marigold Common Elderberry	*Onoclea sensibilis* *Woodwardia areolata* *Fraxinus pennsylvanica* *Saururus cernuus* *Carpinus caroliniana* *Lindera benzoin* *Acer rubrum* *Caltha palustris* *Sambucus Canadensis*
WET 89M	23	02080 107	PFO	0.18	Sensitive Fern Net-Veined Chain Fern Green Ash Lizard's Tail Ironwood Spicebush Red Maple Marsh Marigold Common Elderberry	*Onoclea sensibilis* *Woodwardia areolata* *Fraxinus pennsylvanica* *Saururus cernuus* *Carpinus caroliniana* *Lindera benzoin* *Acer rubrum* *Caltha palustris* *Sambucus Canadensis*

Surface Water Summary Table – Wetlands (Median)

Wetland Number	Location (Map No.)	HUC	Cowardin Classification	Acreage within Study Area	Dominant Vegetation	
					Common Name	Scientific Name
WET 90M	23	02080 107	PFO	0.80	Lizard's Tail Marsh Marigold Seed Box Red Maple False Nettle Sweetgum Black Willow Green Ash Slippery Elm Water Smartweed	*Saururus cernuus* *Caltha palustris* *Ludwigia alternifolia* *Acer rubrum* *Boehmeria cylindrica* *Liquidambar styraciflua* *Salix nigra* *Fraxinus pennsylvanica* *Ulmus rubra* *Polygonum amphibium*
WET 91M	23	02080 107	PFO	0.06	Lizard's Tail Sensitive Fern Red Maple Net-Veined Chain Fern Spice Bush Sweetgum	*Saururus cernuus* *Onoclea sensibilis* *Acer rubrum* *Woodwardia areolata* *Lindera benzoin* *Liquidambar styraciflua*
WET 92M	23	02080 107	PFO	0.23	Slippery Elm Sensitive Fern Royal Fern Ironwood Lizard's tail Green Ash Marsh Marigold	*Ulmus rubra* *Onoclea sensibilis* *Osmunda regalis* *Carpinus caroliniana* *Saururus cernuus* *Fraxinus pennsylvanica* *Caltha palustris*
WET 93M	23	02080 107	PFO	0.11	Marsh Marigold Lizard's Tail False Nettle Cinnamon Fern Sensitive Fern Red Maple Slippery Elm	*Caltha palustris* *Saururus cernuus* *Boehmeria cylindrica* *Osmunda cinnamomea* *Onoclea sensibilis* *Acer rubrum* *Lumus rubra*
WET 94M	23	02080 107	PFO	0.17	River Birch Net-Veined Chain Fern Sensitive Fern Lizard's Tail Common Elderberry Red Maple False Nettle Ironwood	*Betula nigra* *Woodwardia areolata* *Onoclea sensibilis* *Saururus cernuus* *Sambucus Canadensis* *Acer rubrum* *Boehmeria cylindrica* *Carpinus caroliniana*
WET 95M France Swamp	23	02080 107	PFO	0.22	Red Maple Sweetgum Sycamore Green Ash Water Smartweed River Birch	*Acer rubrum* *Liquidambar syraciflua* *Platanus occidnetalis* *Fraxinus pennsylvanica* *Polygonum amphibium* *Betula nigra*
WET 134M Queen Creek	29	02080 107	E2EM1P	0.66	Alkalai bulrush	***Scirpus** alterniflora*
WET 135M	36	02080 107	PFO	0.12	Red Maple Willow Oak Sweetgum Poison Ivy	*Acer rubrum* *Quercus phellos* *Liquidambar styraciflua* *Toxicodendron radicans*

Surface Water Summary Table – Wetlands (South)

Wetland Number	Location (Map No.)	HUC	Cowardin Classification	Acreage in Study Area	Dominant Vegetation	
					Common Name	Scientific Name
WET 1S Tributary to Gillies Creek	4	02080206	PEM	0.20	Soft Rush Rice Cutgrass Skunk Cabbage Royal Fern Broad Leaved Cattail	*Juncus effusus* *Leersia oryzoides* *Symplocarpus foetidus* *Osmunda regalis* *Typha latifolia*
WET 2S	5	02080206	PEM	0.04	Rice Cutgrass	*Leersia oryzoides*
WET 3S	6	02080206	PFO	0.20	Red Maple Sweetgum Lizard's Tail False Nettle Fringed Sedge Bladder Sedge	*Acer rubrum* *Liquidambar styraciflua* *Saururus cernuus* *Boehmeria cylindrica* *Carex crinita* *Carex intumescens*
WET 4S Tributary to Chickahominy River	6	02080206	PSS	0.38	Willow Oak Soft Rush Woolgrass Hazel Alder Water Tupelo	*Quercus phellos* *Juncus effusus* *Scripus cyperinus* *Alnus serrulata* *Nyssa aquatica*
WET 5S	8 / 9	02080206	PFO	0.08	Highbush Blueberry Common Boneset Soft Rush Red Maple Sweetgum Fringed Sedge Poison Ivy Sensitive Fern	*Vaccinium corymbosum* *Eupatorium perfoliatum* *Juncus effusus* *Acer Rubrum* *Liquidambar styraciflua* *Carex crinita* *Toxicodendron radicans* *Onoclea sensibilis*
WET 6S Chickahominy River	9	02080206	PFO	1.06	Rice Cutgrass Red Maple Japanese Stilt Grass False Nettle Bladder Sedge Poison Ivy Black Gum	*Leersia oryzoides* *Acer rubrum* *Microstegium vimineum* *Boehmeria cylindrica* *Carex intumescens* *Toxicodendron radicans* *Nyssa sylvatica*
WET 7S	9	02080206	PFO	0.10	Rice Cutgrass False Nettle Sweetgum Red Maple Poison Ivy Sensitive Fern Royal Fern Muscle Wood	*Leersia oryzoides* *Boehmeria cylindrica* *Liquidambar styraciflua* *Acer rubrum* *Toxicodendron radicans* *Onoclea sensibilis* *Osmunda regalis* *Carpinus caroliniana*
WET 8S Higgins Swamp	9	02080206	PSS	0.98	Willow Oak Black Willow Water Tupelo Duck Weed Buttonbush Red Maple False Nettle Yellow Pond Lily	*Quercus phellos* *Salix nigra* *Nyssa aquatica* *Lemna minor* *Cephalanthus occidentalis* *Acer rubrum* *Boehmeria cylindrica* *Nuphar lutea*
WET 9S Crump Swamp	11	02080206	PSS	0.08	Lizard's Tail Broadleaf Cattail False Nettle Sensitive Fern Hazel Alder Rice Cutgrass Sweetgum Red Maple Soft Rush	*Saururus cernuus* *Typha Latifolia* *Boehmeria cylindrica* *Onoclea sensibilis* *Alnus serrulata* *Leersia oryzoides* *Liquidambar styraciflua* *Acer rubrum* *Juncus effusus*
WET 10S Tributary to Toe Ink Swamp	11	02080206	PFO	0.54	Lizard's Tail Fringed Sedge Japanese Stilt Grass Red Maple American Sycamore Spice Bush False Nettle	*Saururus cernuus* *Carex crinita* *Microstegium vimineum* *Acer rubrum.* *Platanus occidentalis* *Lindera benzoin.* *Boehmeria cylindrica*

Surface Water Summary Table – Wetlands (South)

Wetland Number	Location (Map No.)	HUC	Cowardin Classification	Acreage in Study Area	Dominant Vegetation	
					Common Name	**Scientific Name**
					Sensitive Fern Soft Rush River Birch Bristlebract Sedge	*Onoclea sensibilis* *Juncus effusus* *Betula nigra* *Carex tribuloides*
WET 12S Schiminoe Creek	13	02080206	PFO	0.06	Red Maple Japanese Stilt Grass Sweetgum Lizard's Tail Highbush Blueberry Sensitive Fern Jewel Weed	*Acer rubrum* *Microstegium vimineum* *Liquidambar styraciflua* *Saururus cernuus* *Vaccinium corymbosum* *Onoclea sensibilis* *Impatiens capensis*
WET 13S Rumley Marsh	14	02080206	PFO	0.30	Sensitive Fern False Nettle Red Maple Lizard's Tail Bladder Sedge	*Onoclea sensibilis* *Boehmeria cylindrica* *Acer rubrum* *Saururus cernuus* *Carex intumescens*
WET 14S	18	02080206	PFO	0.01	Lizard's Tail Red Maple Royal Fern Sensitive Fern Poison Ivy	*Saururus cernuus* *Acer rubrum* *Osmunda regalis* *Onoclea sensibilis* *Toxicodendron radicans*
WET 15S	18 / 19	02080206	PFO	0.14	False Nettle Sensitive Fern Red Maple Japanese Stilt Grass	*Boehmeria cylíndrica* *Onoclea sensibilis* *Acer rubrum* *Microstegium vimineum*
WET 17S	19	02080206	PFO	0.03	Lizard's Tail Red Maple Sensitive Fern Green Ash	*Saururus cernuus* *Acer Rubrum* *Onoclea sensibilis* *Fraxinus pennsylvanica*
WET 18S	20	02080206	PEM	0.14	Lizard's Tail False Nettle Halberd Leaved Tearthumb	*Saururus cernuus* *Boehmeria cylindrica* *Polygonum arifolium*
WET 19S	20	02080206	PFO	0.15	Lizard's Tail Sensitive Fern Cinnamon Fern Red Maple Marsh Marigold Highbush Blueberry Green Ash	*Saururus cernuus* *Onoclea sensibilis* *Osmunda cinnamomea* *Acer rubrum* *Caltha palustres* *Vaccinium corymbosum* *Fraxinus pennsylvanica*
WET 20S	22	02080107	PFO	0.08	Lizard's Tail False Nettle Rice Cutgrass Sensitive Fern Red Maple Marsh Marigold	*Saururus cernuus* *Boehmeria cylindrica* *Leersia oryzoides* *Onoclea sensibilis* *Acer rubrum* *Caltha palustris*
WET 21S	22	02080107	PEM	0.03	Lizard's Tail False Nettle Japanese Stilt Grass	*Saururus cernuus* *Boehmeria cylindrica* *Microstegium vimineum*
WET 22S	23	02080107	PEM	0.49	Rice Cutgrass Red Maple Green Ash Black Willow American Sycamore Sensitive Fern Soft Rush False Nettle	*Leersia oryzoides* *Acer rubrum* *Fraxinus pennsylvanica* *Salix nigra* *Platanus occidentalis* *Onoclea sensibilis* *Juncus effusus* *Boehmeria cylindrica*
WET 23S	23	02080107	PFO	0.06	Lizard's Tail American Sycamore Spicebush Green Ash Red Maple	*Saururus cernuus* *Platanus occidentalis* *Lindera benzoin* *Fraxinus pennsylvanica* *Acer rubrum*
WET 24S	23	02080107	PFO	0.02	Lizard's Tail Marsh Marigold Japanese Stilt Grass Sensitive Fern	*Saururus cernuus* *Caltha palustris* *Microstegium vimineum* *Onoclea sensibilis*

Surface Water Summary Table – Wetlands (South)

Wetland Number	Location (Map No.)	HUC	Cowardin Classification	Acreage in Study Area	Dominant Vegetation	
					Common Name	Scientific Name
WET 25S	23	02080107	PFO	0.14	Sensitive Fern Poison Ivy Marsh Marigold Red Maple Cinnamon Fern Lizard's Tail	*Onoclea sensibilis* *Toxicodendron radicans* *Caltha palustris* *Acer rubrum* *Osmunda cinnamomea* *Saururus cernuus*
WET 26S	34	02080206	PFO	0.19	Rough Horsetail Lizard's Tail False Nettle	*Equisetum hymale* *Saururus cernuus* *Boehmeria cylindrica*
WET 27S	39	02080108	PFO	0.14	Red Maple Lizard's Tail False Nettle Poison Ivy Japanese Stilt Grass Green Ash Marsh Marigold	*Acer rubrum* *Saururus cernuus* *Boehmeria cylindrica* *Toxicodendron radicans* *Microstegium vimineum* *Fraxinus pennsylvanica* *Caltha palustris*
WET 28S	42	02080108	PEM	1.32	--	--
WET 29S Newmarket Creek	43	02080108	E2EM1P	11.03	Common Reed	*Phragmites australis*
WET 30S Newmarket Creek	43	02080108	E2EM1P	9.25	Common Reed	*Phragmites australis*
WET 31S	28	02080107	PFO	0.19	Red Maple Lizard's Tail Spicebush Royal Fern Ironwood	*Acer rubrum* *Saururus cernuus* *Linder benzoin* *Osmunda regalis* *Carpinus caroliniana*
WET 32S Blows Mill Run	33	02080206	PEM	5.16	Red Maple Lizard's Tail Spicebush Royal Fern Ironwood Sweetgum Rice Cutgrass Common Elderbery Sensitive Fern Broad Leaved Cattail Highbush Blueberry	*Acer rubrum* *Saururus cernuus* *Linder benzoin* *Osmunda regalis* *Carpinus caroliniana* *Liquidambar styraciflua* *Leersia oryzoides* *Sambucus Canadensis* *Onoclea sensibilis* *Typha latifolia* *Vaccinium corymbosum*
WET 33S Queen Creek	28 / 29	02080107	E2EM1P	1.45	Alkalai bulrush	*Scirpus alterniflora*
WET 34S	6	02080206	PEM	0.15	Red Maple False Nettle Sensitive Fern Japanese Stiltgrass Sweet Pepper Bush	*Acer rubrum* *Boehmeria cylindrical* *Onoclea sensibilis* *Microstegium vimineum* *Clethra alnifolia*
WET 35S	13	02080206	PFO	0.11	Red Maple Lizard's Tail Ironwood Sensitive Fern False Nettle Cinnamon Fern Sweetgum Soft Rush	*Acer rubrum* *Saururus cernuus* *Carpinus caroliniana* *Onoclea sensibilis* *Boehmeria cylindrica* *Osmunda cinnamomea* *Liquidambar styraciflua* *Juncus effuses*
WET 36S	19	02080206	PFO	0.03	Cinnamon Fern Royal Fern Sensitive Fern Red Maple Sweet Pepper Bbush Marsh Marigold	*Osmunda cinnamomea* *Osmunda regalis* *Onoclea sensibilis* *Acer rubrum* *Clethra alnifolia* *Caltha palustris*

Surface Water Summary Table – Wetlands (South)

Wetland Number	Location (Map No.)	HUC	Cowardin Classification	Acreage in Study Area	Dominant Vegetation	
					Common Name	Scientific Name
WET 37S	19	02080206	PFO	0.01	Cinnamon Fern Royal Fern Sensitive Fern Red Maple Lizard's Tail	*Osmunda cinnamomea* *Osmunda regalis* *Onoclea sensibilis* *Acer rubrum* *Saururus cernuus*
WET 38S	19	02080206	PFO	0.03	Cinnamon Fern Royal Fern Sensitive Fern Red Maple Sycamore	*Osmunda cinnamomea* *Osmunda regalis* *Onoclea sensibilis* *Acer rubrum* *Platanus occidentalis*
WET 39S	19	02080206	PFO	0.10	Royal Fern Sensitive Fern Red Maple Soft Rush Sweet Pepper Bush False Nettle	*Osmunda regalis* *Onoclea sensibilis* *Acer rubrum* *Juncus effuses* *Clethra alnifolia* *Boehmeria cylindrica*
WET 41S	23	02080107	PFO	0.01	Red Maple Lizard's Tail Sensitive Fern Marsh Marigold Highbush Blueberry	*Acer rubrum* *Saururus cernuus* *Onoclea sensibilis* *Caltha palustris* *Vaccinium corymbosum*
WET 43S	37	02080206	PFO	0.01	Rice Cutgrass	*Leersia oryzoides*
WET 56S	20	02080206	PEM	0.03	Lizard's Tail False Nettle Halberd Leaved Tearthumb	*Saururus cernuus* *Boehmeria cylindrica* *Polygonum arifolium*
WET 96S Tributary to Chickahominy River	10	02080206	PSS	0.39	Red Maple River Birch Smooth Alder	*Acer rubrum* *Betula nigra* *Alnus serrulata*
WET 97S Schiminoe Creek	13	02080206	PFO	0.08	Red Maple Sweetgum False Nettle Soft Rush Royal Fern Common Elderberry	*Acer rubrum* *Liquidambar styraciflua* *Boehmeria cylindrica* *Juncus ffuses* *Osmunda regalis* *Sambucus Canadensis*
WET 98S Tributary to Rumley Marsh	14	02080206	PEM	0.08	Deertongue Soft Rush Sensitive Fern Net-Veined Chain Fern False Nettle Wax Myrtle	*Dichanthelium clandestinium* *Juncus effuses* *Onoclea sensibilis* *Woodwardia areolata* *Boehmeria cylindrical* *Morella cerifera*
WET 99S	16	02080206	PFO	0.05	Sensitive Fern Sweetgum Red Maple Deer Tongue Marsh Marigold Wax Myrtle Halberd Leaved Tearthumb	*Onoclea sensibilis* *Liquidambar styraciflua* *Acer rubrum* *Dichanthelium clandestinum* *Caltha palustris* *Morella cerifera* *Polygonum arifolium*
WET 100S Tributary to Diascund Creek	16	02080206	PSS	0.04	Royal Fern Soft Rush Sensitive Fern Wax Myrtle Smooth Alder Slippery elm	*Osmunda regalis* *Juncus effuses* *Onoclea sensibilis* *Morella cerifera* *Alnus serrulata* *Ulmus rubra*
WET 101S	17	02080206	PSS	0.04	Broadleaf Cattail Soft Rush Black Willow	*Typha latifolia* *Juncus effuses* *Salix nigra*
WET 102S	19	02080206	PFO	0.24	False Nettle Sensitive Fern Soft Rush Sycamore Red Maple Sweetgum	*Boehmeria cylindrical* *Onoclea sensibilis* *Juncus effuses* *Platanus occidentalis* *Acer rubrum* *Liquidambar styraciflua*

Surface Water Summary Table – Wetlands (South)

Wetland Number	Location (Map No.)	HUC	Cowardin Classification	Acreage in Study Area	Dominant Vegetation	
					Common Name	Scientific Name
WET 103S Wahrani Swamp	19	02080206	PFO	0.30	Marsh Marigold River Birch Sycamore Red Maple Sensitive Fern	*Caltha palustris* *Betula nigra* *Platanus occidentalis* *Acer rubrum* *Onoclea sensibilis*
WET 104S	20	02080206	PEM	0.02	Fringed Sedge Lizards Tail	*Carex crinita* *Saururus cernuus*
WET 105S Barnes Swamp	20	02080206	PFO	0.16	River Birch Sycamore Deer Tongue Sensitive Fern Royal Fern Red Maple	*Betula nigra* *Platanus occidentalis* *Dichanthelium clandestinum* *Onoclea sensibilis* *Osmunda regalis* *Acer rubrum*
WET 106S Tributary to Diascund Creek Reservoir	21	02080206	PFO	0.66	Spicebush Marsh Marigold Sensitive Fern Red Maple Ironwood Lizards Tail	*Linder benzoin* *Caltha palustris* *Onoclea sensibilis* *Acer rubrum* *Carpinus caroliniana* *Saururus cernuus*
WET 107S Edwards Swamp	21	02080206	PFO	0.03	Black Willow Red Maple Deer Tongue Soft Rush Sycamore Sweetgum	*Salix nigra* *Acer rubrum* *Dichanthelium clandestinum* *Juncus ffuses* *Platanus occidentalis* *Liquidambar styraciflua*
WET 108S	22	02080107	PEM	0.11	False Nettle Deer Tongue Japanese Stiltgrass	*Boehmeria cylindrical* *Dichanthelium clandestinum* *Microstegium vimineum*
WET 109S	24	02080107	PEM	0.06	Sensitive Fern	*Onoclea sensibilis*
WET 111S	22	02080107	PEM	0.04	False Nettle Fringed Sedge Deer Tongue Japanese Stiltgrass	*Boehmeria cylindrical* *Carex crinita* *Dichanthelium clandestinum* *Microstegium viminuem*
WET 112S France Swamp	23	02080107	PFO	0.26	Red Maple Sycamore False Nettle Sweetgum	*Acer rubrum* *Platanus occidentalis* *Boehmeria cylindrica* *Liquidambar styraciflua*
WET 113S	25	02080107	PFO	0.08	Sycamore River Birch	*Platanus occidentalis* *Betula nigra*
WET 115S	29	02080107	PFO	0.14	Green Ash Sycamore Lizards Tail Sensitive Fern Marsh Marigold Ironwood False Nettle	*Fraxinus pennsylvanica* *Platanus occidentalis* *Saururus cernuus* *Onoclea sensibilis* *Caltha palustris* *Carpinus caroliniana* *Boehmeria cylindrica*
WET 116S Whiteman Swamp	30	02080107	PEM	0.63	Common Reed	*Phragmites australis*
WET 123S Tributary to Newport News/ Lee Hall Reservoir	35	02080206	PFO	0.21	Sweetgum Red Maple	*Liquidambar styraciflua* *Acer rubrum*
WET 124S	35	02080206	PFO	0.20	Fringed Sedge Red Maple Green Ash Wool Grass	*Carex crinita* *Acer rubrum* *Fraxinus pennsylvanica* *Scirpus cyperinus*
WET 125S	36	02080206	PFO	0.06	Fringed Sedge Wool Grass Green Ash	*Carex crinita* *Scirpus cyperinus* *Fraxinus pennsylvanica*

Surface Water Summary Table – Wetlands (South)

Wetland Number	Location (Map No.)	HUC	Cowardin Classification	Acreage in Study Area	Dominant Vegetation	
					Common Name	Scientific Name
					Red Maple	*Acer rubrum*
WET 133S Newport News/ Lee Hall Reservoir	34	02080206	PFO	0.88	Green Ash Red Maple False Nettle American Sycamore	*Fraxinus pennsylvanica* *Acer rubrum* *Boehmeria cylindrica* *Platanus occidentalis*
WET 142S	31	02080107	PEM	0.14	--	--
WET 143S	34 / 35	02080206	PFO	0.05	--	--
WET 144S	35	02080206	PFO	0.96	--	--
WET 145S	35	02080206	PEM	0.57	--	--
WET 146S	35	02080206	PFO	0.28	--	--
WET 147S	38 / 39	02080108	PFO	2.18	--	--
WET 148S	39	02080108	PEM	2.06	--	--
WET 149S	40	02080108	PFO	0.47	--	--

Surface Water Summary Table – Other Waters of the United States (North)

WUS Number	Location (Map No.)	HUC	Cowardin Classification	Linear Feet in Study Area	Unified Stream Methodology Reach Condition Index
WUS 1N Newmarket Creek	43	02080108	R1UB2	4073	1.45
WUS 2N	43	02080108	R2UB3	3181	0.87
WUS 3N	43	02080108	R2UB2	791	0.83
WUS 4N Tributary to Newmarket Creek	41	02080108	R2UB2	1068	0.84
WUS 5N	41	02080108	R2UB2	290	0.95
WUS 6N	41	02080108	R2UB2	114	0.84
WUS 7N	40 / 41	02080108	R2UB2	9869	0.88
WUS 8N	40	02080108	R2UB2	4524	0.85
WUS 9N	39	02080108	R2UB2	786	1.05
WUS 10N	39	02080108	R2UB2	266	1.00
WUS 11N	38	02080108	R2UB2	244	-
WUS 12N	37	02080206	R2UB2	708	0.92
WUS 13N	36	02080206	R2UB2	97	0.85
WUS 14N Stony Run	36	02080206	R2UB2	782	0.85
WUS 15N	36	02080206	R2UB2	500	0.99
WUS 16N	35	02080206	R2UB2	2314	0.68
WUS 17N	35	02080206	R2UB2	42	1.18
WUS 18N	35	02080206	R2UB2	1203	0.96
WUS 19N	34	02080206	R2UB2	22	1.12
WUS 20N	34	02080206	R2UB2	43	0.96
WUS 23N	33	02080206	R2UB2	81	0.84
WUS 24N Tributary to Skiffes Creek Reservoir	33	02080206	R2UB2	92	1.38
WUS 27N King Creek	31	02080107	R2UB2	509	1.37
WUS 28N	30	02080107	R2UB2	158	1.03
WUS 31N	29	02080107	R2UB2	13	-

Surface Water Summary Table – Other Waters of the United States (North)

WUS Number	Location (Map No.)	HUC	Cowardin Classification	Linear Feet in Study Area	Unified Stream Methodology Reach Condition Index
WUS 34N Queen Creek	29	02080107	R1UB2	176	-
WUS 35N Tributary to Queen Creek	28	02080107	R2UB2	343	1.03
WUS 39N	23	02080107	R2UB2	155	1.35
WUS 40N France Swamp	23	02080107	R2UB2	29	-
WUS 42N	23	02080107	R2UB2	12	1.00
WUS 47N	20	02080206	R4UB2	61	1.34
WUS 48N	19	02080206	R2UB2	65	1.30
WUS 49N	19	02080206	R2UB2	19	1.18
WUS 50N	19	02080206	R2UB2	308	0.99
WUS 53N Beaver Dam Creek	18 /19	02080206	R2UB2	102	-
WUS 54N	18	02080206	R2UB2	54	1.30
WUS 57N	16	02080206	R2UB2	87	1.33
WUS 59N	13	02080206	R2UB2	218	1.29
WUS 60N	13	02080206	R2UB2	19	1.32
WUS 62N	12	02080206	R2UB2	77	1.37
WUS 64N	11	02080206	R2UB2	215	1.23
WUS 66N	10	02080206	R2UB2	779	1.32
WUS 68N	5 / 6	02080206	R4UB2	5375	0.81
WUS 69N	5	02080206	R2UB2	1092	1.06
WUS 70N	5	02080206	R2UB2	156	1.38
WUS 72N	4	02080206	R2UB2	299	1.42
WUS 73N	4	02080206	R2UB2	388	0.92
WUS 197N	30	02080107	R4UB2	332	-
WUS 214N	24	02080107	R2UB2	203	-
WUS 215N	24	02080107	R4UB2	669	-
WUS 216N	12	02080206	R2UB2	24	-

Surface Water Summary Table – Other Waters of the United States (North)

WUS Number	Location (Map No.)	HUC	Cowardin Classification	Linear Feet in Study Area	Unified Stream Methodology Reach Condition Index
WUS 220N Tributary to Boar Swamp	7	02080206	R2UB2	34	-
WUS 221N	7	02080206	R4UB2	367	-
WUS 222N	7	02080206	EPHEMERAL	52	-
WUS 223N	7	02080206	R2UB2	735	-
WUS 224N	7	02080206	R2UB2	44	-
WUS 231N	39	02080108	R4UB2	29	-
WUS 232N	30	02080107	R2UB2	129	-
WUS 233N	30	02080107	R2UB2	97	-
WUS 236N	29	02080107	R2UB2	1	-
WUS 237N Skimino Creek	25	02080107	R2UB2	80	-
WUS 238N Old Mill Pond	25	02080107	R2UB2	64	-
WUS 239N	23	02080107	R2UB2	223	-
WUS 240N	22	02080107	R4UB2	22	-
WUS 241N Tributary to Diascund Creek Reservoir	21	02080206	R2UB2	81	-
WUS 242N Wahrani Swamp	19	02080206	R2UB2	56	-
WUS 243N	19	02080206	R2UB2	102	-
WUS 245N Tributary to Diascund Creek	16	02080206	R2UB2	2	-
WUS 246N Tributary to Diascund Creek	16	02080206	R2UB2	30	-
WUS 247N	8	02080206	R2UB2	35	-
WUS 248N	7 / 8	02080206	R2UB2	475	-
WUS 249N Gillies Creek	3	02080206	R2UB2	26	-
WUS 250N	3	02080206	R2UB2	155	-
WUS 251N	3	02080206	R2UB2	338	-
WUS 252N	3	02080206	R2UB2	137	-

Surface Water Summary Table – Other Waters of the United States (North)

WUS Number	Location (Map No.)	HUC	Cowardin Classification	Linear Feet in Study Area	Unified Stream Methodology Reach Condition Index
WUS 253N	3	02080206	R2UB2	262	-
WUW 254N	15	02080206	R2UB2	2	-
WUS 255N Schiminoe Creek	13	02080206	R2UB2	24	-
WUS 256N	13	02080206	R2UB2	8	-
WUS 257N Toe Ink Swamp	12	02080206	R2UB2	20	-
WUS 258N	12	02080206	R2UB2	23	-
WUS 259N	11	02080206	R2UB2	19	-
WUS 260N Crump Swamp	11	02080206	R2UB2	31	-
WUS 262N Tributary to Chickahominy River	10	02080206	R2UB2	39	-
WUS 263N	4	02080206	R2UB2	110	-
WUS 264N	4	02080206	R4UB2	24	-
WUS 265N	3	02080206	R2UB2	46	-
WUS 266N	3	02080206	R2UB2	953	-
WUS 267N	4	02080206	R4UB3	67	-
WUS 268N Tributary to Rumley Marsh	14	02080206	R2UB2	39	-
WUS 269N	21 / 22	02080206	R2UB2	4	-
WUS 270N Whiteman Swamp	30	02080107	R2UB2	152	-
WUS 271N Curtis Run	34	02080206	R2UB2	59	-
WUS 272N Tributary to Newport News/ Lee Hall Reservoir	35	02080206	R2UB2	34	-
WUS 273N Skiffes Creek	32	02080206	R2UB2	43	-
WUS 276N Shockhoe Creek	2	02080206	R2UB2	315	-
WUS 281N	41 / 42	02080108	R2UB2	1262	-
WUS 282N	42	02080108	R2UB2	236	-
WUS 283N	39	02080108	R2UB2	4627	-

Surface Water Summary Table – Other Waters of the United States (North)

WUS Number	Location (Map No.)	HUC	Cowardin Classification	Linear Feet in Study Area	Unified Stream Methodology Reach Condition Index
WUS 284N	42	02080108	R2UB2	2523	-
WUS 285N	38 / 39	02080108	R2UB2	5110	-
WUS 286N	37	02080206	R2UB2	1234	-
WUS 287N	5	02080206	R2UB2	337	-
WUS 289N Diascund Creek	15	02080206	R2UB2	72	-
WUS 290N	18	02080206	R2UB2	306	-
WUS 291N	18	02080206	R2UB2	129	-
WUS 292N	26	02080107	R4UB2	36	-
WUS 293N	26	02080107	EPHEMERAL	252	-
WUS 294N	26	02080107	R4UB2	281	-
WUS 295N	26	02080107	R4UB2	32	-
WUS 296N	30	02080107	R2UB2	48	-
WUS 298N	31	02080107	R4UB2	610	-
WUS 300N	33	02080206	EPHEMERAL	22	-
WUS 307N Tributary to Newport News/ Lee Hall Reservoir	35	02080206	R2UB2	82	-
WUS 308N Lukas Creek	37	02080206	R2UB1	26	-
WUS 312N	39	02080108	R2UB1	125	-
WUS 313N Brick Kiln Creek	39	02080108	R2UB1	381	-
WUS 314N Newmarket Creek	40	02080108	R2UB1	28	-

Surface Water Summary Table – Other Waters of the United States (Median)

WUS Number	Location (Map No.)	HUC	Cowardin Classification	Linear Feet in Study Area	Unified Stream Methodology Reach Condition Index
WUS 14M Stony Run	36	02080206	R2UB2	39	-
WUS 70M Chickahominy River	9	02080206	R2UB2	76	1.50
WUS 71M	9	02080206	R2UB2	57	1.13
WUS 72M Higgins Swamp	9	02080206	R2UB2	79	1.38
WUS 73M	9	02080206	R2UB2	64	0.84
WUS 74M	11	02080206	R2UB2	68	1.32
WUS 75M Crump Swamp	11	02080206	R2UB3	65	1.20
WUS 76M	11	02080206	R2UB2	79	1.00
WUS 77M	11	02080206	R2UB3	32	1.00
WUS 78M	11	02080206	R2UB2	105	1.10
WUS 79M Tributary to Toe Ink Swamp	11	02080206	R2UB2	69	1.40
WUS 80M Toe Ink Swamp	12	02080206	R2UB3	83	1.34
WUS 81M	13	02080206	R2UB2	28	1.34
WUS 82M	13	02080206	R2UB2	30	1.14
WUS 83M	13	02080206	R4UB2	102	0.89
WUS 84M	13	02080206	R2UB3	101	1.24
WUS 85M Schiminoe Creek	14	02080206	R2UB2	157	1.10
WUS 86M Rumley Marsh	14	02080206	R2UB2	136	1.24
WUS 87M Tributary to Rumley Marsh	14	02080206	R2UB2	112	1.36
WUS 88M	14	02080206	EPHEMERAL	151	0.50
WUS 89M Diascund Creek	15	02080206	R2UB3	72	1.18
WUS 90M	15	02080206	R4UB2	106	0.79
WUS 91M	16	02080206	R4UB2	113	0.82
WUS 92M	17	02080206	R4UB2	42	1.02
WUS 93M	17	02080206	R2UB3	70	0.84

Surface Water Summary Table – Other Waters of the United States (Median)

WUS Number	Location (Map No.)	HUC	Cowardin Classification	Linear Feet in Study Area	Unified Stream Methodology Reach Condition Index
WUS 94M	17	02080206	R2UB2	56	-
WUS 95M	17	02080206	EPHEMERAL	179	0.60
WUS 96M	17	02080206	R2UB2	60	1.18
WUS 97M	17	02080206	EPHEMERAL	134	0.60
WUS 98M	17	02080206	EPHEMERAL	219	0.60
WUS 99M	18	02080206	R2UB2	267	0.96
WUS 100M	18	02080206	R2UB2	804	1.02
WUS 101M	18	02080206	R2UB2	78	0.88
WUS 102M	18	02080206	R2UB2	275	0.88
WUS 103M	18	02080206	R2UB2	78	0.88
WUS 104M	18	02080206	R2UB2	1165	1.36
WUS 105M	18	02080206	R2UB2	188	1.36
WUS 106M	18	02080206	R2UB3	77	1.34
WUS 107M	18	02080206	R2UB2	182	1.36
WUS 108M	18	02080206	R2UB2	398	1.04
WUS 109M	18	02080206	R2UB2	189	1.18
WUS 110M	18	02080206	R2UB2	1382	1.23
WUS 111M Beaver Dam Creek	19	02080206	R2UB2	298	1.46
WUS 112M	19	02080206	R2UB2	98	1.02
WUS 113M	19	02080206	R2UB2	47	0.89
WUS 114M Wahrani Swamp	19	02080206	R2UB2	109	1.24
WUS 115M	19	02080206	R4UB2	333	1.13
WUS 116M	19	02080206	R2UB2	111	1.16
WUS 117M	19	02080206	R2UB2	326	1.30
WUS 118M	19	02080206	R2UB2	188	0.52
WUS 119M	19	02080206	R2UB2	265	1.30
WUS 120M	20	02080206	R2UB2	195	1.40

Surface Water Summary Table – Other Waters of the United States (Median)

WUS Number	Location (Map No.)	HUC	Cowardin Classification	Linear Feet in Study Area	Unified Stream Methodology Reach Condition Index
WUS 121M Diascund Creek Reservoir	20	02080206	R2UB2	365	1.50
WUS 122M	20	02080206	R2UB2	1633	1.26
WUS 123M	20	02080206	R2UB2	141	1.34
WUS 124M	20	02080206	R2UB2	472	1.14
WUS 125M	20	02080206	R2UB2	443	1.22
WUS 126M Barnes Swamp	20	02080206	R2UB2	118	1.20
WUS 127M	20	02080206	R2UB2	294	0.87
WUS 128M	20	02080206	R2UB2	165	1.00
WUS 129M	20 / 21	02080206	R2UB2	91	1.00
WUS 130M	20	02080206	R4UB2	142	0.93
WUS 131M	21	02080206	R2UB2	143	1.18
WUS 132M Tributary to Diascund Creek Reservoir	21	02080206	R2UB2	724	1.09
WUS 133M	21	02080206	R2UB2	48	1.04
WUS 134M	21	02080206	R4UB2	39	0.96
WUS 135M	21	02080206	R4UB2	148	1.16
WUS 136M	21	02080206	R2UB2	744	2.13
WUS 137M	22	02080107	R2UB2	691	0.69
WUS 138M	22	02080107	R2UB2	126	1.28
WUS 139M	22	02080107	R2UB2	129	1.24
WUS 140M	22	02080107	R4UB2	175	1.16
WUS 141M	22 / 23	02080107	R2UB2	182	1.26
WUS 142M	23	02080107	R2UB2	326	1.24
WUS 143M	23	02080107	R2UB2	252	1.08
WUS 144M	23	02080107	R2UB2	206	1.20
WUS 145M	23	02080107	R2UB2	229	1.30

Surface Water Summary Table – Other Waters of the United States (Median)

WUS Number	Location (Map No.)	HUC	Cowardin Classification	Linear Feet in Study Area	Unified Stream Methodology Reach Condition Index
WUS 146M	23	02080107	R2UB2	118	1.12
WUS 147M	23	02080107	R2UB2	283	-
WUS 148M	23	02080107	R2UB2	484	1.36
WUS 149M	23	02080107	R2UB2	97	1.24
WUS 150M France Swamp	23	02080107	R2UB2	118	1.20
WUS 151M	30	02080107	R2UB2	36	0.96
WUS 152M	30	02080107	R2UB2	123	0.77
WUS 153M	30	02080107	R2UB2	19	0.97
WUS 277M Shockhoe Creek	2	02080206	R2UB1	27	-
WUS 278M Newport News/ Lee Hall Reservoir	34	02080206	L2UBHh	115	-
WUS 279M Queen Creek	29	02080107	R1UB2	98	-

Surface Water Summary Table - Other Waters of the United States (South)

WUS Number	Location (Map No.)	HUC	Cowardin Classification	Linear Feet (in Study Area)	Unified Stream Methodology Reach Condition Index
WUS 1S	2 / 3	02080206	R2UB1	1388	0.66
WUS 2S	3	02080206	R2UB1	41	0.66
WUS 3S	4	02080206	R2UB1	39	1.00
WUS 4S Tributary to Gilles Creek	4	02080206	R2UB3	65	1.11
WUS 5S	7 / 8	02080206	R2UB1	157	1.16
WUS 6S	8	02080206	R2UB1	41	1.16
WUS 7S Chickahominy River	9	02080206	R2UB3	70	1.46
WUS 8S	9	02080206	R2UB1	443	1.06
WUS 9S	11	02080206	R2UB3	44	1.08
WUS 10S	11	02080206	R2UB3	161	0.60
WUS 11S	13	02080206	R2UB2	35	1.14
WUS 12S Rumley Marsh	14	02080206	R2UB3	65	1.46
WUS 13S	18	02080206	R2UB2	599	1.08
WUS 14S	18	02080206	R2UB2	36	1.26
WUS 15S	18	02080206	R2UB2	54	1.26
WUS 16S	18	02080206	R2UB2	91	0.84
WUS 17S	19	02080206	R2UB2	108	0.88
WUS 18S	20	02080206	R2UB2	75	1.12
WUS 19S	20	02080206	R2UB2	122	0.88
WUS 20S	20 / 21	02080206	R2UB2	43	1.08
WUS 21S	22	02080107	R2UB2	69	0.92
WUS 22S	22 / 23	02080107	R2UB2	129	1.14
WUS 23S	23	02080107	R2UB2	115	1.12
WUS 24S	23	02080107	R2UB2	86	1.00
WUS 25S Queen Creek	29	02080107	R1UB2	120	1.50

Surface Water Summary Table - Other Waters of the United States (South)

WUS Number	Location (Map No.)	HUC	Cowardin Classification	Linear Feet (in Study Area)	Unified Stream Methodology Reach Condition Index
WUS 26S	30 / 31	02080107	R2UB3	931	1.11
WUS 27S	33	02080206	R2UB2	79	0.97
WUS 28S	33	02080206	R2UB2	352	1.50
WUS 29S	34	02080206	R2UB2	748	0.96
WUS 30S	34	02080206	R2UB2	557	1.04
WUS 33S Stony Run	36	02080206	R2UB2	124	1.06
WUS 34S	38	02080108	R2UB1	59	0.76
WUS 35S	38	02080108	R2UB2	949	0.75
WUS 36S	41	02080108	R2UB2	465	0.79
WUS 37S Tributary to Newmarket Creek	41	02080108	R2UB2	562	0.79
WUS 38S	41	02080108	R2UB2	613	0.75
WUS 40S	39	02080108	R2UB2	209	0.80
WUS 41S	39	02080108	R2UB1	628	0.64
WUS 42S	39	02080108	R2UB2	3679	0.64
WUS 43S	40 / 41	02080108	R2UB2	14596	0.73
WUS 44S	42	02080108	R2UB3	3577	0.89
WUS 46S	42	02080108	R2UB3	3230	0.68
WUS 47S	42 / 43	02080108	R2UB1	956	0.64
WUS 49S Tide Mill Creek	43	02080108	R2UB3	1921	0.71
WUS 50S	15	02080206	R2UB2	54	-
WUS 51S Skiffes Creek	32	02080206	R2UB1	37	0.85
WUS 52S	19	02080206	EPHEMERAL	92	0.83
WUS 53S	19	02080206	EPHEMERAL	94	-
WUS 54S	20	02080206	R2UB2	606	-
WUS 56S	23	02080107	R2UB2	76	-
WUS 57S	33	02080206	EPHEMERAL	79	-

Surface Water Summary Table - Other Waters of the United States (South)

WUS Number	Location (Map No.)	HUC	Cowardin Classification	Linear Feet (in Study Area)	Unified Stream Methodology Reach Condition Index
WUS 58S	36	02080206	R2UB2	569	-
WUS 59S	36	02080206	EPHEMERAL	1219	-
WUS 60S	36	02080206	EPHEMERAL	115	-
WUS 61S	36	02080206	EPHEMERAL	239	-
WUS 154S	30	02080107	R2UB2	474	1.00
WUS 155S	30	02080107	R2UB2	53	1.01
WUS 156S	3	02080206	R2UB1	85	0.85
WUS 157S Gillies Creek	3	02080206	R2UB2	49	0.92
WUS 158S Tributary to Gillies Creek	5	02080206	R2UB2	182	1.00
WUS 159S	6	02080206	R2UB2	97	1.08
WUS 160S	8	02080206	R2UB2	42	1.22
WUS 161S Tibutary to Chickahominy River	10	02080206	R2UB2	58	-
WUS 162S	11	02080206	R2UB2	41	1.19
WUS 163S Tributary to Toe Ink Swamp	11	02080206	R2UB2	77	1.44
WUS 164S Allen’s Run	12	02080206	R2UB2	33	1.44
WUS 165S	12	02080206	R2UB2	17	1.50
WUS 166S Toe Ink Swamp	12	02080206	R2UB2	43	1.50
WUS 167S	13	02080206	R2UB2	34	1.44
WUS 168S Schiminoe Creek	13	02080206	R2UB2	52	1.38
WUS 169S	13	02080206	R2UB2	542	0.62
WUS 170S Tributary to Rumley Marsh	14	02080206	R2UB2	62	1.50
WUS 171S Diascund Creek	15	02080206	R2UB2	108	1.20
WUS 172S	15	02080206	R4UB2	338	0.53
WUS 173S	16	02080206	R2UB2	47	1.50

Surface Water Summary Table - Other Waters of the United States (South)

WUS Number	Location (Map No.)	HUC	Cowardin Classification	Linear Feet (in Study Area)	Unified Stream Methodology Reach Condition Index
WUS 174S Tributary to Gillies Creek	5	02080206	R2UB1	2743	0.75
WUS 175S	9	02080206	R2UB2	72	1.44
WUS 177S Tributary to Diascund Creek	16	02080206	R2UB2	47	1.50
WUS 178S Tributary to Diascund Creek	16	02080206	R2UB2	23	1.50
WUS 179S	17	02080206	R2UB2	10	0.70
WUS 180S	17	02080206	R2UB2	51	0.99
WUS 183S Beaver Dam Creek	19	02080206	R2UB2	97	1.50
WUS 184S	19	02080206	R2UB2	104	1.08
WUS 185S Wahrani Swamp	19	02080206	R2UB2	89	1.28
WUS 187S Barnes Swamp	20	02080206	R2UB2	100	1.50
WUS 188S	21	02080206	R2UB2	76	1.28
WUS 189S Tibutary to Diascund Creek Reservoir	21	02080206	R2UB2	379	1.24
WUS 190S	21	02080206	R4UB2	111	1.08
WUS 191S Edwards Swamp	21	02080206	R2UB2	36	1.40
WUS 192S	22	02080107	R2UB2	72	1.34
WUS 193S	28	02080107	EPHEMERAL	46	0.60
WUS 195S	22	02080107	R4UB2	83	1.24
WUS 196S	22	02080107	R4UB2	79	1.10
WUS 197S	23	02080107	R2UB2	182	1.32
WUS 198S	23	02080107	R2UB2	65	1.28
WUS 199S France Swamp	23	02080107	R2UB2	104	1.50
WUS 200S	28	02080107	EPHEMERAL	37	0.60
WUS 204S	29	02080107	R2UB2	36	1.16
WUS 205S	29	02080107	R2UB2	47	-

Surface Water Summary Table - Other Waters of the United States (South)

WUS Number	Location (Map No.)	HUC	Cowardin Classification	Linear Feet (in Study Area)	Unified Stream Methodology Reach Condition Index
WUS 206S	29	02080107	R2UB2	94	-
WUS 207S	29	02080107	R2UB2	186	-
WUS 208S	30	02080107	R2UB2	67	-
WUS 209S	30	02080107	R2UB2	178	-
WUS 210S Whiteman Swamp	30 / 31	02080107	R2UB2	238	-
WUS 211S	33	02080206	R2UB2	51	-
WUS 212S	33	02080206	R2UB2	42	-
WUS 213S Curtis Run	34	02080206	R2UB2	85	-
WUS 225S Tributary to Newport News/ Lee Hall Reservoir	35	02080206	R2UB2	66	-
WUS 227S Lukas Creek	37	02080206	R2UB2	120	-
WUS 228S Tributary to Lukas Creek	37	02080206	R2UB2	110	-
WUS 229S	39	02080108	R2UB3	126	-
WUS 230S Tributary to Brick Kiln Creek	39	02080108	R2UB3	168	-
WUS 267S	4	02080206	R4UB3	67	-
WUS 274S Tributary to Chickahominy River	10	02080206	R2UB2	55	-
WUS 275S Shockhoe Creek	2	02080206	R2UB2	384	-
WUS 278S Diascund Creek Reservoir	20	02080206	R2UB2	119	-
WUS 280S Newport News/ Lee Hall Reservoir	34	02080206	L2UBHh	57	-
WUS 288S	6	02080206	R2UB2	435	-
WUS 297S	30	02080107	R2UB2	725	-
WUS 299S	31	02080107	R4UB2	150	-
WUS 302S	34 / 35	02080206	R4UB2	261	-

Surface Water Summary Table - Other Waters of the United States (South)

WUS Number	Location (Map No.)	HUC	Cowardin Classification	Linear Feet (in Study Area)	Unified Stream Methodology Reach Condition Index
WUS 303S	35	02080206	R4UB2	108	-
WUS 304S	35	02080206	R4UB2	288	-
WUS 305S Tributary to Newport News/ Lee Hall Reservoir	35	02080206	R2UB2	65	-
WUS 306S	35	02080206	R4UB2	889	-
WUS 309S	39	02080108	R4UB2	1412	-
WUS 310S	39	02080108	EPHEMERAL	870	-
WUS 315S Newmarket Creek	40	02080108	R2UB1	14	-

INTERSTATE 64 PENINSULA STUDY

APPENDIX F

Waters of the United States, Including Wetlands Impact Summary Tables

Surface Water Impact Summary Table - Wetlands (North)

Resource ID	Cowardin Classification	HUC	Acreage in Study Area	Acreage Impacted by Alternatives 1A/2A	Acreage Impacted by Alternatives 1B/2B	Acreage Impacted by Alternative 3	Map Number
WET 1 N	E2EM1P	2080108	4.19	4.10	4.08	4.08	43
WET 2 N	PSS	2080108	0.97	0.97	0.97	0.97	42
WET 3 N	PEM	2080108	1.64	1.64	1.64	1.64	42
WET 5 N	PEM	2080108	0.19	0.19	0.19	0.19	42
WET 9 N	PEM	2080108	0.13	0.13	0.13	0.13	40
WET 12 N	PEM	2080108	0.56	0.56	0.56	0.56	39
WET 14 N	PFO	2080206	0.10	0.00	0.00	0.00	35
WET 16 N	PEM	2080206	2.94	2.94	2.94	2.94	35
WET 17 N	PFO	2080206	0.87	0.87	0.87	0.87	35
WET 18 N	PFO	2080206	1.65	1.65	1.65	1.65	35
WET 19 N	PFO	2080206	0.04	0.04	0.04	0.04	34
WET 20 N	PFO	2080206	0.46	0.46	0.46	0.46	34
WET 21 N	PFO	2080206	0.25	0.25	0.25	0.25	34
WET 22 N	PFO	2080206	0.11	0.00	0.00	0.00	34
WET 23 N	PFO	2080206	0.10	0.01	0.00	0.01	34
WET 24 N	PEM	2080206	0.08	0.00	0.00	0.00	33
WET 25 N	PEM	2080206	0.04	0.00	0.00	0.00	33
WET 26 N	PFO	2080206	0.02	0.00	0.00	0.00	32
WET 27 N	PEM	2080107	0.96	0.96	0.96	0.96	31
WET 30 N	E2EM1P	2080107	2.96	2.96	2.96	2.96	29
WET 31 N	PFO	2080107	0.05	0.00	0.00	0.00	23
WET 32 N	PFO	2080107	0.08	0.00	0.00	0.00	23
WET 33 N	PFO	2080107	0.31	0.00	0.00	0.00	23
WET 34 N	PFO	2080107	0.07	0.00	0.00	0.00	23
WET 35 N	PFO	2080107	0.00	0.00	0.00	0.00	23
WET 36 N	PEM	2080107	0.02	0.00	0.00	0.00	23
WET 37 N	PFO	2080107	0.04	0.00	0.00	0.00	22
WET 38 N	PEM	2080206	0.03	0.00	0.00	0.00	21
WET 39 N	PFO	2080206	0.05	0.00	0.00	0.00	20
WET 40 N	PFO	2080206	0.03	0.00	0.00	0.00	20
WET 41 N	PFO	2080206	0.59	0.00	0.06	0.08	20

Surface Water Impact Summary Table - Wetlands (North)

Resource ID	Cowardin Classification	HUC	Acreage in Study Area	Acreage Impacted by Alternatives 1A/2A	Acreage Impacted by Alternatives 1B/2B	Acreage Impacted by Alternative 3	Map Number
WET 46 N	PFO	2080206	0.13	0.00	0.00	0.00	16
WET 48 N	PFO	2080206	1.81	0.00	0.00	0.00	14
WET 55 N	PEM	2080206	0.51	0.00	0.00	0.00	9
WET 56 N	PFO	2080206	0.09	0.00	0.00	0.00	9
WET 57 N	PFO	2080206	2.10	0.25	0.12	0.22	9
WET 58 N	PEM	2080206	0.17	0.00	0.00	0.00	6
WET 60 N	PEM	2080206	0.10	0.00	0.00	0.05	6
WET 62 N	PFO	2080206	0.10	0.10	0.10	0.10	5
WET 63 N	PFO	2080206	1.34	1.34	1.34	1.34	5
WET 64 N	PEM	2080206	0.05	0.00	0.00	0.00	4
WET 110 N	PFO	2080107	0.28	0.28	0.28	0.28	30
WET 117 N	PFO	2080206	0.01	0.00	0.00	0.00	12
WET 118 N	PFO	2080206	0.21	0.21	0.21	0.21	9
WET 119 N	PEM	2080206	0.53	0.00	0.00	0.00	9
WET 120 N	PEM	2080206	0.21	0.00	0.00	0.00	7
WET 121 N	PSS	2080206	1.09	1.09	1.09	1.09	7
WET 122 N	PEM	2080206	0.06	0.00	0.00	0.00	7
WET 126 N	PSS	2080107	0.46	0.11	0.00	0.07	25
WET 128 N	PEM	2080206	0.03	0.00	0.00	0.00	15
WET 129 N	PEM	2080206	0.08	0.00	0.00	0.00	10
WET 130 N	PSS	2080206	0.22	0.00	0.00	0.00	10
WET 131 N	PFO	2080206	0.05	0.00	0.00	0.00	6
WET 132 N	PEM	2080107	0.65	0.65	0.65	0.65	30
WET 136 N	PEM	2080206	0.24	0.24	0.24	0.24	5
WET 137 N	PFO	2080206	1.90	1.90	1.90	1.90	5
WET 138 N	PFO	2080206	0.08	0.00	0.00	0.00	18
WET 139 N	PFO	2080107	0.32	0.32	0.32	0.32	30
WET 140 N	PFO	2080107	0.67	0.67	0.67	0.67	30
WET 141 N	PEM	2080107	0.38	0.38	0.38	0.38	30
WET 150 N	PFO	2080108	0.41	0.39	0.39	0.33	40
WET 151 N	PEM	2080108	2.01	2.01	2.01	2.01	39

Surface Waters Impacts Summary Table - Wetlands (Median)

Resource ID	Cowardin Classification	HUC	Acreage in Study Area	Acreage Impacted by Alternatives 1A/2A	Acreage Impacted by Alternatives 1B/2B	Acreage Impacted by Alternative 3	Map Number
WET 14 M	PFO	2080206	0.14	0.14	0.14	0.14	36
WET 50 M	PEM	2080206	0.22	0.22	0.22	0.22	8
WET 51 M	PFO	2080206	0.30	0.00	0.00	0.01	11
WET 52 M	PFO	2080206	0.51	0.00	0.06	0.12	11
WET 53 M	PFO	2080206	0.10	0.10	0.10	0.10	12
WET 54 M	PFO	2080206	0.01	0.00	0.00	0.00	13
WET 55 M	PFO	2080206	0.04	0.00	0.00	0.00	13
WET 56 M	PFO	2080206	0.36	0.00	0.06	0.13	13
WET 57 M	PFO	2080206	1.28	0.00	0.09	0.16	14
WET 58 M	PFO	2080206	0.07	0.07	0.07	0.07	14
WET 59 M	PFO	2080206	0.09	0.00	0.00	0.02	15
WET 60 M	PFO	2080206	0.07	0.00	0.00	0.00	17
WET 61 M	PFO	2080206	0.16	0.16	0.16	0.16	18
WET 63 M	PFO	2080206	0.10	0.10	0.10	0.10	18
WET 64 M	PFO	2080206	3.90	3.90	3.90	3.90	18
WET 65 M	PSS	2080206	0.06	0.06	0.06	0.06	18
WET 66 M	PFO	2080206	0.28	0.00	0.13	0.08	18
WET 67 M	PFO	2080206	0.12	0.00	0.00	0.00	18
WET 68 M	PFO	2080206	2.27	0.11	0.30	0.43	18
WET 69 M	PFO	2080206	0.37	0.00	0.02	0.06	18
WET 70 M	PFO	2080206	0.19	0.00	0.04	0.06	19
WET 71 M	PFO	2080206	0.45	0.00	0.18	0.25	19
WET 72 M	PFO	2080206	0.03	0.00	0.00	0.00	19
WET 73 M	PFO	2080206	0.08	0.00	0.01	0.01	19
WET 74 M	PFO	2080206	0.01	0.00	0.00	0.00	19
WET 75 M	PFO	2080206	0.03	0.00	0.00	0.00	19
WET 76 M	PFO	2080206	0.08	0.00	0.00	0.00	20
WET 77 M	PFO	2080206	0.46	0.00	0.06	0.08	20
WET 78 M	PFO	2080206	1.64	0.00	0.00	0.00	20
WET 79 M	PFO	2080206	0.10	0.00	0.03	0.04	20
WET 80 M	PFO	2080206	0.05	0.00	0.00	0.00	20

Surface Waters Impacts Summary Table - Wetlands (Median)

Resource ID	Cowardin Classification	HUC	Acreage in Study Area	Acreage Impacted by Alternatives 1A/2A	Acreage Impacted by Alternatives 1B/2B	Acreage Impacted by Alternative 3	Map Number
WET 81 M	PFO	2080206	0.24	0.00	0.01	0.02	20
WET 82 M	PFO	2080206	0.17	0.00	0.00	0.00	20
WET 83 M	PFO	2080206	0.41	0.00	0.00	0.00	20
WET 84 M	PFO	2080206	0.13	0.00	0.00	0.00	21
WET 85 M	PFO	2080206	0.67	0.01	0.15	0.23	21
WET 86 M	PFO	2080206	0.19	0.00	0.00	0.00	21
WET 87 M	PFO	2080107	0.06	0.00	0.00	0.00	22
WET 88 M	PFO	2080107	0.12	0.00	0.00	0.00	22
WET 89 M	PFO	2080107	0.18	0.00	0.00	0.00	23
WET 90 M	PFO	2080107	0.80	0.00	0.02	0.05	23
WET 91 M	PFO	2080107	0.06	0.00	0.00	0.00	23
WET 92 M	PFO	2080107	0.23	0.00	0.00	0.00	23
WET 93 M	PFO	2080107	0.11	0.00	0.00	0.00	23
WET 94 M	PFO	2080107	0.17	0.00	0.02	0.03	23
WET 95 M	PFO	2080107	0.22	0.05	0.08	0.10	23
WET 134 M	E2EM1P	2080107	0.66	0.66	0.66	0.66	29
WET 135 M	PFO	2080206	0.12	0.12	0.12	0.12	36

Surface Waters Impacts Summary Table - Wetlands (South)

Resource ID	Cowardin Classification	HUC	Acreage in Study Area	Acreage Impacted by Alternatives 1A/2A	Acreage Impacted by Alternatives 1B/2B	Acreage Impacted by Alternative 3	Map Number
WET 1 S	PEM	2080206	0.20	0.02	0.00	0.01	4
WET 2 S	PEM	2080206	0.04	0.04	0.04	0.04	5
WET 3 S	PFO	2080206	0.20	0.04	0.00	0.09	6
WET 4 S	PSS	2080206	0.38	0.02	0.00	0.07	6
WET 5 S	PFO	2080206	0.08	0.03	0.00	0.00	8
WET 6 S	PFO	2080206	1.06	0.49	0.00	0.03	9
WET 7 S	PFO	2080206	0.10	0.05	0.00	0.02	9
WET 8 S	PSS	2080206	0.98	0.61	0.04	0.42	9
WET 9 S	PSS	2080206	0.08	0.00	0.00	0.00	11
WET 10 S	PFO	2080206	0.54	0.00	0.00	0.00	11
WET 11 S	PFO	2080206	0.00	0.00	0.00	0.00	11
WET 12 S	PFO	2080206	0.06	0.00	0.00	0.00	13
WET 13 S	PFO	2080206	0.30	0.00	0.00	0.00	14
WET 14 S	PFO	2080206	0.01	0.00	0.00	0.00	18
WET 15 S	PFO	2080206	0.14	0.02	0.00	0.01	18
WET 17 S	PFO	2080206	0.03	0.00	0.00	0.00	19
WET 18 S	PEM	2080206	0.14	0.00	0.00	0.00	20
WET 19 S	PFO	2080206	0.15	0.00	0.00	0.00	20
WET 20 S	PFO	2080107	0.08	0.00	0.00	0.00	22
WET 21 S	PEM	2080107	0.03	0.00	0.00	0.00	22
WET 22 S	PEM	2080107	0.49	0.00	0.00	0.00	23
WET 23 S	PFO	2080107	0.06	0.00	0.00	0.00	23
WET 24 S	PFO	2080107	0.02	0.00	0.00	0.00	23
WET 25 S	PFO	2080107	0.14	0.00	0.00	0.00	23
WET 26 S	PFO	2080206	0.19	0.11	0.04	0.06	34
WET 27 S	PFO	2080108	0.14	0.14	0.14	0.14	39
WET 28 S	PEM	2080108	1.32	1.32	1.32	1.32	42
WET 29 S	E2EM1P	2080108	11.03	10.41	11.03	11.03	43
WET 30 S	E2EM1P	2080108	9.25	9.25	8.64	8.64	43
WET 31 S	PFO	2080107	0.19	0.06	0.01	0.03	28
WET 32 S	PEM	2080206	5.16	0.41	0.13	0.21	33

Surface Waters Impacts Summary Table - Wetlands (South)

Resource ID	Cowardin Classification	HUC	Acreage in Study Area	Acreage Impacted by Alternatives 1A/2A	Acreage Impacted by Alternatives 1B/2B	Acreage Impacted by Alternative 3	Map Number
WET 33 S	E2EM1P	2080107	1.45	0.63	0.40	0.46	29
WET 34 S	PEM	2080206	0.15	0.11	0.01	0.15	6
WET 35 S	PFO	2080206	0.11	0.00	0.00	0.00	13
WET 36 S	PFO	2080206	0.03	0.00	0.00	0.00	19
WET 37 S	PFO	2080206	0.01	0.00	0.00	0.00	19
WET 38 S	PFO	2080206	0.03	0.00	0.00	0.00	19
WET 39 S	PFO	2080206	0.10	0.00	0.00	0.00	19
WET 41 S	PFO	2080107	0.01	0.00	0.00	0.00	23
WET 43 S	PFO	2080206	0.01	0.01	0.00	0.01	37
WET 56 S	PEM	2080206	0.03	0.00	0.00	0.00	20
WET 96 S	PSS	2080206	0.39	0.24	0.24	0.24	10
WET 97 S	PFO	2080206	0.08	0.00	0.00	0.00	13
WET 98 S	PEM	2080206	0.08	0.00	0.00	0.00	14
WET 99 S	PFO	2080206	0.05	0.00	0.00	0.00	16
WET 100 S	PSS	2080206	0.04	0.00	0.00	0.00	16
WET 101 S	PSS	2080206	0.04	0.00	0.00	0.00	17
WET 102 S	PFO	2080206	0.24	0.00	0.00	0.00	19
WET 103 S	PFO	2080206	0.30	0.00	0.00	0.00	19
WET 104 S	PEM	2080206	0.02	0.00	0.00	0.00	20
WET 105 S	PFO	2080206	0.16	0.00	0.00	0.00	20
WET 106 S	PFO	2080206	0.66	0.00	0.00	0.00	21
WET 107 S	PFO	2080206	0.03	0.03	0.03	0.03	21
WET 108 S	PEM	2080107	0.11	0.00	0.00	0.00	22
WET 109 S	PEM	2080107	0.06	0.06	0.06	0.06	24
WET 111 S	PEM	2080107	0.04	0.00	0.00	0.00	22
WET 112 S	PFO	2080107	0.26	0.00	0.00	0.00	23
WET 113 S	PFO	2080107	0.08	0.02	0.00	0.00	25
WET 115 S	PFO	2080107	0.14	0.03	0.00	0.00	29
WET 116 S	PEM	2080107	0.63	0.63	0.63	0.63	30
WET 123 S	PFO	2080206	0.21	0.21	0.21	0.21	35
WET 124 S	PFO	2080206	0.20	0.20	0.20	0.20	35

Surface Waters Impacts Summary Table - Wetlands (South)

Resource ID	Cowardin Classification	HUC	Acreage in Study Area	Acreage Impacted by Alternatives 1A/2A	Acreage Impacted by Alternatives 1B/2B	Acreage Impacted by Alternative 3	Map Number
WET 125 S	PFO	2080206	0.06	0.00	0.00	0.00	36
WET 133 S	PFO	2080206	0.88	0.88	0.88	0.88	34
WET 142 S	PEM	2080107	0.14	0.14	0.14	0.14	31
WET 143 S	PFO	2080206	0.05	0.05	0.05	0.05	34
WET 144 S	PFO	2080206	0.96	0.96	0.96	0.96	35
WET 145 S	PEM	2080206	0.57	0.57	0.57	0.57	35
WET 146 S	PFO	2080206	0.28	0.28	0.28	0.28	35
WET 147 S	PFO	2080108	2.18	2.18	2.18	2.18	38
WET 148 S	PEM	2080108	2.06	2.06	2.06	2.06	39
WET 149 S	PFO	2080108	0.47	0.47	0.47	0.47	40

Surface Water Impacts Summary Table - Other Waters of the United States (North)

Resource ID	Cowardin Classification	HUC	Linear Feet in Study Area	Linear Feet Impacted by Alternatives 1A/2A	Linear Feet Impacted by Alternatives 1B/2B	Linear Feet Impacted by Alternative 3	Map Number
WUS 1 N	R1UB2	2080108	4073	2657	2594	2594	43
WUS 2 N	R2UB3	2080108	3181	3181	3181	3181	43
WUS 3 N	R2UB2	2080108	791	790	790	163	43
WUS 4 N	R2UB2	2080108	1068	1068	1068	1068	41
WUS 5 N	R2UB2	2080108	290	290	290	290	41
WUS 6 N	R2UB2	2080108	114	114	114	114	41
WUS 7 N	R2UB2	2080108	9869	9869	9869	9242	40
WUS 8 N	R2UB2	2080108	4524	4524	4524	4524	40
WUS 9 N	R2UB2	2080108	786	786	786	786	39
WUS 10 N	R2UB2	2080108	266	266	266	266	39
WUS 11 N	R2UB2	2080108	244	244	244	244	38
WUS 12 N	R2UB2	2080206	708	708	708	708	37
WUS 13 N	R2UB2	2080206	97	0	0	0	36
WUS 14 N	R2UB2	2080206	782	16	0	14	36
WUS 15 N	R2UB2	2080206	500	0	0	0	36
WUS 16 N	R2UB2	2080206	2314	2314	2314	2314	35
WUS 17 N	R2UB2	2080206	42	42	42	42	35
WUS 18 N	R2UB2	2080206	1203	1203	1203	1203	35
WUS 19 N	R2UB2	2080206	22	0	0	0	34
WUS 20 N	R2UB2	2080206	43	0	0	0	34
WUS 23 N	R2UB2	2080206	81	0	0	0	33
WUS 24 N	R2UB2	2080206	92	0	0	0	33
WUS 27 N	R2UB2	2080107	509	484	484	484	31
WUS 28 N	R2UB2	2080107	158	158	158	158	30
WUS 31 N	R2UB2	2080107	13	0	0	0	29
WUS 34 N	R1UB2	2080107	176	176	176	176	29
WUS 35 N	R2UB2	2080107	343	343	343	343	28
WUS 39 N	R2UB2	2080107	155	0	0	0	23
WUS 40 N	R2UB2	2080107	29	0	0	0	23
WUS 42 N	R2UB2	2080107	12	0	0	0	23
WUS 47 N	R4UB2	2080206	61	0	0	0	20

Surface Water Impacts Summary Table - Other Waters of the United States (North)

Resource ID	Cowardin Classification	HUC	Linear Feet in Study Area	Linear Feet Impacted by Alternatives 1A/2A	Linear Feet Impacted by Alternatives 1B/2B	Linear Feet Impacted by Alternative 3	Map Number
WUS 48 N	R2UB2	2080206	65	0	0	0	19
WUS 49 N	R2UB2	2080206	19	0	0	0	19
WUS 50 N	R2UB2	2080206	308	0	0	0	19
WUS 53 N	R2UB2	2080206	102	102	84	102	18
WUS 54 N	R2UB2	2080206	54	0	0	0	18
WUS 57 N	R2UB2	2080206	87	0	0	0	16
WUS 59 N	R2UB2	2080206	218	0	0	0	13
WUS 60 N	R2UB2	2080206	19	0	0	0	13
WUS 62 N	R2UB2	2080206	77	0	0	0	12
WUS 64 N	R2UB2	2080206	215	0	0	0	11
WUS 66 N	R2UB2	2080206	779	494	494	494	10
WUS 68 N	R4UB2	2080206	5375	3553	3530	3832	5
WUS 69 N	R2UB2	2080206	1092	1092	1092	1092	5
WUS 70 N	R2UB2	2080206	156	156	156	156	5
WUS 72 N	R2UB2	2080206	299	263	263	263	4
WUS 73 N	R2UB2	2080206	388	388	388	388	4
WUS 197 N	R2UB2	2080107	332	332	332	332	30
WUS 214 N	R2UB2	2080107	203	203	203	203	24
WUS 215 N	R4UB2	2080107	669	669	669	669	24
WUS 216 N	R2UB2	2080206	24	4	4	4	12
WUS 220 N	R2UB2	2080206	34	0	0	0	7
WUS 221 N	R4UB2	2080206	367	340	340	340	7
WUS 222 N	EPHEMERAL	2080206	52	52	52	52	7
WUS 223 N	R2UB2	2080206	735	652	652	652	7
WUS 224 N	R2UB2	2080206	44	0	0	0	7
WUS 231 N	R4UB2	2080108	29	29	29	29	39
WUS 232 N	R2UB2	2080107	129	129	129	129	30
WUS 233 N	R2UB2	2080107	97	97	97	97	30
WUS 236 N	R2UB2	2080107	1	0	0	0	29
WUS 237 N	R2UB2	2080107	80	9	9	2	25
WUS 238 N	R2UB2	2080107	64	5	0	0	25

Surface Water Impacts Summary Table - Other Waters of the United States (North)

Resource ID	Cowardin Classification	HUC	Linear Feet in Study Area	Linear Feet Impacted by Alternatives 1A/2A	Linear Feet Impacted by Alternatives 1B/2B	Linear Feet Impacted by Alternative 3	Map Number
WUS 239 N	R2UB2	2080107	223	0	0	0	23
WUS 240 N	R4UB2	2080107	22	0	0	0	22
WUS 241 N	R2UB2	2080206	81	0	0	0	21
WUS 242 N	R2UB2	2080206	56	0	0	0	19
WUS 243 N	R2UB2	2080206	102	0	0	0	19
WUS 245 N	R2UB2	2080206	2	0	0	0	16
WUS 246 N	R2UB2	2080206	30	0	0	0	16
WUS 247 N	R2UB2	2080206	35	0	0	0	8
WUS 248 N	R2UB2	2080206	475	0	0	0	7
WUS 249 N	R2UB2	2080206	26	0	0	0	3
WUS 250 N	R2UB2	2080206	155	0	0	0	3
WUS 251 N	R2UB2	2080206	338	338	338	338	3
WUS 252 N	R2UB2	2080206	137	137	137	137	3
WUS 253 N	R2UB2	2080206	262	262	262	262	3
WUS 254 N	R2UB2	2080206	2	0	0	0	15
WUS 255 N	R2UB2	2080206	24	0	0	0	13
WUS 256 N	R2UB2	2080206	8	0	0	0	13
WUS 257 N	R2UB2	2080206	20	0	0	0	12
WUS 258 N	R2UB2	2080206	23	0	0	0	12
WUS 259 N	R2UB2	2080206	19	0	0	0	11
WUS 260 N	R2UB2	2080206	31	0	0	0	11
WUS 262 N	R2UB2	2080206	39	0	0	0	10
WUS 263 N	R2UB2	2080206	110	110	110	110	4
WUS 264 N	R4UB2	2080206	24	0	0	0	4
WUS 265 N	R2UB2	2080206	46	0	0	10	3
WUS 266 N	R2UB2	2080206	953	953	953	953	3
WUS 267 N	R4UB3	2080206	67	0	0	0	4
WUS 268 N	R2UB2	2080206	39	0	0	0	14
WUS 269 N	R2UB2	2080206	4	0	0	0	21
WUS 270 N	R2UB2	2080107	152	152	152	152	30
WUS 271 N	R2UB2	2080206	59	28	11	28	34

Surface Water Impacts Summary Table - Other Waters of the United States (North)

Resource ID	Cowardin Classification	HUC	Linear Feet in Study Area	Linear Feet Impacted by Alternatives 1A/2A	Linear Feet Impacted by Alternatives 1B/2B	Linear Feet Impacted by Alternative 3	Map Number
WUS 272 N	R2UB2	2080206	34	34	34	34	35
WUS 273 N	R2UB2	2080206	43	0	0	0	32
WUS 276 N	R2UB2	2080206	315	315	315	315	2
WUS 281 N	R2UB2	2080108	1262	1262	1262	1262	41
WUS 282 N	R2UB2	2080108	236	236	236	236	42
WUS 283 N	R2UB2	2080108	4627	4627	4627	4627	39
WUS 284 N	R2UB2	2080108	2523	2375	2375	2375	42
WUS 285 N	R2UB2	2080108	5110	5110	5110	5110	38
WUS 286 N	R2UB2	2080206	1234	0	0	0	37
WUS 287 N	R2UB2	2080206	337	337	337	337	5
WUS 289 N	R2UB2	2080206	72	0	0	0	15
WUS 290 N	R2UB2	2080206	306	0	0	0	18
WUS 291 N	R2UB2	2080206	129	0	0	0	18
WUS 292 N	R4UB2	2080107	36	36	36	36	26
WUS 293 N	EPHEMERAL	2080107	252	252	252	252	26
WUS 294 N	R4UB2	2080107	281	281	281	281	26
WUS 295 N	R4UB2	2080107	32	32	32	32	26
WUS 296 N	R2UB2	2080107	48	48	48	48	30
WUS 298 N	R4UB2	2080107	610	610	610	610	31
WUS 300 N	EPHEMERAL	2080206	22	22	8	21	33
WUS 307 N	R2UB2	2080206	82	82	82	82	35
WUS 308 N	R2UB1	2080206	26	0	0	6	37
WUS 312 N	R2UB1	2080108	125	125	125	125	39
WUS 313 N	R2UB1	2080108	381	381	381	381	39
WUS 314 N	R2UB1	2080108	28	28	28	24	40

Surface Water Impacts Summary Table - Other Waters of the United States (Median)

Resource ID	Cowardin Classification	HUC	Linear Feet in Study Area	Linear Feet Impacted by Alternatives 1A/2A	Linear Feet Impacted by Alternatives 1B/2B	Linear Feet Impacted by Alternative 3	Map Number
WUS 14 M	R2UB2	2080206	39	39	39	39	36
WUS 70 M	R2UB2	2080206	76	76	76	0	9
WUS 71 M	R2UB2	2080206	57	57	57	57	9
WUS 72 M	R2UB2	2080206	79	79	79	79	9
WUS 73 M	R2UB2	2080206	64	64	64	64	9
WUS 74 M	R2UB2	2080206	68	0	0	2	11
WUS 75 M	R2UB3	2080206	65	0	0	4	11
WUS 76 M	R2UB2	2080206	79	0	3	17	11
WUS 77 M	R2UB3	2080206	32	0	0	0	11
WUS 78 M	R2UB2	2080206	105	0	0	0	11
WUS 79 M	R2UB2	2080206	69	0	0	0	11
WUS 80 M	R2UB3	2080206	83	83	83	83	12
WUS 81 M	R2UB2	2080206	28	0	0	6	13
WUS 82 M	R2UB2	2080206	30	0	1	9	13
WUS 83 M	R4UB2	2080206	102	0	0	0	13
WUS 84 M	R2UB3	2080206	101	13	37	46	13
WUS 85 M	R2UB2	2080206	157	0	4	17	14
WUS 86 M	R2UB2	2080206	136	0	28	37	14
WUS 87 M	R2UB2	2080206	112	112	112	112	14
WUS 88 M	EPHEMERAL	2080206	151	151	151	151	14
WUS 89 M	R2UB3	2080206	72	0	42	58	15
WUS 90 M	R4UB2	2080206	106	0	41	59	15
WUS 91 M	R4UB2	2080206	113	11	19	29	16
WUS 92 M	R4UB2	2080206	42	0	0	0	17
WUS 93 M	R2UB3	2080206	70	0	0	7	17
WUS 94 M	R2UB2	2080206	56	0	0	0	17
WUS 95 M	EPHEMERAL	2080206	179	11	29	39	17
WUS 96 M	R2UB2	2080206	60	0	0	0	17
WUS 97 M	EPHEMERAL	2080206	134	0	0	0	17
WUS 98 M	EPHEMERAL	2080206	219	219	219	219	17
WUS 99 M	R2UB2	2080206	267	267	267	267	18

Surface Water Impacts Summary Table - Other Waters of the United States (Median)

Resource ID	Cowardin Classification	HUC	Linear Feet in Study Area	Linear Feet Impacted by Alternatives 1A/2A	Linear Feet Impacted by Alternatives 1B/2B	Linear Feet Impacted by Alternative 3	Map Number
WUS 100 M	R2UB2	2080206	804	804	804	804	18
WUS 101 M	R2UB2	2080206	78	78	78	78	18
WUS 102 M	R2UB2	2080206	275	275	275	275	18
WUS 103 M	R2UB2	2080206	78	78	78	78	18
WUS 104 M	R2UB2	2080206	1165	1165	1165	1165	18
WUS 105 M	R2UB2	2080206	188	188	188	188	18
WUS 106 M	R2UB3	2080206	77	77	77	77	18
WUS 107 M	R2UB2	2080206	182	182	182	182	18
WUS 108 M	R2UB2	2080206	398	398	398	398	18
WUS 109 M	R2UB2	2080206	189	0	12	20	18
WUS 110 M	R2UB2	2080206	1382	0	589	669	18
WUS 111 M	R2UB2	2080206	298	61	89	114	18
WUS 112 M	R2UB2	2080206	98	0	17	26	19
WUS 113 M	R2UB2	2080206	47	0	47	47	19
WUS 114 M	R2UB2	2080206	109	0	54	67	19
WUS 115 M	R4UB2	2080206	333	79	333	333	19
WUS 116 M	R2UB2	2080206	111	0	31	42	19
WUS 117 M	R2UB2	2080206	326	0	92	177	19
WUS 118 M	R2UB2	2080206	188	0	0	9	19
WUS 119 M	R2UB2	2080206	265	0	15	25	19
WUS 120 M	R2UB2	2080206	195	0	0	0	20
WUS 121 M	R2UB2	2080206	365	33	125	143	20
WUS 122 M	R2UB2	2080206	1633	0	0	0	20
WUS 123 M	R2UB2	2080206	141	4	16	25	20
WUS 124 M	R2UB2	2080206	472	149	249	259	20
WUS 125 M	R2UB2	2080206	443	7	22	30	20
WUS 126 M	R2UB2	2080206	118	0	0	0	20
WUS 127 M	R2UB2	2080206	294	0	0	0	20
WUS 128 M	R2UB2	2080206	165	0	0	0	20
WUS 129 M	R2UB2	2080206	91	0	0	0	20
WUS 130 M	R4UB2	2080206	142	0	0	0	20

Surface Water Impacts Summary Table - Other Waters of the United States (Median)

Resource ID	Cowardin Classification	HUC	Linear Feet in Study Area	Linear Feet Impacted by Alternatives 1A/2A	Linear Feet Impacted by Alternatives 1B/2B	Linear Feet Impacted by Alternative 3	Map Number
WUS 131 M	R2UB2	2080206	143	0	0	0	21
WUS 132 M	R2UB2	2080206	724	27	223	240	21
WUS 133 M	R2UB2	2080206	48	0	24	33	21
WUS 134 M	R4UB2	2080206	39	0	0	0	21
WUS 135 M	R4UB2	2080206	148	0	0	0	21
WUS 136 M	R2UB2	2080206	744	1	19	27	21
WUS 137 M	R2UB2	2080107	691	691	691	691	22
WUS 138 M	R2UB2	2080107	126	0	0	0	22
WUS 139 M	R2UB2	2080107	129	0	0	8	22
WUS 140 M	R4UB2	2080107	175	0	35	44	22
WUS 141 M	R2UB2	2080107	182	0	3	13	22
WUS 142 M	R2UB2	2080107	326	0	23	37	23
WUS 143 M	R2UB2	2080107	252	0	0	0	23
WUS 144 M	R2UB2	2080107	206	0	11	19	23
WUS 145 M	R2UB2	2080107	229	0	0	3	23
WUS 146 M	R2UB2	2080107	118	0	3	11	23
WUS 147 M	R2UB2	2080107	283	0	0	0	23
WUS 148 M	R2UB2	2080107	484	44	255	264	23
WUS 149 M	R2UB2	2080107	97	0	14	22	23
WUS 150 M	R2UB2	2080107	118	32	49	59	23
WUS 151 M	R2UB2	2080107	36	36	36	36	30
WUS 152 M	R2UB2	2080107	123	123	123	123	30
WUS 153 M	R2UB2	2080107	19	19	19	19	30
WUS 277 M	R2UB1	2080206	27	27	27	27	2
WUS 278 M	L2UBHh	2080206	115	115	115	115	34
WUS 279 M	R1UB2	2080107	98	98	98	98	29

Surface Water Impacts Summary Table - Other Waters of the United States (South)

Resource ID	Cowardin Classification	HUC	Linear Feet in Study Area	Linear Feet Impacted by Alternatives 1A/2A	Linear Feet Impacted by Alternatives 1B/2B	Linear Feet Impacted by Alternative 3	Map Number
WUS 1 S	R2UB1	2080206	1388	1388	1388	1388	2
WUS 2 S	R2UB1	2080206	1911	1911	1911	1911	3
WUS 3 S	R2UB1	2080206	39	13	13	39	4
WUS 4 S	R2UB3	2080206	65	19	0	18	4
WUS 5 S	R2UB1	2080206	157	0	0	0	7
WUS 6 S	R2UB1	2080206	41	0	0	0	8
WUS 7 S	R2UB3	2080206	70	49	26	31	9
WUS 8 S	R2UB1	2080206	443	433	433	433	9
WUS 9 S	R2UB3	2080206	44	0	0	0	11
WUS 10 S	R2UB3	2080206	161	0	0	0	11
WUS 11 S	R2UB2	2080206	35	0	0	0	13
WUS 12 S	R2UB3	2080206	65	0	0	0	14
WUS 13 S	R2UB2	2080206	599	534	534	534	18
WUS 14 S	R2UB2	2080206	36	0	0	0	18
WUS 15 S	R2UB2	2080206	54	0	0	0	18
WUS 16 S	R2UB2	2080206	91	14	0	0	18
WUS 17 S	R2UB2	2080206	108	0	0	0	19
WUS 18 S	R2UB2	2080206	75	0	0	0	20
WUS 19 S	R2UB2	2080206	122	0	0	0	20
WUS 20 S	R2UB2	2080206	43	0	0	0	20
WUS 21 S	R2UB2	2080107	69	0	0	0	22
WUS 22 S	R2UB2	2080107	129	0	0	0	22
WUS 23 S	R2UB2	2080107	115	8	0	0	23
WUS 24 S	R2UB2	2080107	86	0	0	0	23
WUS 25 S	R1UB2	2080107	120	81	65	68	29
WUS 26 S	R2UB3	2080107	931	931	931	931	30
WUS 27 S	R2UB2	2080206	79	0	0	0	33
WUS 28 S	R2UB2	2080206	352	0	0	0	33
WUS 29 S	R2UB2	2080206	748	700	680	687	34
WUS 30 S	R2UB2	2080206	557	557	557	557	34
WUS 33 S	R2UB2	2080206	124	53	15	39	36

Surface Water Impacts Summary Table - Other Waters of the United States (South)

Resource ID	Cowardin Classification	HUC	Linear Feet in Study Area	Linear Feet Impacted by Alternatives 1A/2A	Linear Feet Impacted by Alternatives 1B/2B	Linear Feet Impacted by Alternative 3	Map Number
WUS 34 S	R2UB1	2080108	59	59	59	59	38
WUS 35 S	R2UB2	2080108	5911	5911	5911	5911	38
WUS 36 S	R2UB2	2080108	465	465	465	465	41
WUS 37 S	R2UB2	2080108	562	562	562	562	41
WUS 38 S	R2UB2	2080108	613	613	613	613	41
WUS 40 S	R2UB2	2080108	209	209	209	209	39
WUS 41 S	R2UB1	2080108	628	628	628	628	39
WUS 42 S	R2UB2	2080108	3679	3679	3679	3679	39
WUS 43 S	R2UB2	2080108	14596	13940	13940	13509	40
WUS 44 S	R2UB3	2080108	3577	2362	2362	1992	41
WUS 46 S	R2UB3	2080108	3230	1422	1422	905	42
WUS 47 S	R2UB1	2080108	956	0	0	0	42
WUS 49 S	R2UB3	2080108	1921	1638	1654	1654	43
WUS 50 S	R2UB2	2080206	54	0	0	0	15
WUS 51 S	R2UB1	2080206	37	9	0	0	32
WUS 52 S	EPHEMERAL	2080206	92	0	0	0	19
WUS 53 S	EPHEMERAL	2080206	94	0	0	0	19
WUS 54 S	R2UB2	2080206	606	0	0	0	20
WUS 56 S	R2UB2	2080107	76	0	0	0	23
WUS 57 S	EPHEMERAL	2080206	79	0	0	0	33
WUS 58 S	R2UB2	2080206	569	441	369	408	36
WUS 59 S	EPHEMERAL	2080206	1219	1219	1219	1219	36
WUS 60 S	EPHEMERAL	2080206	115	68	0	39	36
WUS 61 S	EPHEMERAL	2080206	239	239	239	239	36
WUS 154 S	R2UB2	2080107	474	474	474	474	30
WUS 155 S	R2UB2	2080107	53	53	53	53	30
WUS 156 S	R2UB1	2080206	85	34	34	45	3
WUS 157 S	R2UB2	2080206	49	0	0	49	3
WUS 158 S	R2UB2	2080206	182	182	182	182	5
WUS 159 S	R2UB2	2080206	97	38	18	52	6
WUS 160 S	R2UB2	2080206	42	34	0	26	8

Surface Water Impacts Summary Table - Other Waters of the United States (South)

Resource ID	Cowardin Classification	HUC	Linear Feet in Study Area	Linear Feet Impacted by Alternatives 1A/2A	Linear Feet Impacted by Alternatives 1B/2B	Linear Feet Impacted by Alternative 3	Map Number
WUS 161 S	R2UB2	2080206	58	58	58	58	10
WUS 162 S	R2UB2	2080206	41	0	0	0	11
WUS 163 S	R2UB2	2080206	77	0	0	0	11
WUS 164 S	R2UB2	2080206	33	0	0	0	12
WUS 165 S	R2UB2	2080206	17	0	0	0	12
WUS 166 S	R2UB2	2080206	43	0	0	0	12
WUS 167 S	R2UB2	2080206	34	0	0	0	13
WUS 168 S	R2UB2	2080206	52	0	0	0	13
WUS 169 S	R2UB2	2080206	542	0	0	0	13
WUS 170 S	R2UB2	2080206	62	0	0	0	14
WUS 171 S	R2UB2	2080206	108	0	0	0	15
WUS 172 S	R4UB2	2080206	338	0	0	0	15
WUS 173 S	R2UB2	2080206	47	0	0	0	16
WUS 174 S	R2UB1	2080206	2743	2743	2743	2743	5
WUS 175 S	R2UB2	2080206	72	7	0	0	9
WUS 177 S	R2UB2	2080206	47	0	0	0	16
WUS 178 S	R2UB2	2080206	23	0	0	0	16
WUS 179 S	R2UB2	2080206	10	0	0	0	17
WUS 180 S	R2UB2	2080206	51	0	0	0	17
WUS 183 S	R2UB2	2080206	97	33	17	23	19
WUS 184 S	R2UB2	2080206	104	0	0	0	19
WUS 185 S	R2UB2	2080206	89	0	0	0	19
WUS 187 S	R2UB2	2080206	100	0	0	0	20
WUS 188 S	R2UB2	2080206	76	0	0	0	21
WUS 189 S	R2UB2	2080206	379	8	0	2	21
WUS 190 S	R4UB2	2080206	111	17	3	6	21
WUS 191 S	R2UB2	2080206	36	36	36	36	21
WUS 192 S	R2UB2	2080107	72	0	0	0	22
WUS 193 S	EPHEMERAL	2080107	46	0	0	0	28
WUS 195 S	R4UB2	2080107	83	0	0	0	22
WUS 196 S	R4UB2	2080107	79	0	0	0	22

Surface Water Impacts Summary Table - Other Waters of the United States (South)

Resource ID	Cowardin Classification	HUC	Linear Feet in Study Area	Linear Feet Impacted by Alternatives 1A/2A	Linear Feet Impacted by Alternatives 1B/2B	Linear Feet Impacted by Alternative 3	Map Number
WUS 197 S	R2UB2	2080107	182	0	0	0	23
WUS 198 S	R2UB2	2080107	65	0	0	0	23
WUS 199 S	R2UB2	2080107	104	0	0	0	23
WUS 200 S	EPHEMERAL	2080107	37	37	37	37	28
WUS 204 S	R2UB2	2080107	36	20	0	0	29
WUS 205 S	R2UB2	2080107	47	3	0	0	29
WUS 206 S	R2UB2	2080107	94	41	0	0	29
WUS 207 S	R2UB2	2080107	186	50	0	0	29
WUS 208 S	R2UB2	2080107	67	43	25	25	30
WUS 209 S	R2UB2	2080107	100	98	99	100	30
WUS 210 S	R2UB2	2080107	238	238	238	238	30
WUS 211 S	R2UB2	2080206	51	44	30	33	33
WUS 212 S	R2UB2	2080206	42	23	5	10	33
WUS 213 S	R2UB2	2080206	85	59	36	40	34
WUS 225 S	R2UB2	2080206	66	66	66	66	35
WUS 227 S	R2UB2	2080206	120	0	0	14	37
WUS 228 S	R2UB2	2080206	110	110	110	110	37
WUS 229 S	R2UB3	2080108	126	126	126	126	39
WUS 230 S	R2UB3	2080108	168	168	168	168	39
WUS 274 S	R2UB2	2080206	55	0	0	0	10
WUS 275 S	R2UB2	2080206	384	384	384	384	2
WUS 278 S	R2UB2	2080206	119	12	22	28	20
WUS 280 S	L2UBHh	2080206	57	57	57	57	34
WUS 288 S	R2UB2	2080206	435	74	0	311	6
WUS 297 S	R2UB2	2080107	725	725	725	725	30
WUS 299 S	R4UB2	2080107	150	150	150	150	31
WUS 302 S	R4UB2	2080206	261	261	261	261	34
WUS 303 S	R4UB2	2080206	108	108	108	108	35
WUS 304 S	R4UB2	2080206	288	288	288	288	35
WUS 305 S	R2UB2	2080206	65	65	65	65	35
WUS 306 S	R4UB2	2080206	889	889	889	889	35

Surface Water Impacts Summary Table - Other Waters of the United States (South)

Resource ID	Cowardin Classification	HUC	Linear Feet in Study Area	Linear Feet Impacted by Alternatives 1A/2A	Linear Feet Impacted by Alternatives 1B/2B	Linear Feet Impacted by Alternative 3	Map Number
WUS 309 S	R4UB2	2080108	1412	1412	1412	1412	38
WUS 310 S	EPHEMERAL	2080108	870	870	870	870	39
WUS 315 S	R2UB1	2080108	14	0	0	0	40

INTERSTATE 64 PENINSULA STUDY

APPENDIX G

VDEQ 2010 Impared Waters (Categories 4 and 5) Summary Tables

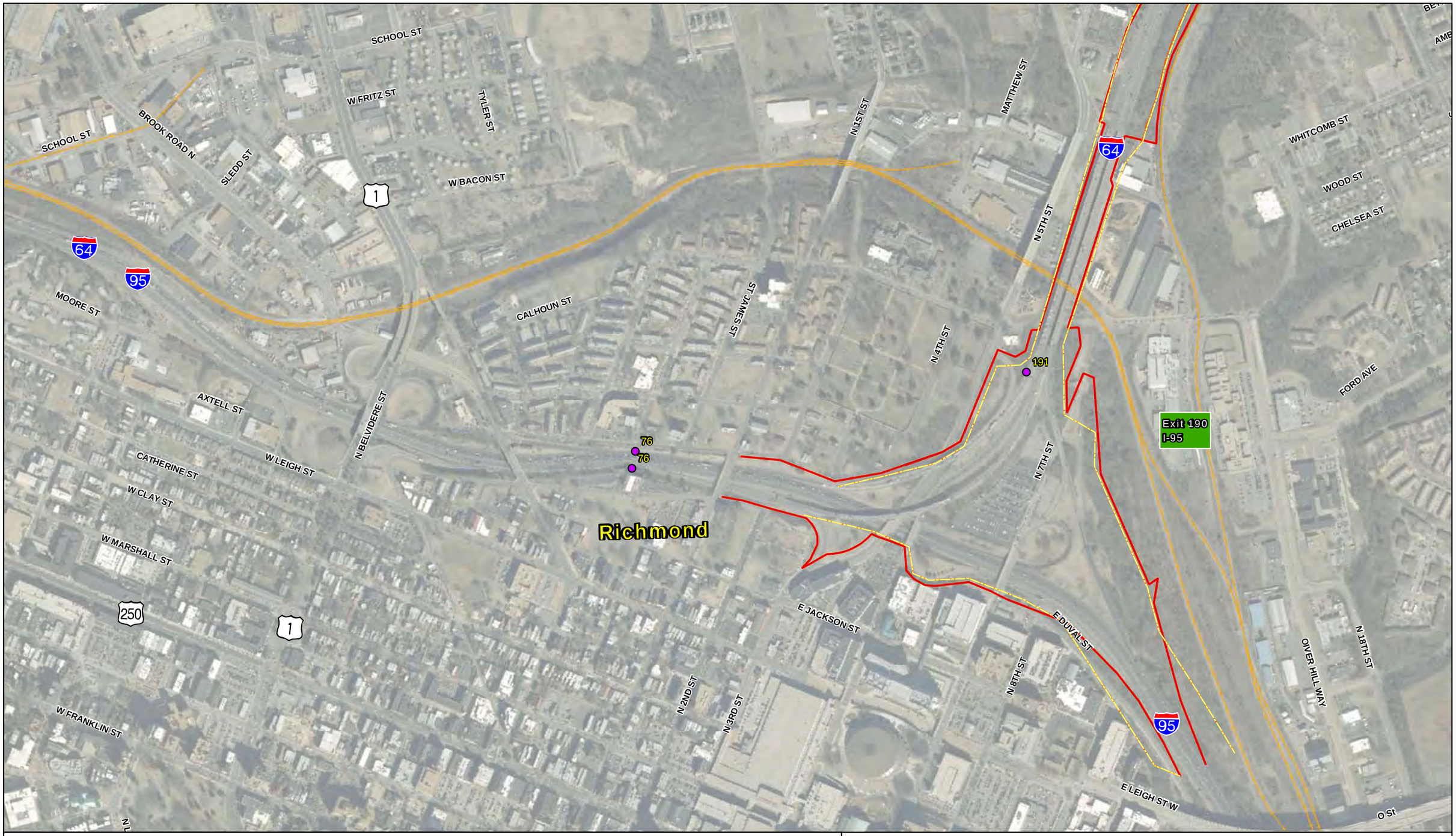
VDEQ 2010 Impaired Waters (Categories 4 and 5) Summary Table

Map Sheet	Project Corridor Locality	Basin	Water Name	Cause Group Code	Designated Use	Cause Category	Cause Name	Impairment Source(s)	Cycle First Listed	TMDL Schedule
3	Henrico	James	Gillies Creek	G01R-06-BAC	Recreation	5A	*Escherichia coli*	Unknown; Combined Sewer Overflows	2008	2016
				G01R-06-PH	Aquatic Life	5A	pH	Unknown	2004	2016
3 & 4	Henrico	James	Stony Run	G01R-19-BAC	Recreation	5A	*Escherichia coli*	Unknown	2008	2020
14	New Kent	James	Rumley Marsh	G07R-02-DO	Aquatic Life	5C	Dissolved Oxygen	Natural Conditions - Water Quality Standards Use Attainability Analyses Needed	2002	2014
				G07R-02-PH	Aquatic Life	5C	pH	Natural Conditions - Water Quality Standards Use Attainability Analyses Needed	2010	2022
15 & 16	New Kent	James	Diascund Creek	G09R-02-BAC	Recreation	5A	*Escherichia coli*	Unknown	2008	2020
				G09R-02-DO	Aquatic Life	5C	Dissolved Oxygen	Natural Conditions - Water Quality Standards Use Attainability Analyses Needed	2008	2020
18 & 19	New Kent	James	Beaverdam Creek	G09R-01-DO	Aquatic Life	5C	Dissolved Oxygen	Natural Conditions - Water Quality Standards Use Attainability Analyses Needed	2002	2014
28 & 29	York	York	Queen Creek	F26E-01-PCB	Fish Consumption	5A	PCB in Fish Tissue	Unknown	2006	2018
				F26E-03-BAC	Recreation	4A	*Enterococcus*	Unknown	2002	2010
				F26E-16-SF	Shellfishing	4A	Fecal Coliform	Unknown	1998	2010
				YRKMH-DO-BAY	Aquatic Life; Open-Water Aquatic Life	5A	Dissolved Oxygen	Sources Outside State Jurisdiction or Borders; Internal Nutrient Recycling; Municipal Point Source Discharges; Atmospheric Deposition - Nitrogen; Agriculture; Loss of Riparian Habitat; Wet Weather Discharges (Non-Point Source; Point Source & Combination of Stormwater, SSO or CSO); Industrial Point Source Discharge	1998	2010
				YRKMH-SAV-BAY	Aquatic Life; Shallow-Water SAV	5A	Aquatic Plants (Macrophytes)	Loss of Riparian Habitat; Atmospheric Deposition - Nitrogen; Internal Nutrient Recycling; Industrial Point Source Discharge; Agriculture; Sediment Resuspension (Clean Sediment); Wet Weather Discharges (Non-Point Source; Point Source & Combination of Stormwater, SSO or CSO); Clean Sediments; Municipal Point Source Discharges; Sources Outside State Jurisdiction or Borders	2006	2010
34 & 35	Newport News	James	Lee Hall Reservoir (Newport News Reservoir)	G11L-01-CU	Aquatic Life	5A	Copper	Unknown	2004	2016
					Wildlife	5A	Copper	Unknown	2004	2016
				G11L-01-DO	Aquatic Life	5A	Dissolved Oxygen	Unknown	2006	2018
				G11L-01-HG	Fish Consumption	5A	Mercury in Fish Tissue	Unknown	2010	2022
				G11L-01-PCB	Fish Consumption	5A	PCB in Fish Tissue	Unknown	2010	2022
43	Hampton	Chesapeake Bay / Atlantic / Small Coastal	Newmarket Creek - Lower	MOBPH-DO-BAY	Aquatic Life; Open-Water Aquatic Life	5A	Dissolved Oxygen	Wet Weather Discharges (Non-Point Source; Point Source & Combination of Stormwater, SSO or CSO); Industrial Point Source Discharge; Sources Outside State Jurisdiction or Borders; Loss of Riparian Habitat; Municipal Point Source Discharges; Atmospheric Deposition - Nitrogen; Internal Nutrient Recycling; Agriculture	2004	2010
				MOBPH-SAV-BAY	Aquatic Life; Shallow-Water SAV	5A	Aquatic Plants (Macrophytes)	Clean Sediments; Sources Outside State Jurisdiction or Borders; Sediment Resuspension (Clean Sediment); Internal Nutrient Recycling; Atmospheric Deposition - Nitrogen; Agriculture; Municipal Point Source Discharges; Wet Weather Discharges (Non-Point Source; Point Source & Combination of Stormwater, SSO or CSO); Industrial Point Source Discharge; Loss of Riparian Habitat	2006	2010
				C07E-01-PCB	Fish Consumption	5A	PCB in Fish Tissue	Unknown	2006	2018
				C07E-02-BAC	Recreation	4A	*Enterococcus*	Unknown	2006	2010
				C07E-22-SF	Shellfishing	4A	Fecal Coliform	Discharges from Municipal Separate Storm Sewer Systems (MS4); Unknown	1998	2010
43	Hampton	Chesapeake Bay / Atlantic / Small Coastal	Newmarket Creek - Upper	MOBPH-DO-BAY	Aquatic Life; Open-Water Aquatic Life	5A	Dissolved Oxygen	Wet Weather Discharges (Non-Point Source; Point Source & Combination of Stormwater, SSO or CSO); Industrial Point Source Discharge; Sources Outside State Jurisdiction or Borders; Loss of Riparian Habitat; Municipal Point Source Discharges; Atmospheric Deposition - Nitrogen; Internal Nutrient Recycling; Agriculture	2004	2010
				MOBPH-SAV-BAY	Aquatic Life; Shallow-Water SAV	5A	Aquatic Plants (Macrophytes)	Clean Sediments; Sources Outside State Jurisdiction or Borders; Sediment Resuspension (Clean Sediment); Internal Nutrient Recycling; Atmospheric Deposition - Nitrogen; Agriculture; Municipal Point Source Discharges; Wet Weather Discharges (Non-Point Source; Point Source & Combination of Stormwater, SSO or CSO); Industrial Point Source Discharge; Loss of Riparian Habitat	2006	2010
					Fish Consumption	5A	PCB in Fish Tissue	Unknown	2006	2018
				C07E-02-BAC	Recreation	4A	*Enterococcus*	Unknown	2006	2010
				C07E-22-SF	Shellfishing	4A	Fecal Coliform	Discharges from Municipal Separate Storm Sewer Systems (MS4); Unknown	1998	2010
				C07E-01-PCB	Fish Consumption	5A	PCB in Fish Tissue	Unknown	2006	2018

INTERSTATE 64 PENINSULA STUDY

APPENDIX H

VDEQ 2010 Impared Waters (Categories 4 and 5) Mapping



INTERSTATE 64 PENINSULA STUDY

2010 VDEQ Impaired Waters
Locality/ Jurisdiction
210 Mile Marker

Limits of Alternative 1A/2A Footprint
Limits of Alternative 1B/2B Footprint
Limits of Alternative 3 Footprint
Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 1 of 43

Notes:

Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N W E S

0 187.5 375 750
Feet

INTERSTATE 64 PENINSULA STUDY

- 2010 VDEQ Impaired Waters
- Locality/ Jurisdiction
- 210 Mile Marker
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint
- Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 2 of 43

Notes:

Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N W E S

0 187.5 375 750
Feet

INTERSTATE 64 PENINSULA STUDY

- 2010 VDEQ Impaired Waters
- Locality/ Jurisdiction
- 210 Mile Marker
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint
- Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

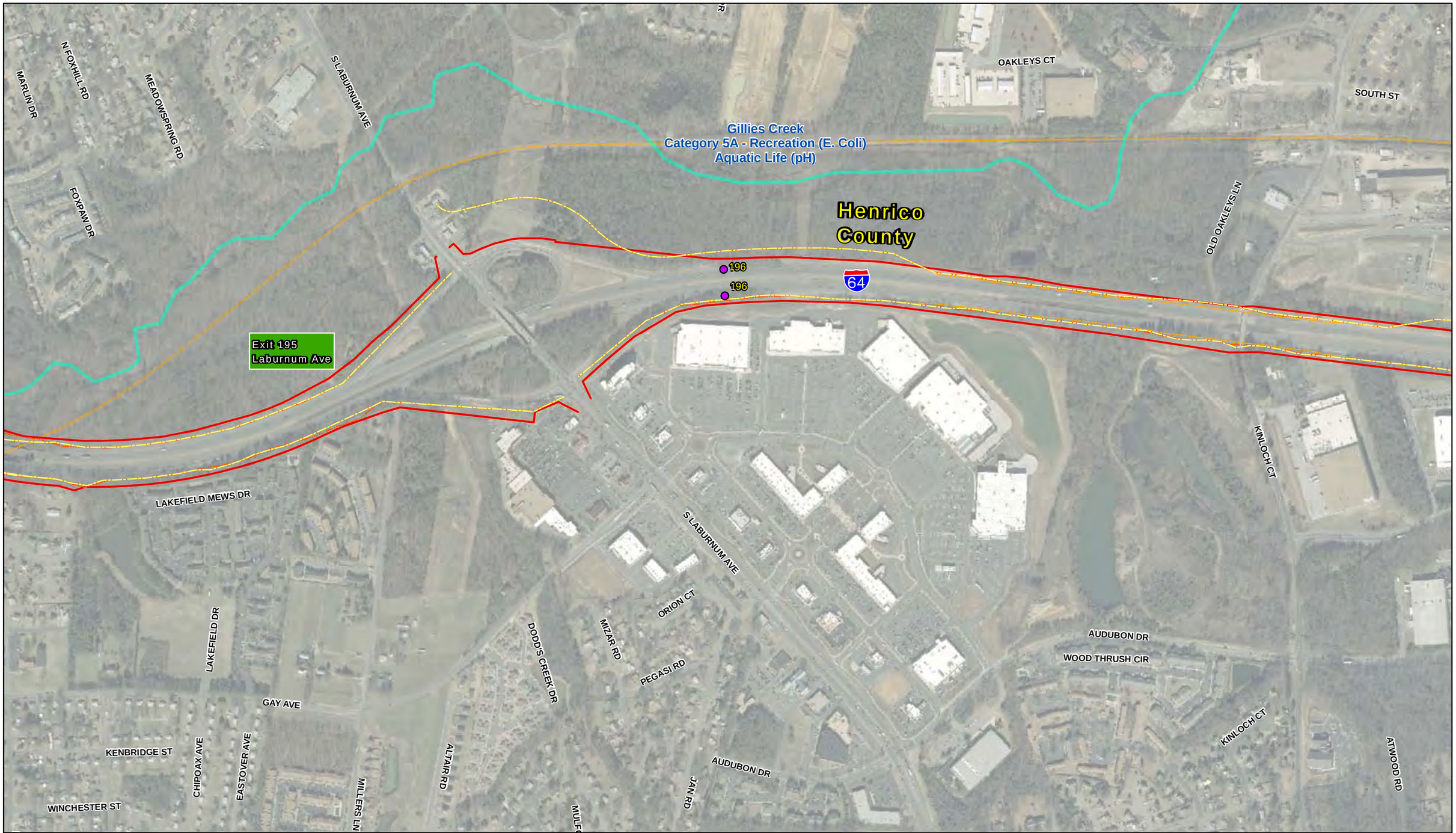
Map 3 of 43

Notes:

Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

0 185 370 740
Feet



INTERSTATE 64 PENINSULA STUDY

- 2010 VDEQ Impaired Waters
- Locality/ Jurisdiction
- 210 Mile Marker
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint
- Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 4 of 43

Notes:

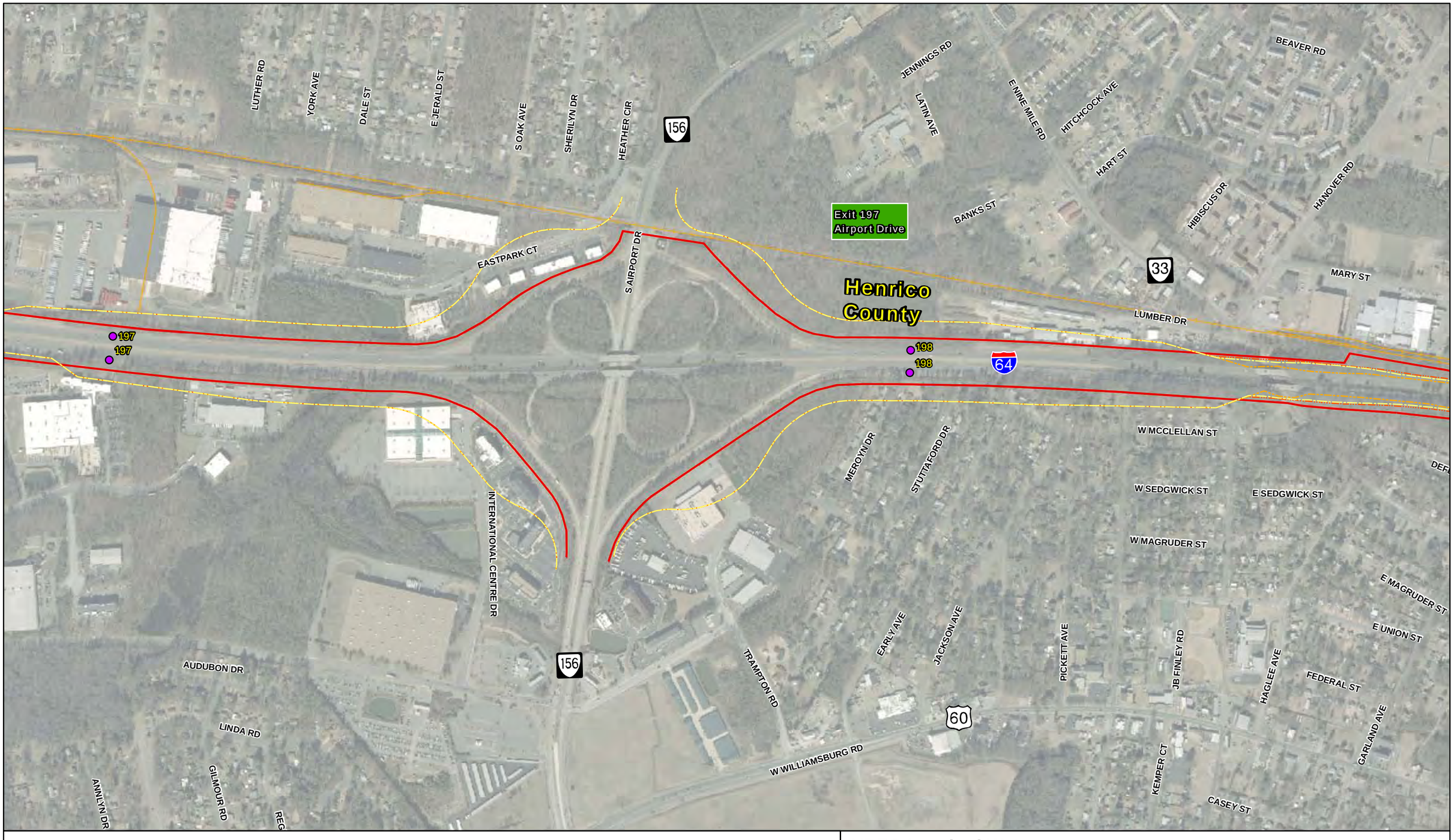
Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N W E S

0 185 370 740

Feet



INTERSTATE 64 PENINSULA STUDY

- 2010 VDEQ Impaired Waters
- Locality/ Jurisdiction
- 210 Mile Marker
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint
- Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 5 of 43

Notes:

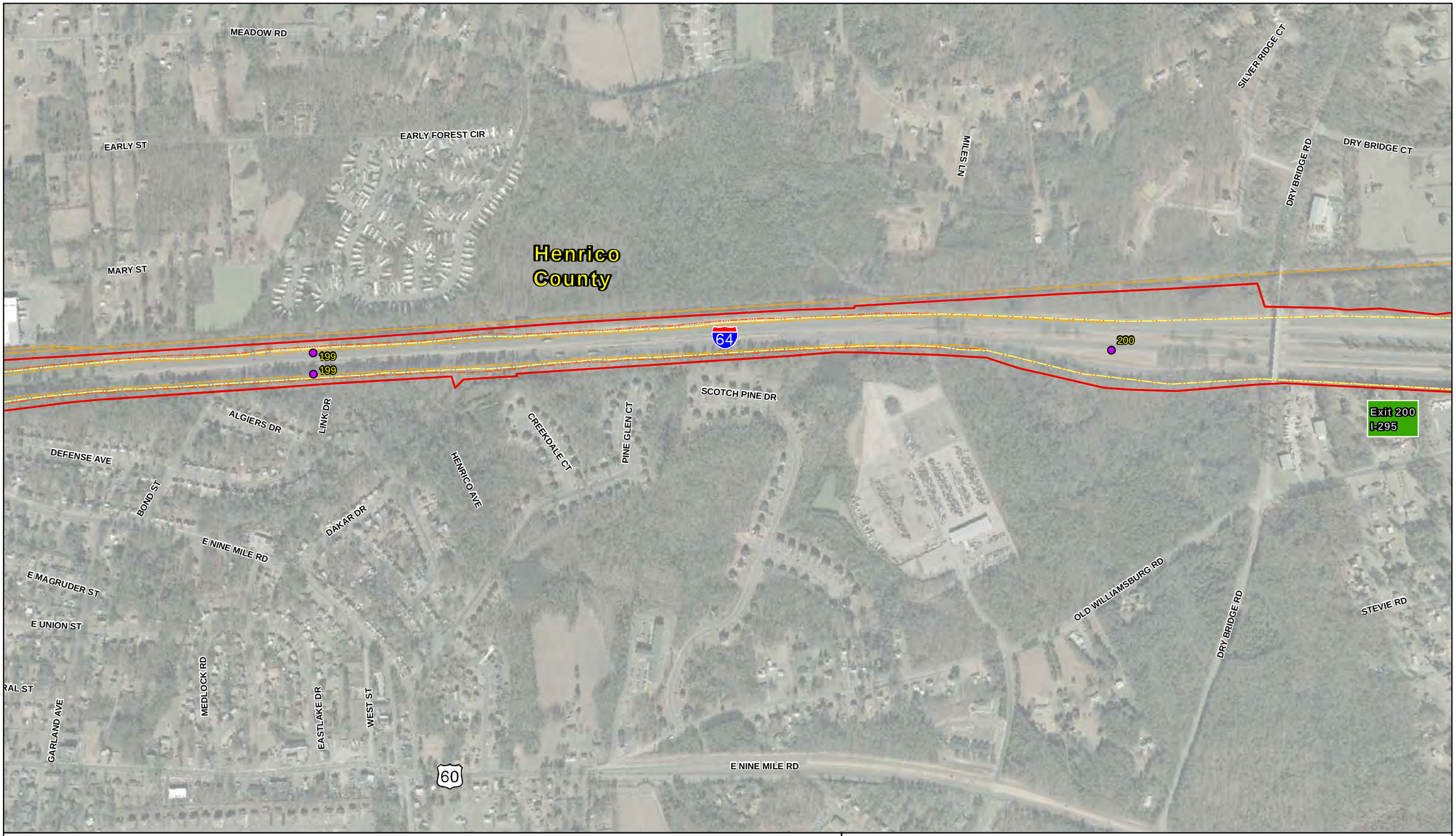
Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N W E S

0 185 370 740

Feet



INTERSTATE 64 PENINSULA STUDY

- 2010 VDEQ Impaired Waters
- Locality/ Jurisdiction
- 210 Mile Marker
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint
- Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 6 of 43

Notes:

Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N W E S

0 187.5 375 750

Feet

INTERSTATE 64 PENINSULA STUDY

2010 VDEQ Impaired Waters
Locality/ Jurisdiction
210 Mile Marker

Limits of Alternative 1A/2A Footprint
Limits of Alternative 1B/2B Footprint
Limits of Alternative 3 Footprint
Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 7 of 43

Notes:

Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N W E S

0 187.5 375 750
Feet

INTERSTATE 64 PENINSULA STUDY

- 2010 VDEQ Impaired Waters
- Locality/ Jurisdiction
- 210 Mile Marker
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint
- Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 8 of 43

Notes:

Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N W E S

0 185 370 740

Feet

Exit 205
Bottom Bridge

NEW KENT HWY

64

205

205

204

204

New Kent
County

Henrico
County

60

33

E WILLIAMSBURG RD

WHITE OAK RD

OLD WILLIAMSBURG RD

KINGS CROSS QUAY

QUAY CT

BATTLEFIELD CMNS

N FRANKLINS WAY

KIMBALL LN

S FRANKLINS WAY

CUMBERLAND STATION RD

POCAHONTAS TRL

MARKET PLACE DR

INTERSTATE 64 PENINSULA STUDY

2010 VDEQ Impaired Waters

Locality/ Jurisdiction

210 Mile Marker

Limits of Alternative 1A/2A Footprint

Limits of Alternative 1B/2B Footprint

Limits of Alternative 3 Footprint

Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 9 of 43

Notes:

Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N
W E
S

0 185 370 740

Feet

INTERSTATE 64 PENINSULA STUDY

- 2010 VDEQ Impaired Waters
- Locality/ Jurisdiction
- 210 Mile Marker
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint
- Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 10 of 43

Notes:

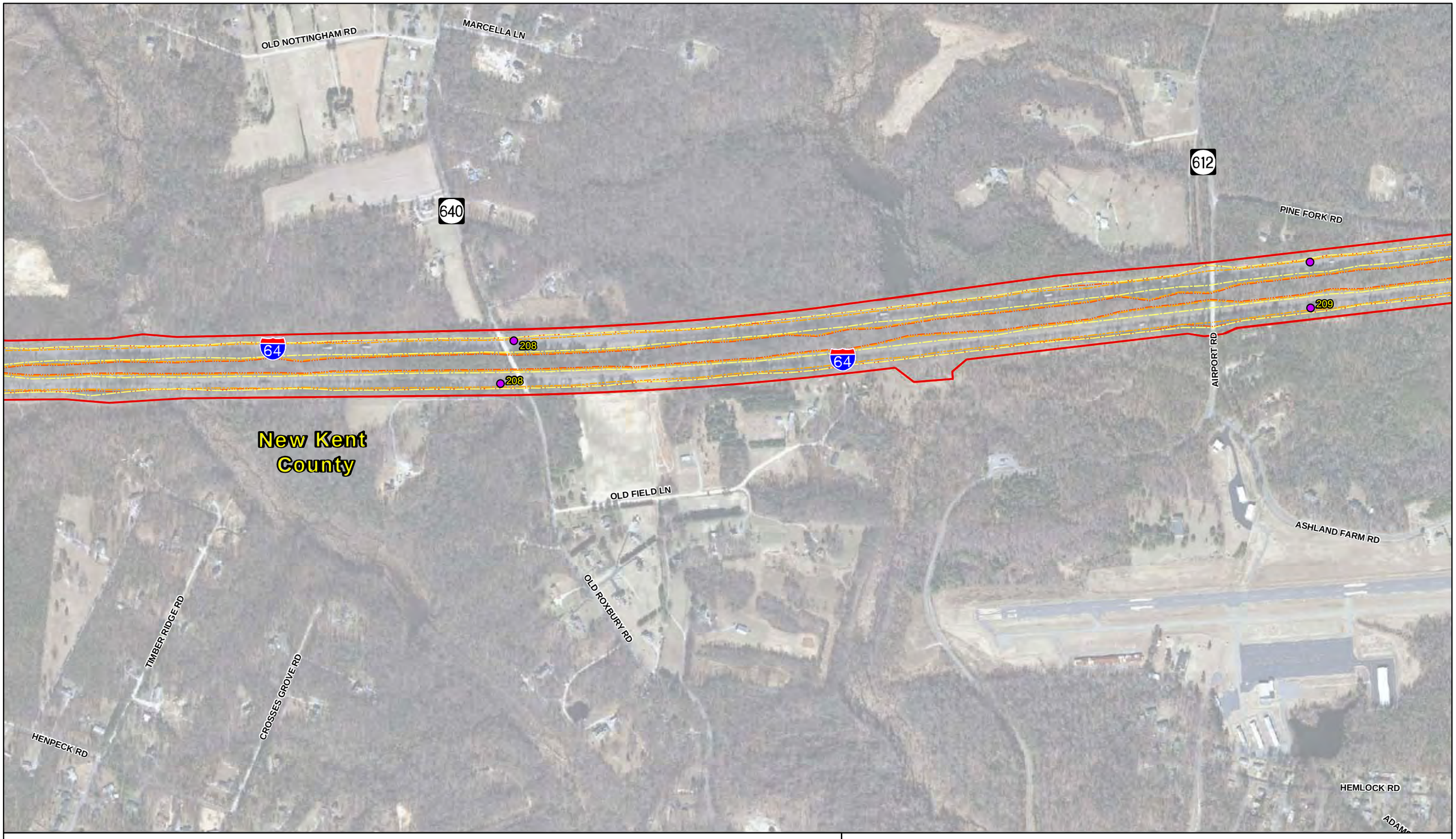
Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N W E S

0 185 370 740

Feet



INTERSTATE 64 PENINSULA STUDY

- 2010 VDEQ Impaired Waters
- Locality/ Jurisdiction
- 210 Mile Marker
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint
- Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 11 of 43

Notes:

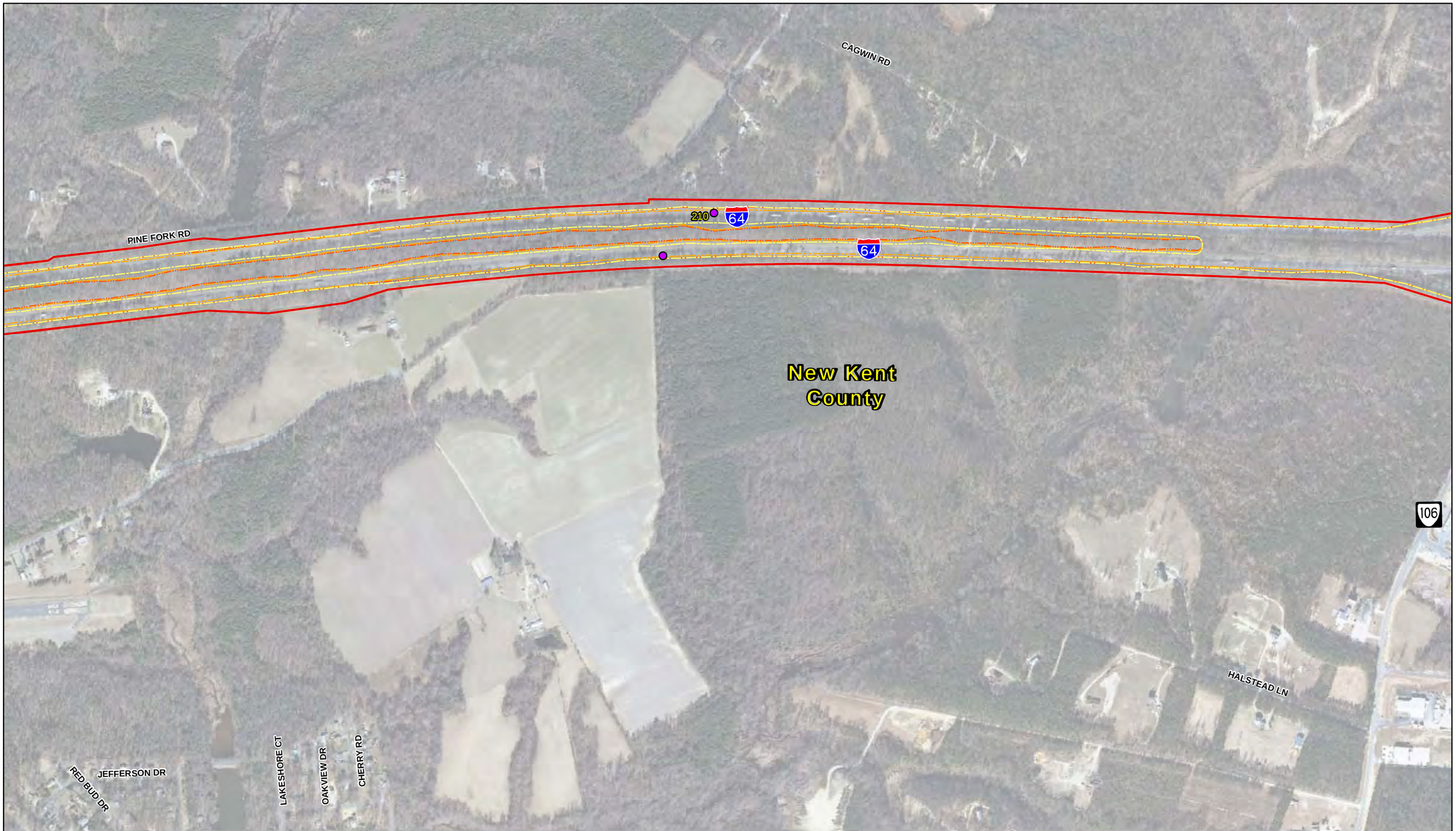
Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N W E S

0 185 370 740

Feet



INTERSTATE 64 PENINSULA STUDY

2010 VDEQ Impaired Waters
Locality/ Jurisdiction
210 Mile Marker
Limits of Alternative 1A/2A Footprint
Limits of Alternative 1B/2B Footprint
Limits of Alternative 3 Footprint
Limits of Existing Right of Way

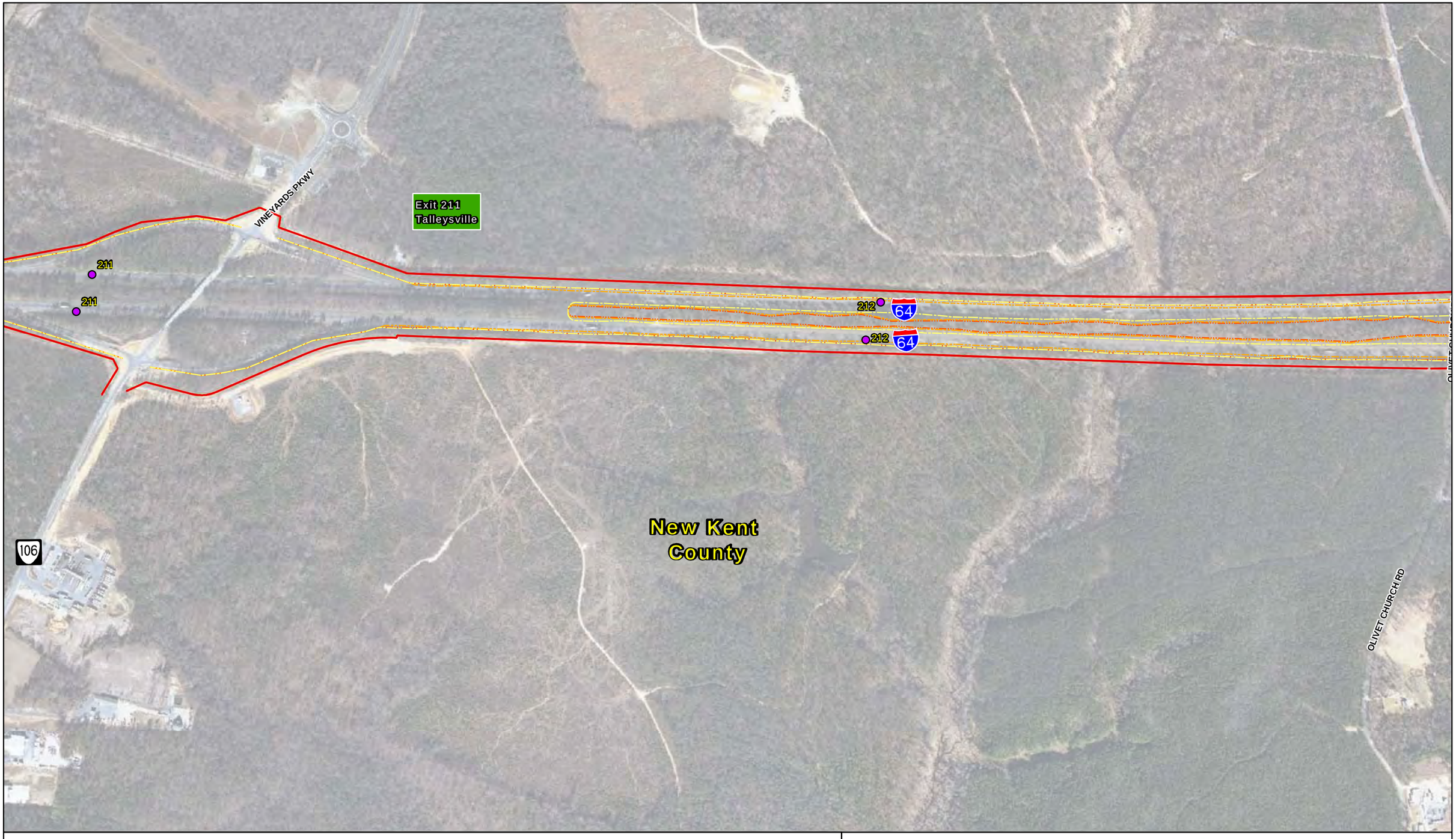
VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 12 of 43

Notes:
Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N W E S
0 185 370 740
Feet



INTERSTATE 64 PENINSULA STUDY

- 2010 VDEQ Impaired Waters
- Locality/ Jurisdiction
- 210 Mile Marker
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint
- Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 13 of 43

Notes:

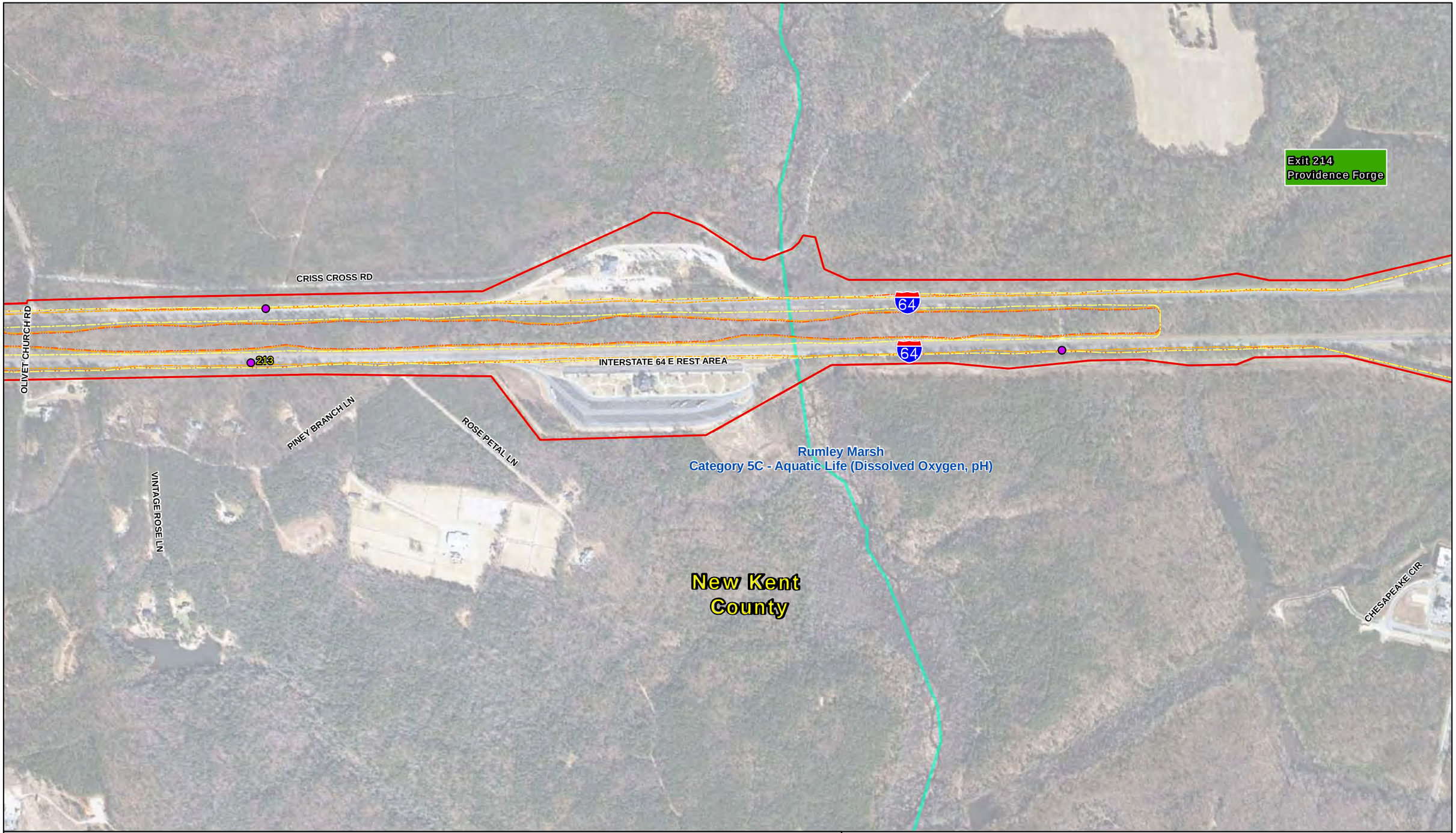
Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N W E S

0 185 370 740

Feet



INTERSTATE 64 PENINSULA STUDY

- 2010 VDEQ Impaired Waters
- Locality/ Jurisdiction
- 210 Mile Marker
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint
- Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 14 of 43

Notes:

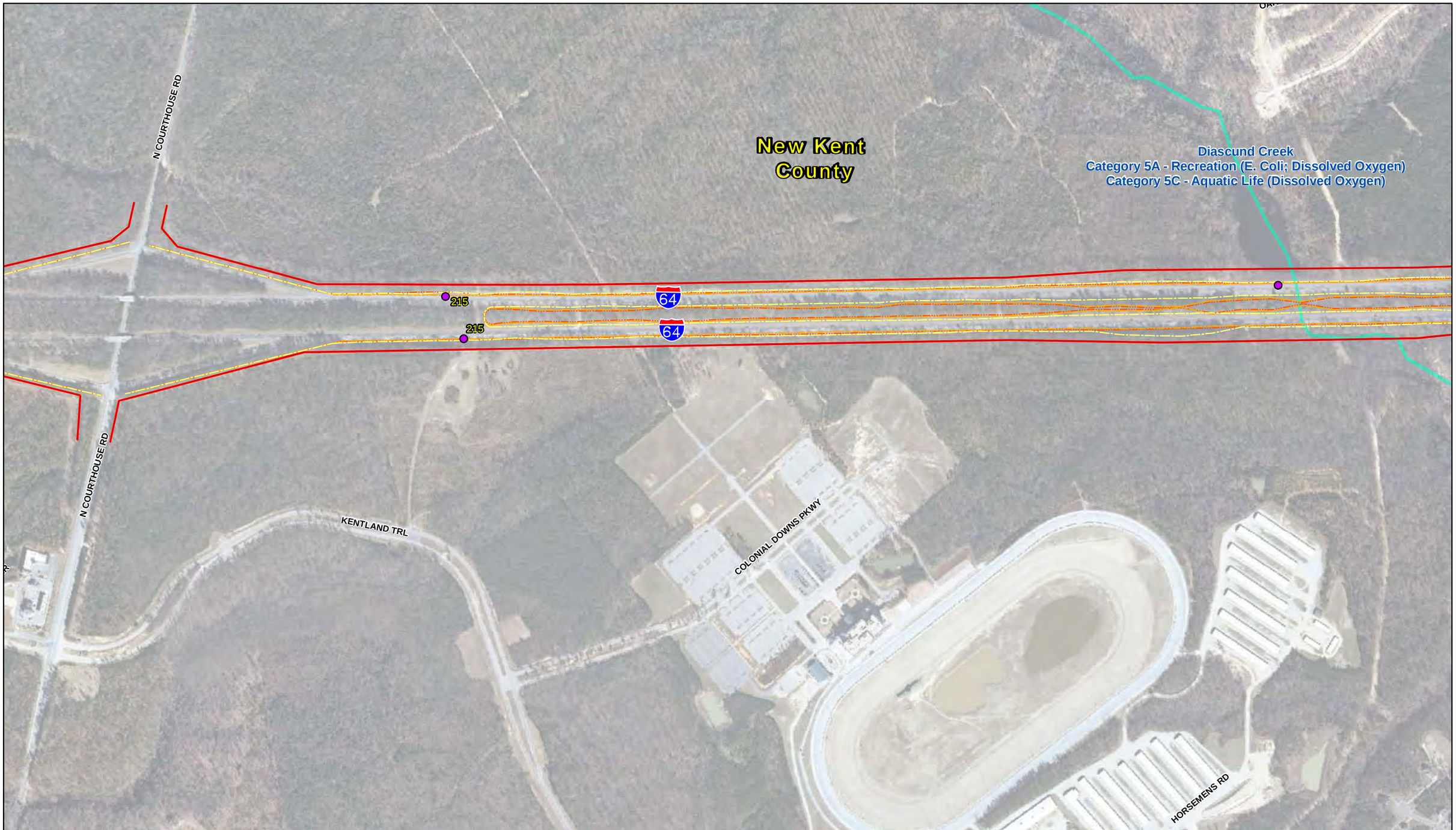
Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N W E S

0 185 370 740

Feet



INTERSTATE 64 PENINSULA STUDY

- 2010 VDEQ Impaired Waters
- Locality/ Jurisdiction
- 210 Mile Marker
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint
- Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 15 of 43

Notes:

Roads layer courtesy of VGIN.
2010 Impaired Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N W E S

0 185 370 740

Feet

EGYPT RD

LOFTY RETREAT D

64

64

Diascund Creek
Category 5A - Recreation (E. Coli; Dissolved Oxygen)
Category 5C - Aquatic Life (Dissolved Oxygen)

New Kent County

EGYPT RD

MT PLEASANT RD

KRUG LN

BRICKSHIRE DR

REGAL LN

CHAUCER DR

BR

INTERSTATE 64 PENINSULA STUDY

2010 VDEQ Impaired Waters

Locality/ Jurisdiction

210 Mile Marker

Limits of Alternative 1A/2A Footprint

Limits of Alternative 1B/2B Footprint

Limits of Alternative 3 Footprint

Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 16 of 43

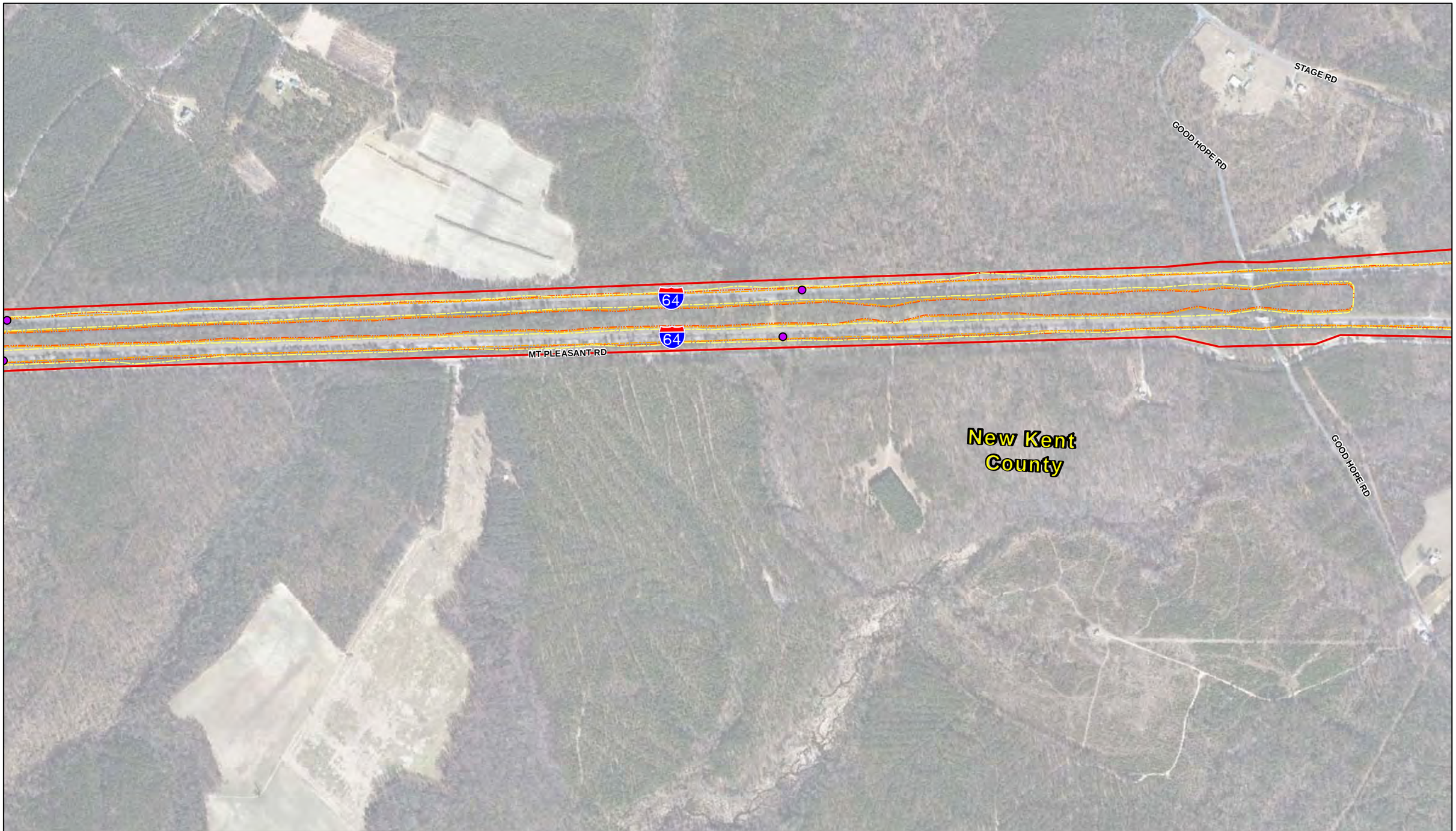
Notes:

Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N
W E
S

0 185 370 740
Feet



INTERSTATE 64 PENINSULA STUDY

2010 VDEQ Impaired Waters
Locality/ Jurisdiction
210 Mile Marker

Limits of Alternative 1A/2A Footprint
Limits of Alternative 1B/2B Footprint
Limits of Alternative 3 Footprint
Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 17 of 43

Notes:
Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N W E S

0 185 370 740
Feet

INTERSTATE 64 PENINSULA STUDY

- 2010 VDEQ Impaired Waters
- Locality/ Jurisdiction
- 210 Mile Marker
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint
- Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 18 of 43

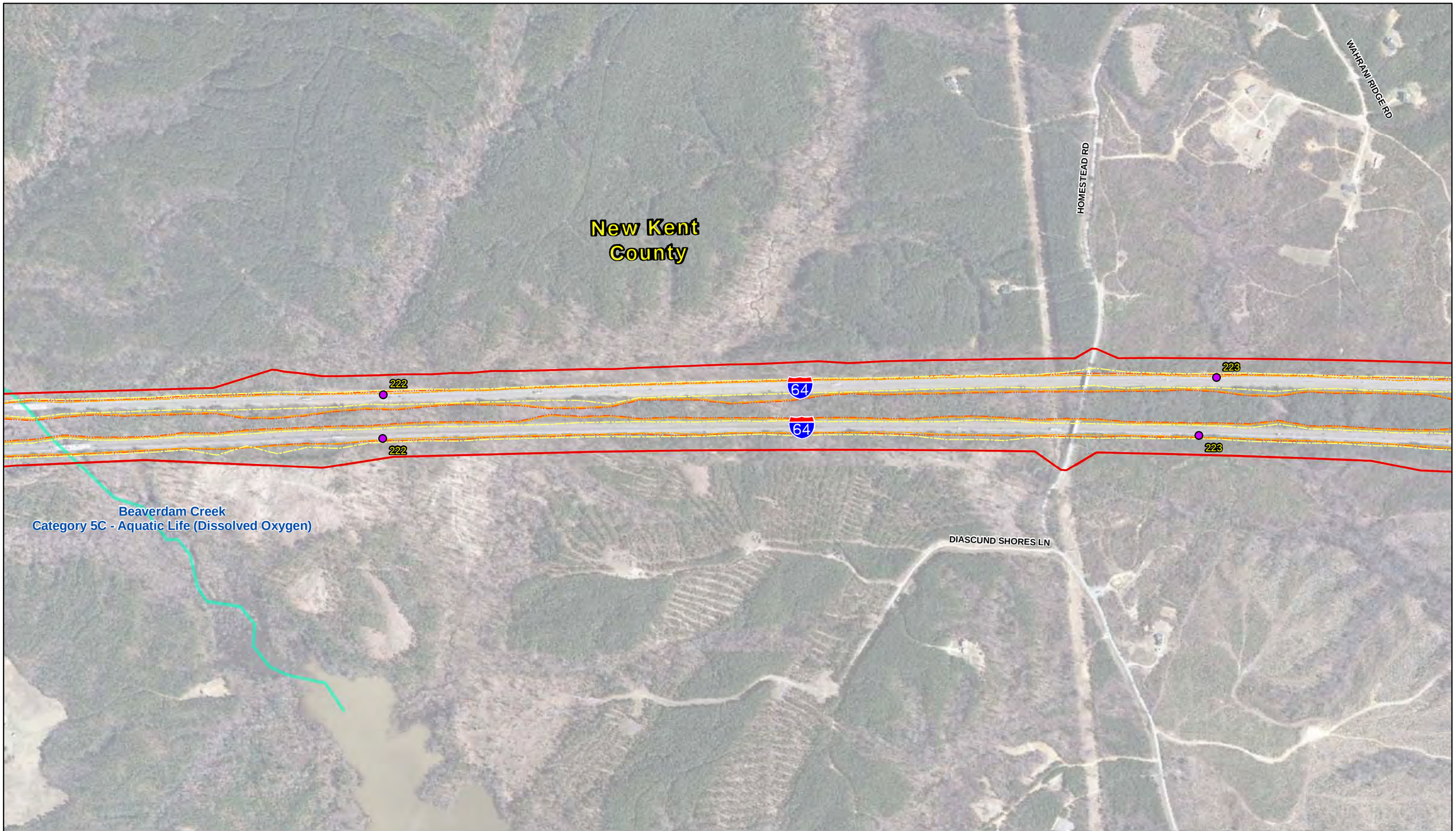
Notes:

Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N E S W

0 185 370 740
Feet



INTERSTATE 64 PENINSULA STUDY

2010 VDEQ Impaired Waters

Locality/ Jurisdiction

210 Mile Marker

Limits of Alternative 1A/2A Footprint

Limits of Alternative 1B/2B Footprint

Limits of Alternative 3 Footprint

Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 19 of 43

Notes:

Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N E S W

0 185 370 740

Feet

WEDGEWOOD DR

TILFORD MILL LN

WEDGEWOOD CT

MOORES LN

James City County

224

64

ROPERS CHURCH RD

64

225

224

New Kent County

INTERSTATE 64 PENINSULA STUDY

2010 VDEQ Impaired Waters

Locality/ Jurisdiction

210 Mile Marker

Limits of Alternative 1A/2A Footprint

Limits of Alternative 1B/2B Footprint

Limits of Alternative 3 Footprint

Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 20 of 43

Notes:

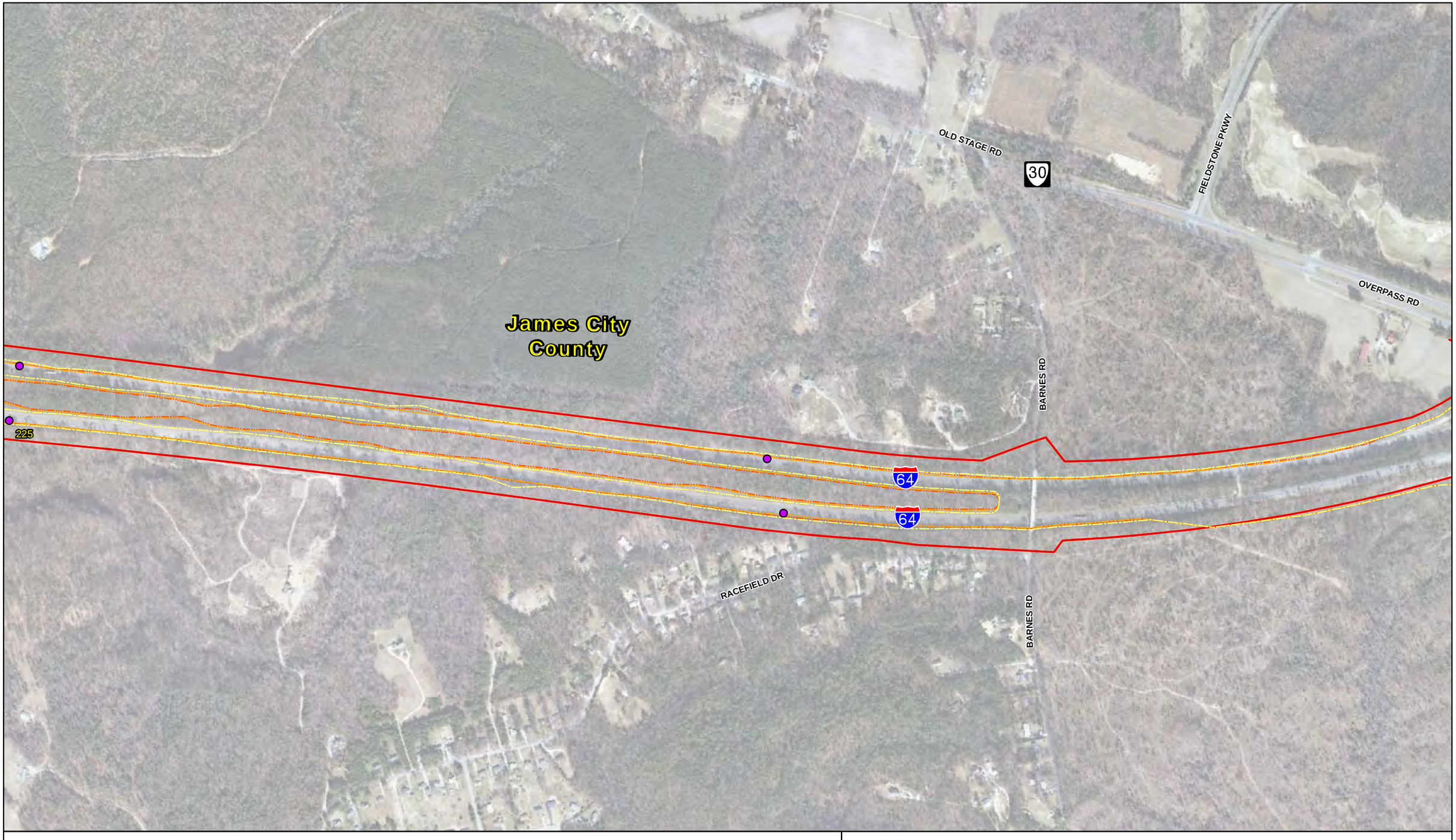
Roads layer courtesy of VGIN.
2010 Impaired Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N W E S

0 185 370 740

Feet



INTERSTATE 64 PENINSULA STUDY

2010 VDEQ Impaired Waters
Locality/ Jurisdiction
210 Mile Marker

Limits of Alternative 1A/2A Footprint
Limits of Alternative 1B/2B Footprint
Limits of Alternative 3 Footprint
Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

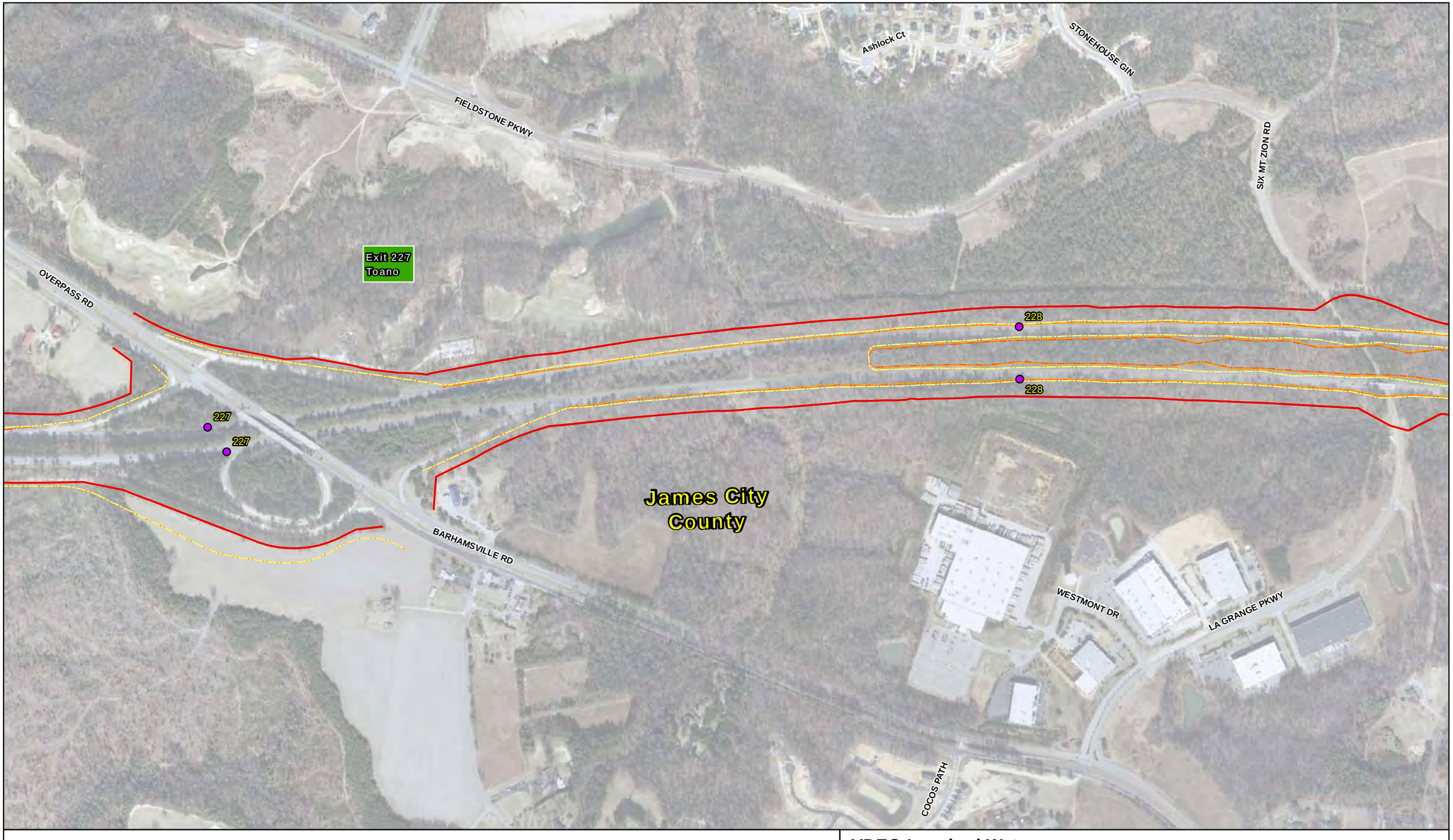
Map 21 of 43

Notes:
Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N W E S

0 185 370 740
Feet



INTERSTATE 64 PENINSULA STUDY

2010 VDEQ Impaired Waters

Locality/ Jurisdiction

210 Mile Marker

Limits of Alternative 1A/2A Footprint

Limits of Alternative 1B/2B Footprint

Limits of Alternative 3 Footprint

Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 22 of 43

Notes:

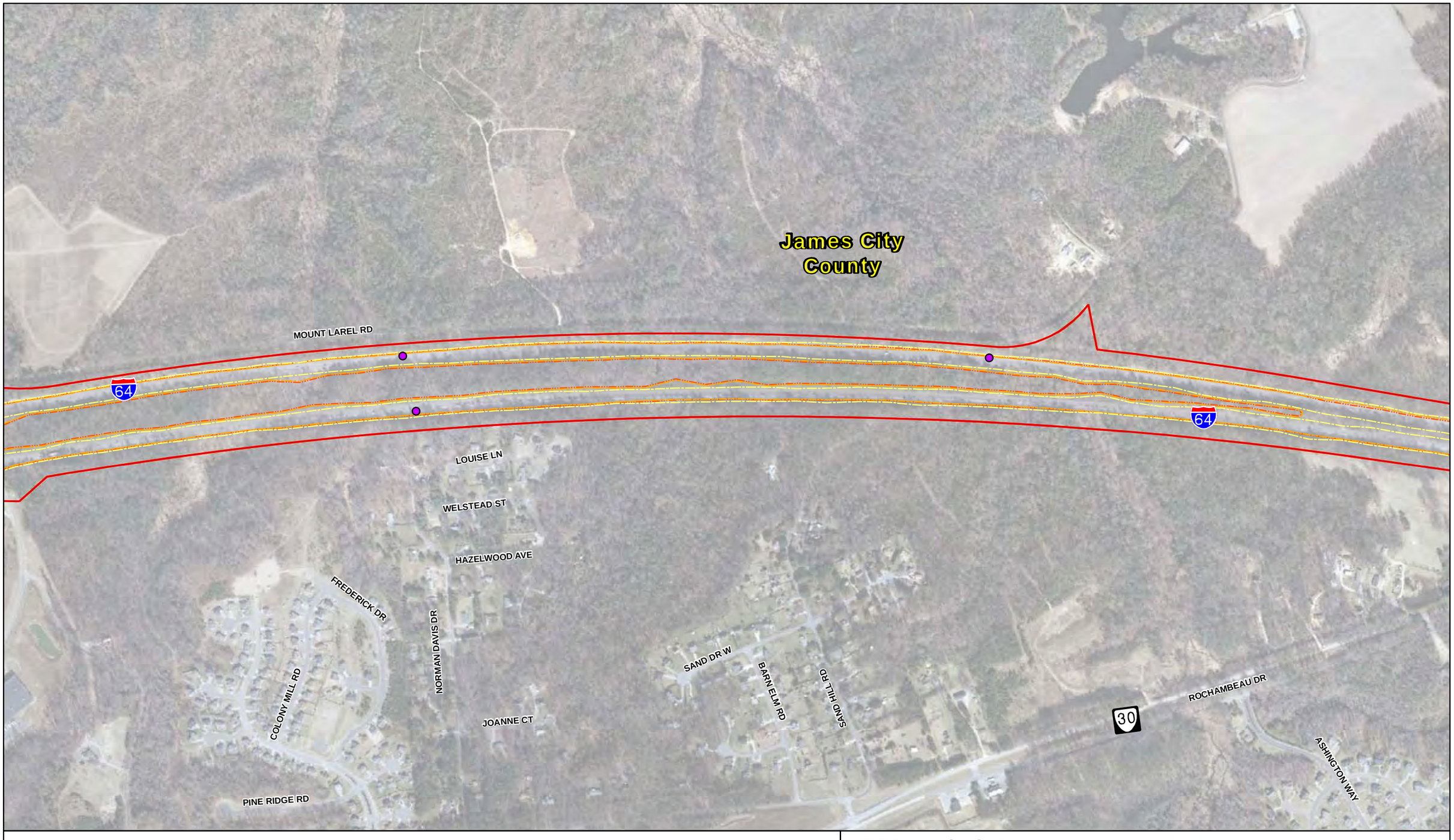
Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N E S W

0 187.5 375 750

Feet



INTERSTATE 64 PENINSULA STUDY

- 2010 VDEQ Impaired Waters
- Locality/ Jurisdiction
- 210 Mile Marker
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint
- Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 23 of 43

Notes:

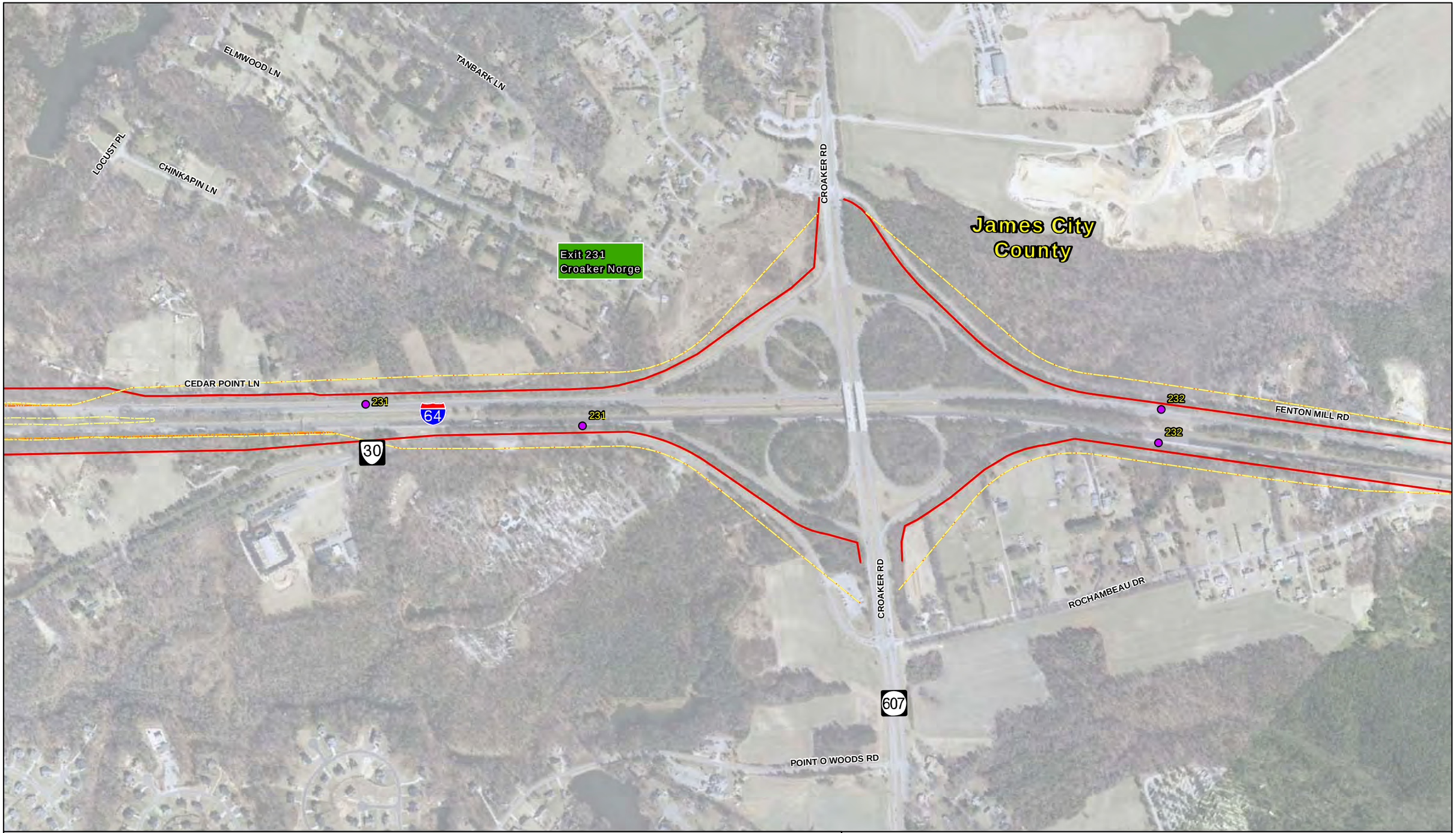
Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N W E S

0 185 370 740

Feet



INTERSTATE 64 PENINSULA STUDY

- 2010 VDEQ Impaired Waters
- Locality/ Jurisdiction
- 210 Mile Marker
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint
- Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

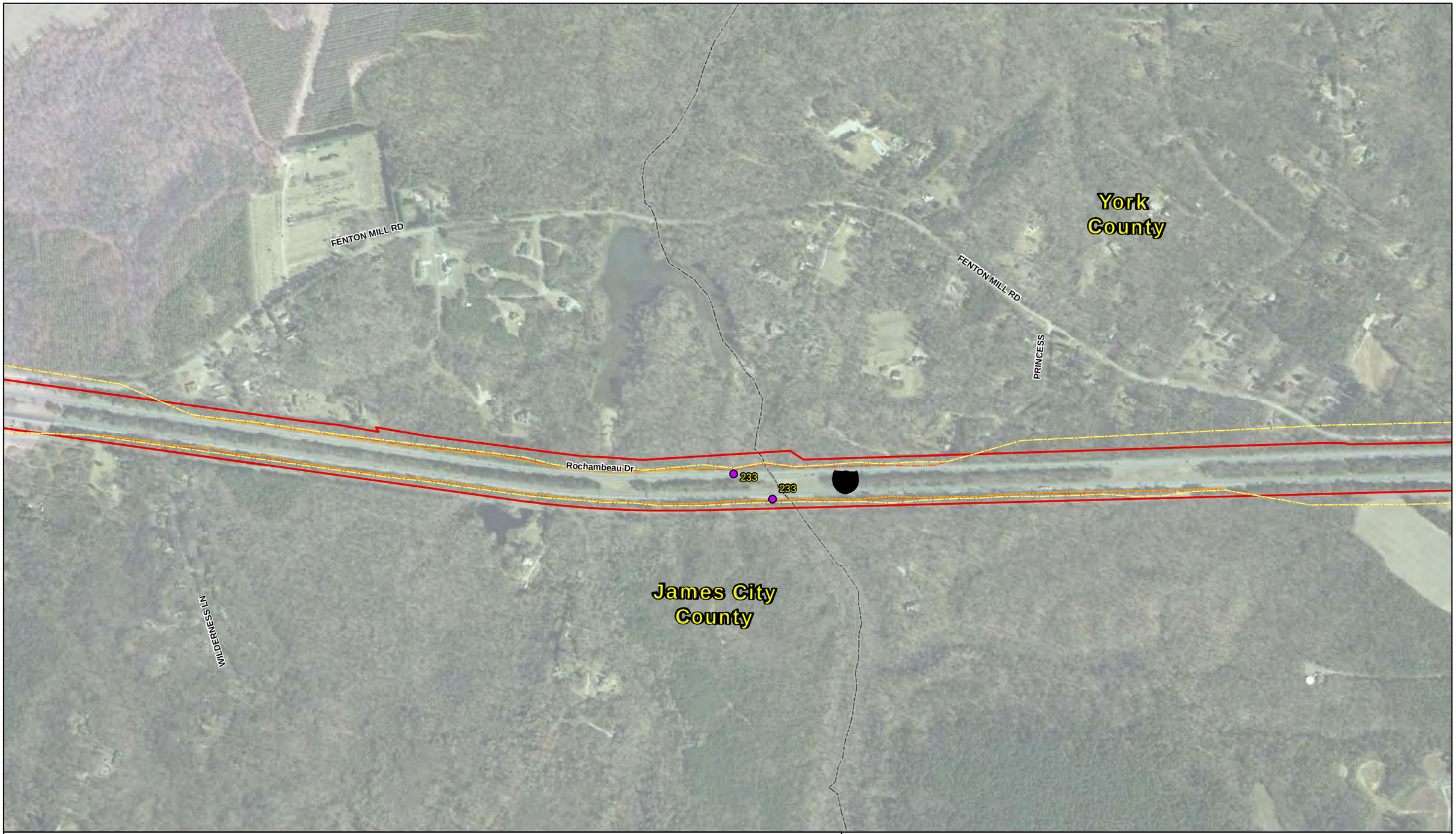
Map 24 of 43

Notes:

Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

0 185 370 740
Feet



INTERSTATE 64 PENINSULA STUDY

- 2010 VDEQ Impaired Waters
- Locality/ Jurisdiction
- 210 Mile Marker
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint
- Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 25 of 43

Notes:

Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N W E S

0 185 370 740

Feet

INTERSTATE 64 PENINSULA STUDY

2010 VDEQ Impaired Waters

Locality/ Jurisdiction

210 Mile Marker

Limits of Alternative 1A/2A Footprint

Limits of Alternative 1B/2B Footprint

Limits of Alternative 3 Footprint

Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 26 of 43

Notes:

Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

0 185 370 740
Feet

INTERSTATE 64 PENINSULA STUDY

- 2010 VDEQ Impaired Waters
- Locality/ Jurisdiction
- 210 Mile Marker
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint
- Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

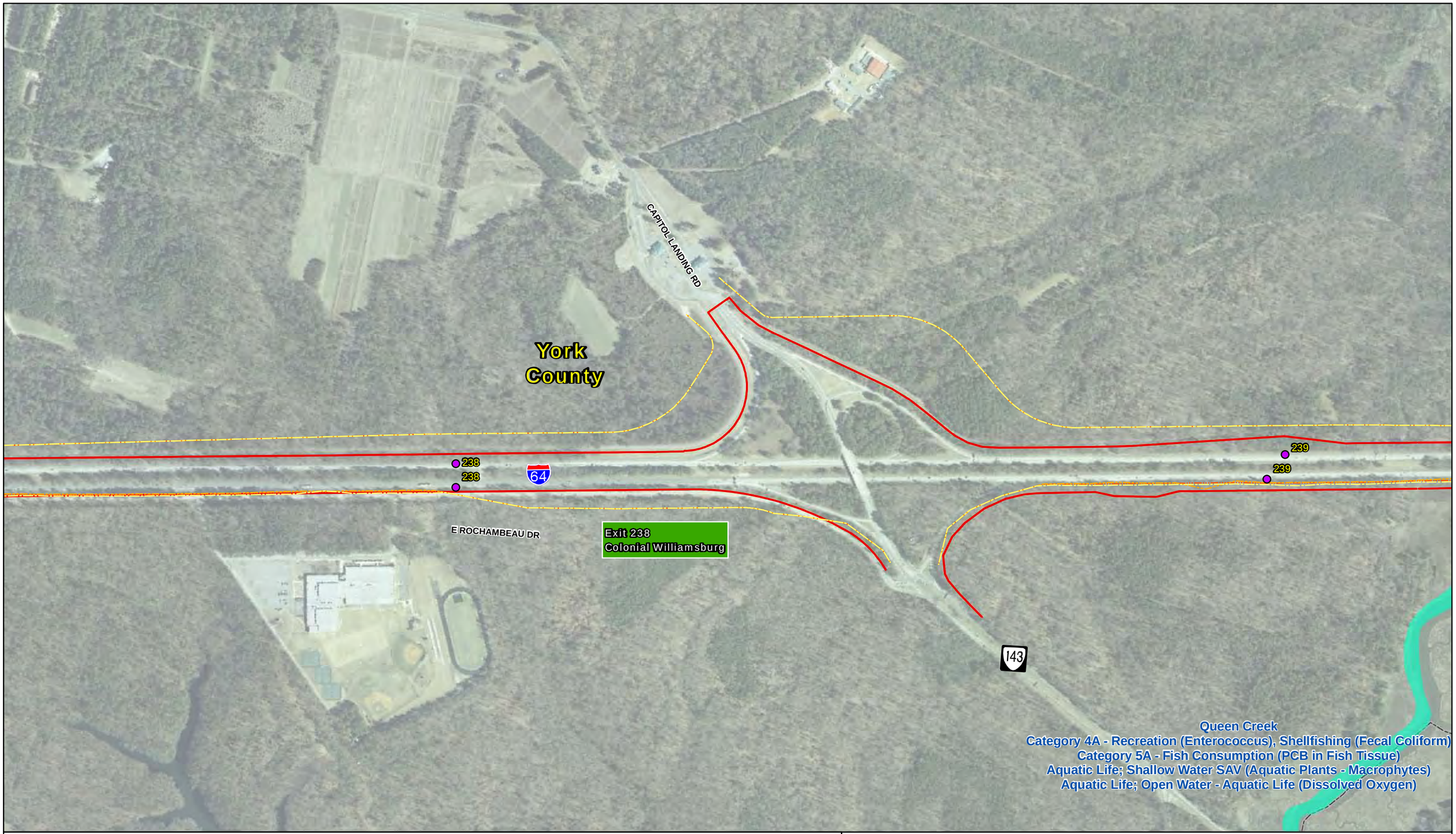
Map 27 of 43

Notes:

Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

0 185 370 740
Feet



INTERSTATE 64 PENINSULA STUDY

2010 VDEQ Impaired Waters
Locality/ Jurisdiction
210 Mile Marker

Limits of Alternative 1A/2A Footprint
Limits of Alternative 1B/2B Footprint
Limits of Alternative 3 Footprint
Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 28 of 43

Notes:

Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N E S W

0 187.5 375 750
Feet

Queen Creek
Category 4A - Recreation (Enterococcus), Shellfishing (Fecal Coliform)
Category 5A - Fish Consumption (PCB in Fish Tissue)
Aquatic Life; Shallow Water SAV (Aquatic Plants - Macrophytes)
Aquatic Life; Open Water - Aquatic Life (Dissolved Oxygen)

HOLCOMB DR
DENNIS
QUEENS DR
BOWSTRING DR
HOLLOWAY
CAMBRIDGE LN
SHOREHAM LN
LAKESHEAD
SAXON DR
240
240
64
241
QUEENSBURY
SPRINGFIELD
CLIPPER CT
SCHOONER BLVD
JIB CT
QUEENS DR
VALOR
NATIONAL LN
LAKESHEAD
HICKORY HILLS DR
BURGUNDY RD
York County
Williamsburg

INTERSTATE 64 PENINSULA STUDY

2010 VDEQ Impaired Waters
Locality/ Jurisdiction
210 Mile Marker
Limits of Alternative 1A/2A Footprint
Limits of Alternative 1B/2B Footprint
Limits of Alternative 3 Footprint
Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

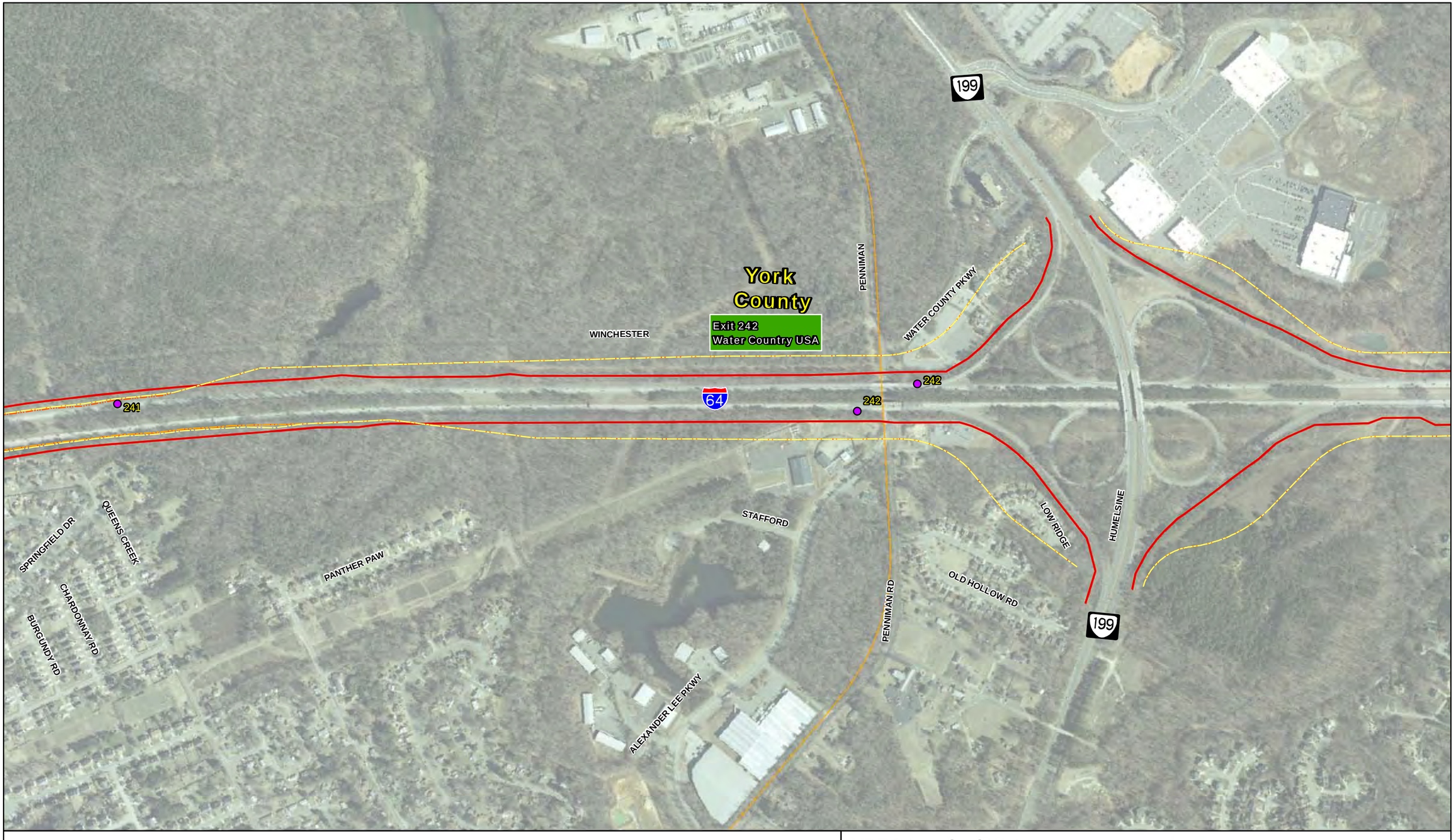
Map 29 of 43

Notes:
Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N W E S

0 187.5 375 750
Feet



INTERSTATE 64 PENINSULA STUDY

- 2010 VDEQ Impaired Waters
- Locality/ Jurisdiction
- 210 Mile Marker
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint
- Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 30 of 43

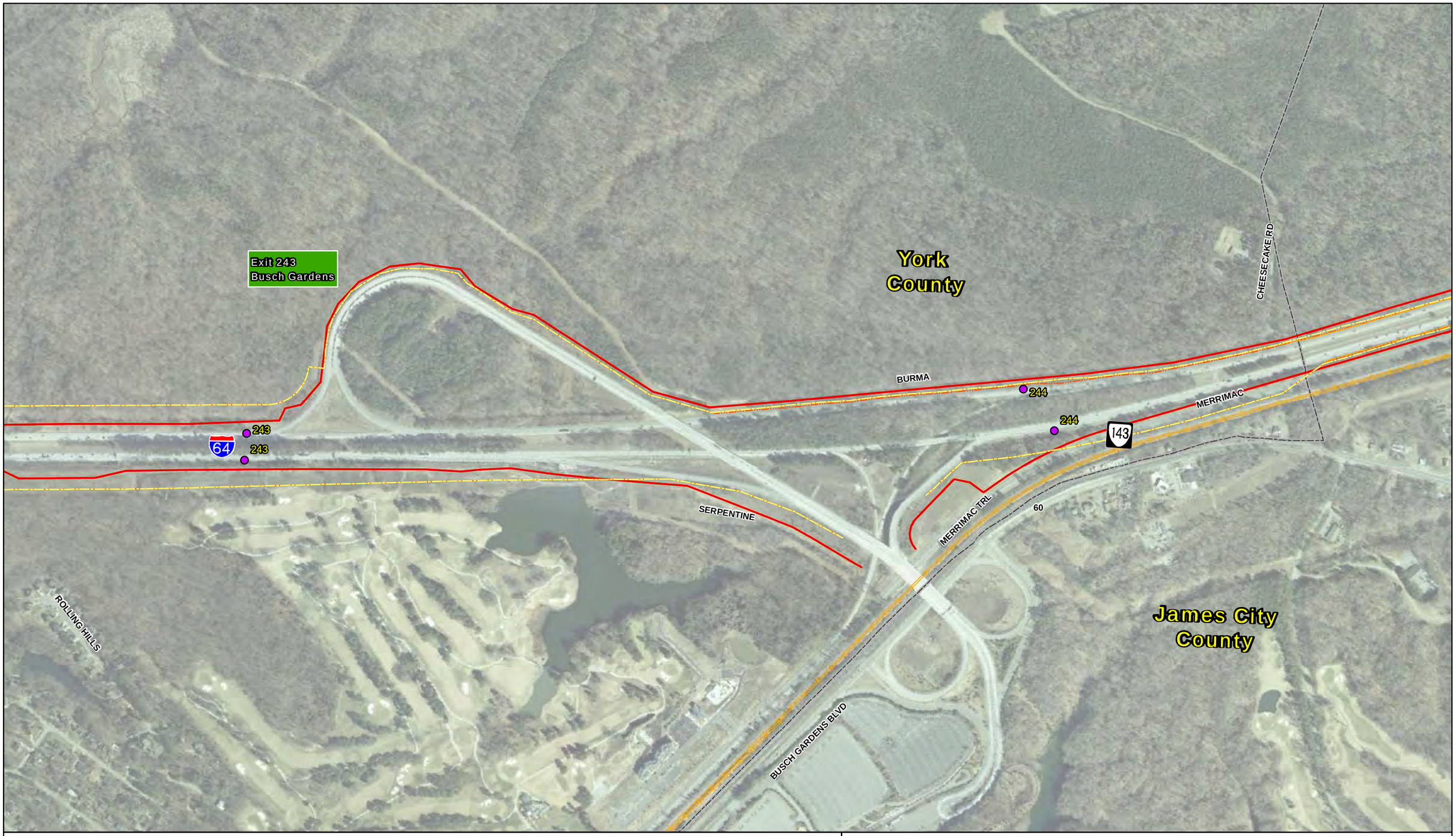
Notes:

Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N W E S

0 187.5 375 750
Feet



INTERSTATE 64 PENINSULA STUDY

2010 VDEQ Impaired Waters

Locality/ Jurisdiction

210 Mile Marker

Limits of Alternative 1A/2A Footprint

Limits of Alternative 1B/2B Footprint

Limits of Alternative 3 Footprint

Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 31 of 43

Notes:

Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N W E S

0 187.5 375 750

Feet

James City County

MERIMAC TRL

245

245

64

246

246

143

RAILROAD ST

HOWARD DR

60

Whiting Ave

JACKSON ST

CHURCH ST

TANTALLON DR

TADICH DR

DEL LAGO DR

INTERSTATE 64 PENINSULA STUDY

2010 VDEQ Impaired Waters

Locality/ Jurisdiction

210 Mile Marker

Limits of Alternative 1A/2A Footprint

Limits of Alternative 1B/2B Footprint

Limits of Alternative 3 Footprint

Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 32 of 43

Notes:

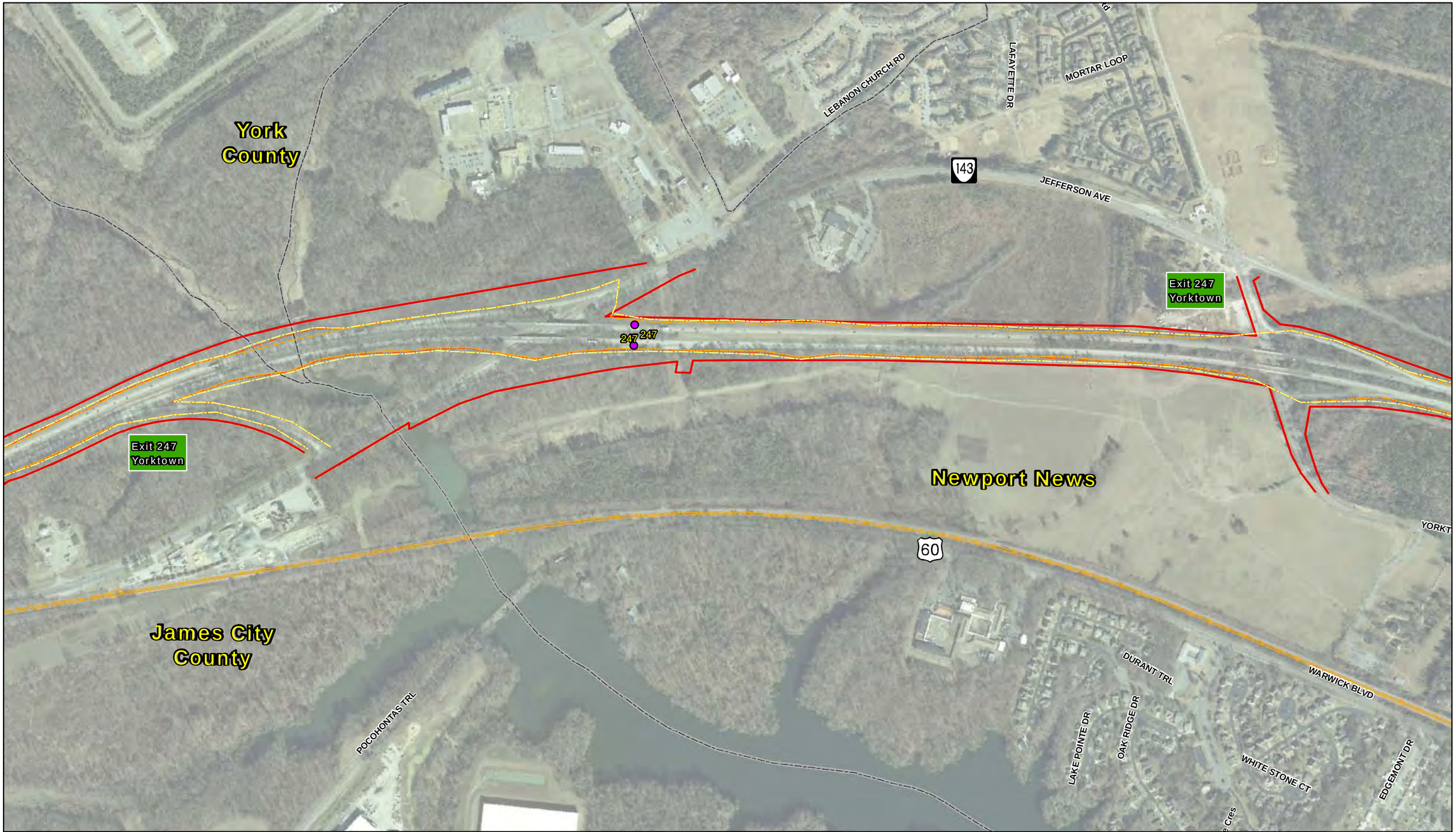
Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N W E S

0 185 370 740

Feet



INTERSTATE 64 PENINSULA STUDY

- 2010 VDEQ Impaired Waters
- Locality/ Jurisdiction
- 210 Mile Marker
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint
- Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 33 of 43

Notes:

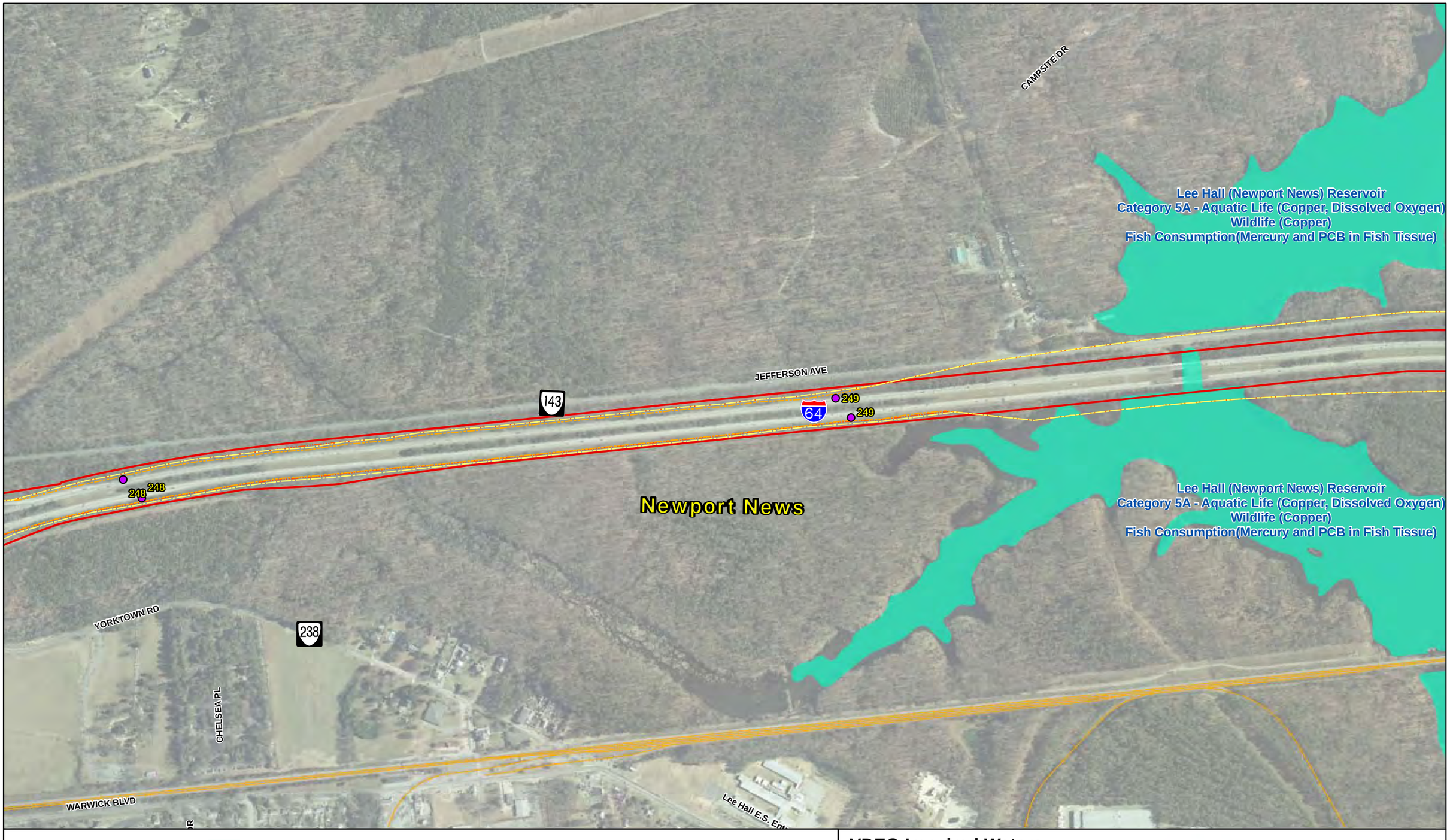
Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N W E S

0 185 370 740

Feet



INTERSTATE 64 PENINSULA STUDY

- 2010 VDEQ Impaired Waters
- Locality/ Jurisdiction
- 210 Mile Marker
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint
- Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

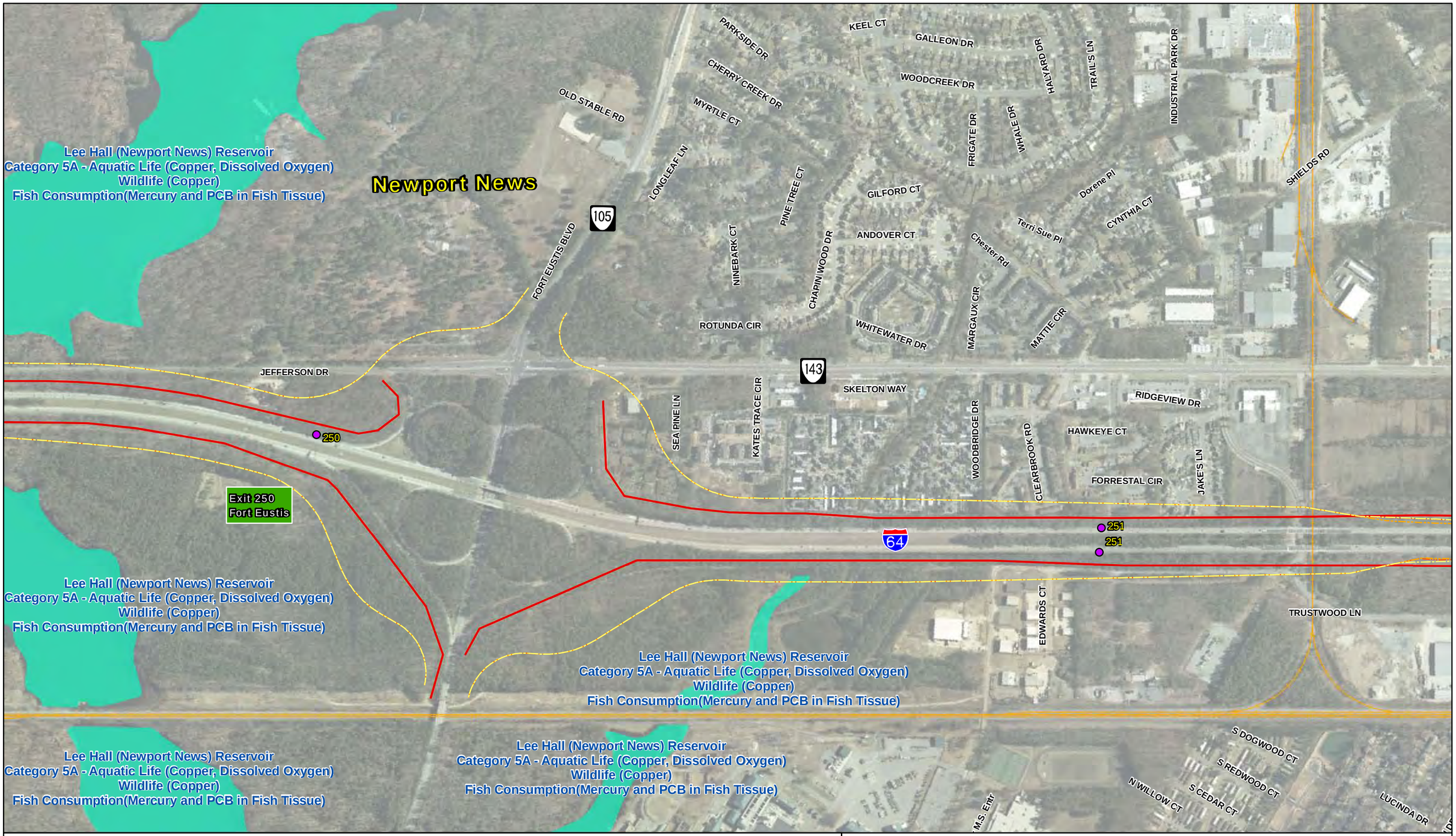
Map 34 of 43

Notes:

Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

0 185 370 740
Feet



INTERSTATE 64 PENINSULA STUDY

- 2010 VDEQ Impaired Waters
- Locality/ Jurisdiction
- 210 Mile Marker
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint
- Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 35 of 43

Notes:

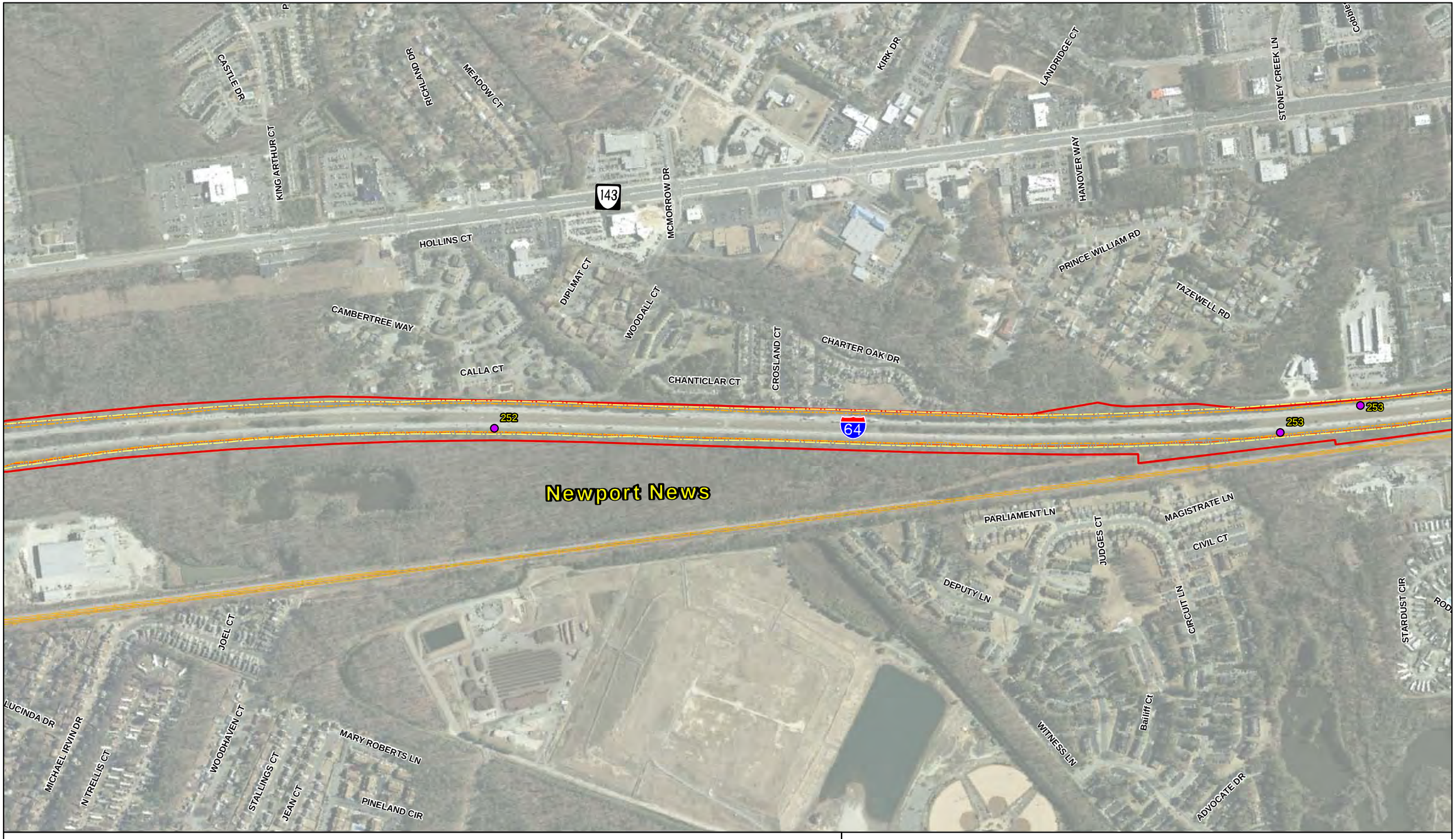
Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N W E S

0 185 370 740

Feet



INTERSTATE 64 PENINSULA STUDY

- 2010 VDEQ Impaired Waters
- Locality/ Jurisdiction
- 210 Mile Marker
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint
- Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 36 of 43

Notes:

Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

0 187.5 375 750
Feet

INTERSTATE 64 PENINSULA STUDY

- 2010 VDEQ Impaired Waters
- Locality/ Jurisdiction
- 210 Mile Marker
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint
- Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 37 of 43

Notes:

Roads layer courtesy of VGIN.
2010 Impaired Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

0 185 370 740
Feet

INTERSTATE 64 PENINSULA STUDY

- 2010 VDEQ Impaired Waters
- Locality/ Jurisdiction
- 210 Mile Marker
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint
- Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 38 of 43

Notes:

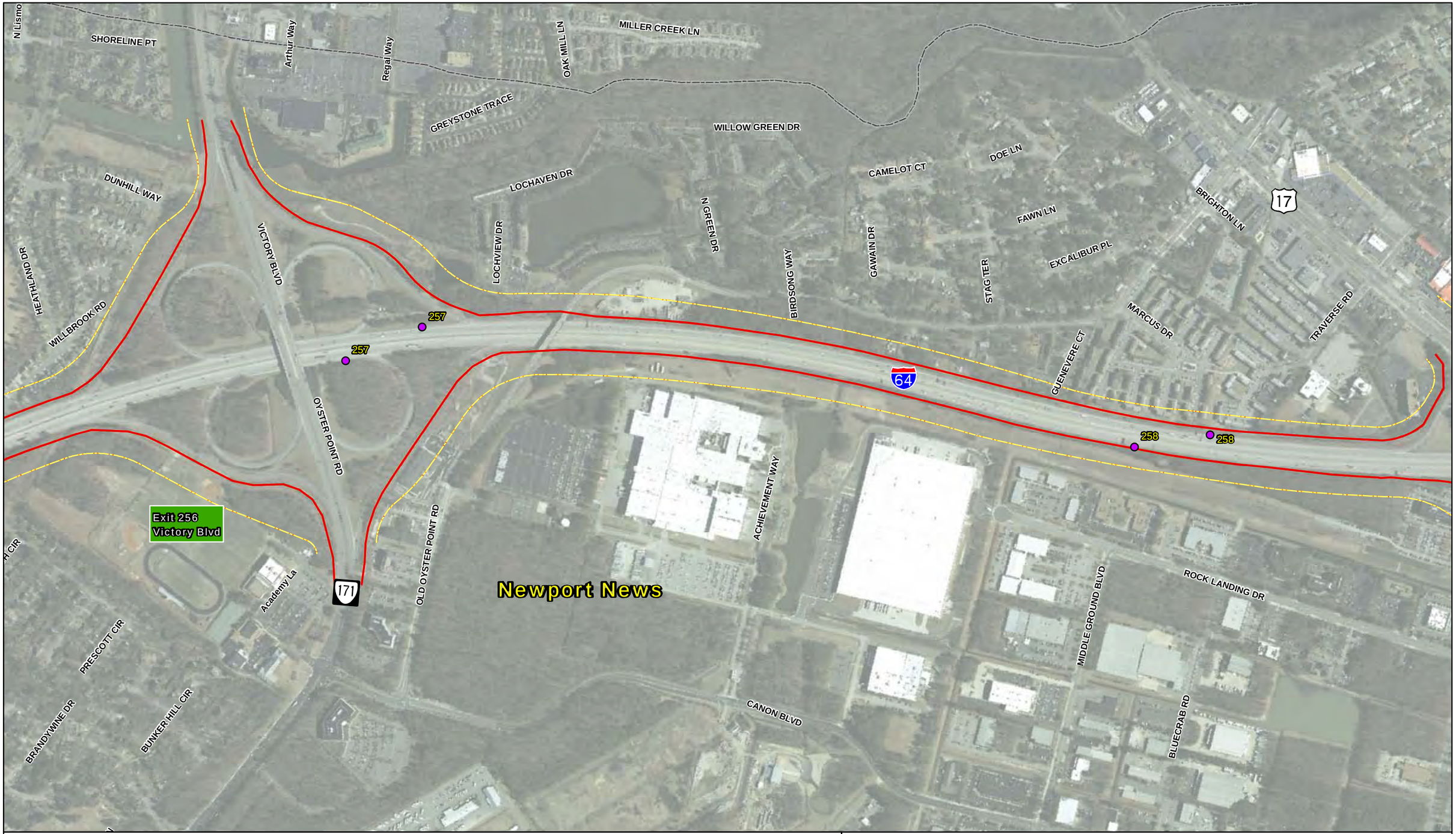
Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N E S W

0 185 370 740

Feet



INTERSTATE 64 PENINSULA STUDY

2010 VDEQ Impaired Waters
Locality/ Jurisdiction
210 Mile Marker

Limits of Alternative 1A/2A Footprint
Limits of Alternative 1B/2B Footprint
Limits of Alternative 3 Footprint
Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 39 of 43

Notes:
Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

0 185 370 740
Feet

INTERSTATE 64 PENINSULA STUDY

- 2010 VDEQ Impaired Waters
- Locality/ Jurisdiction
- 210 Mile Marker
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint
- Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 40 of 43

Notes:

Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N W E S

0 185 370 740

Feet

INTERSTATE 64 PENINSULA STUDY

- 2010 VDEQ Impaired Waters
- Locality/ Jurisdiction
- 210 Mile Marker
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint
- Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 41 of 43

Notes:

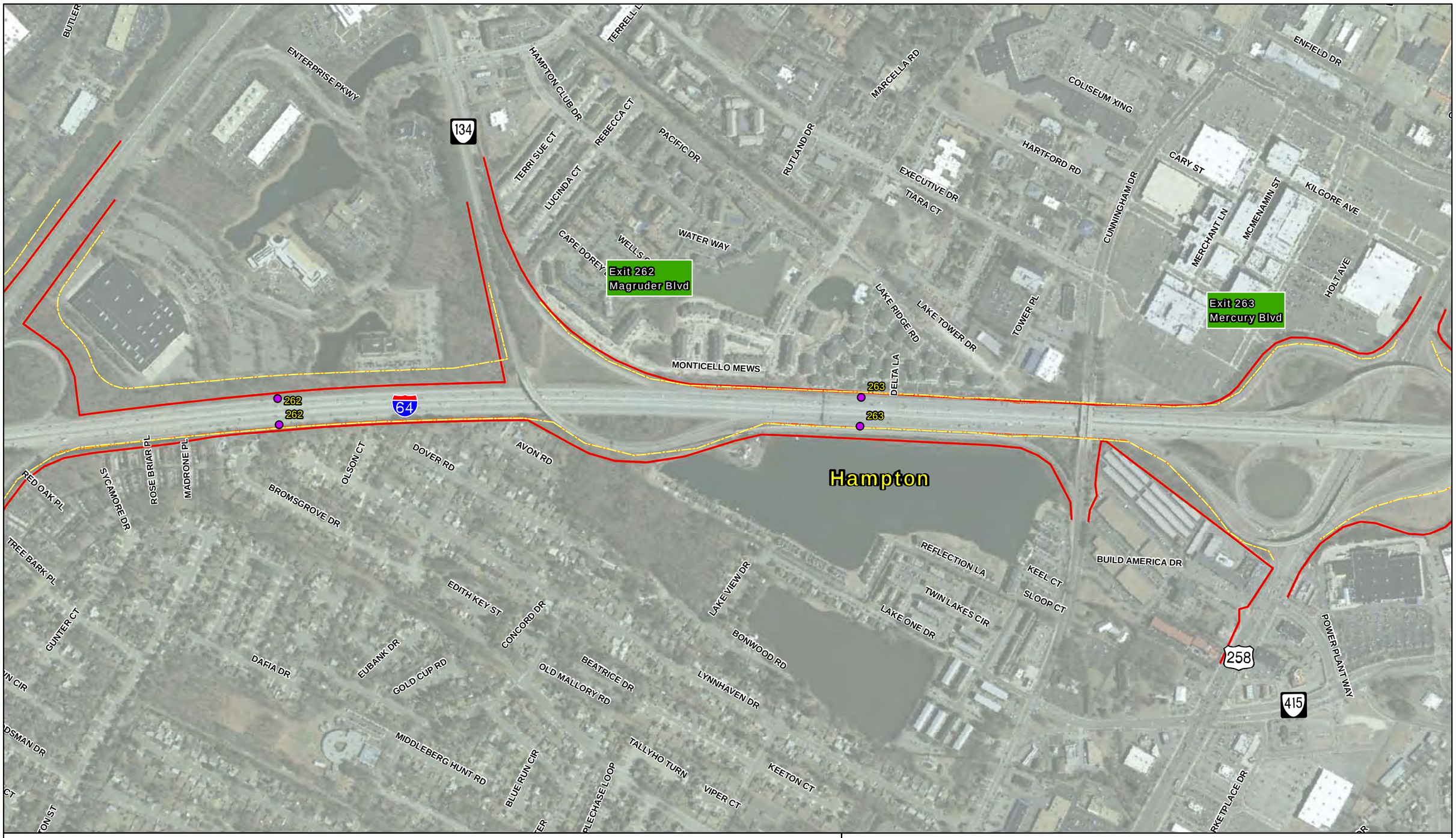
Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N E S W

0 185 370 740

Feet



INTERSTATE 64 PENINSULA STUDY

- 2010 VDEQ Impaired Waters
- Locality/ Jurisdiction
- 210 Mile Marker
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint
- Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

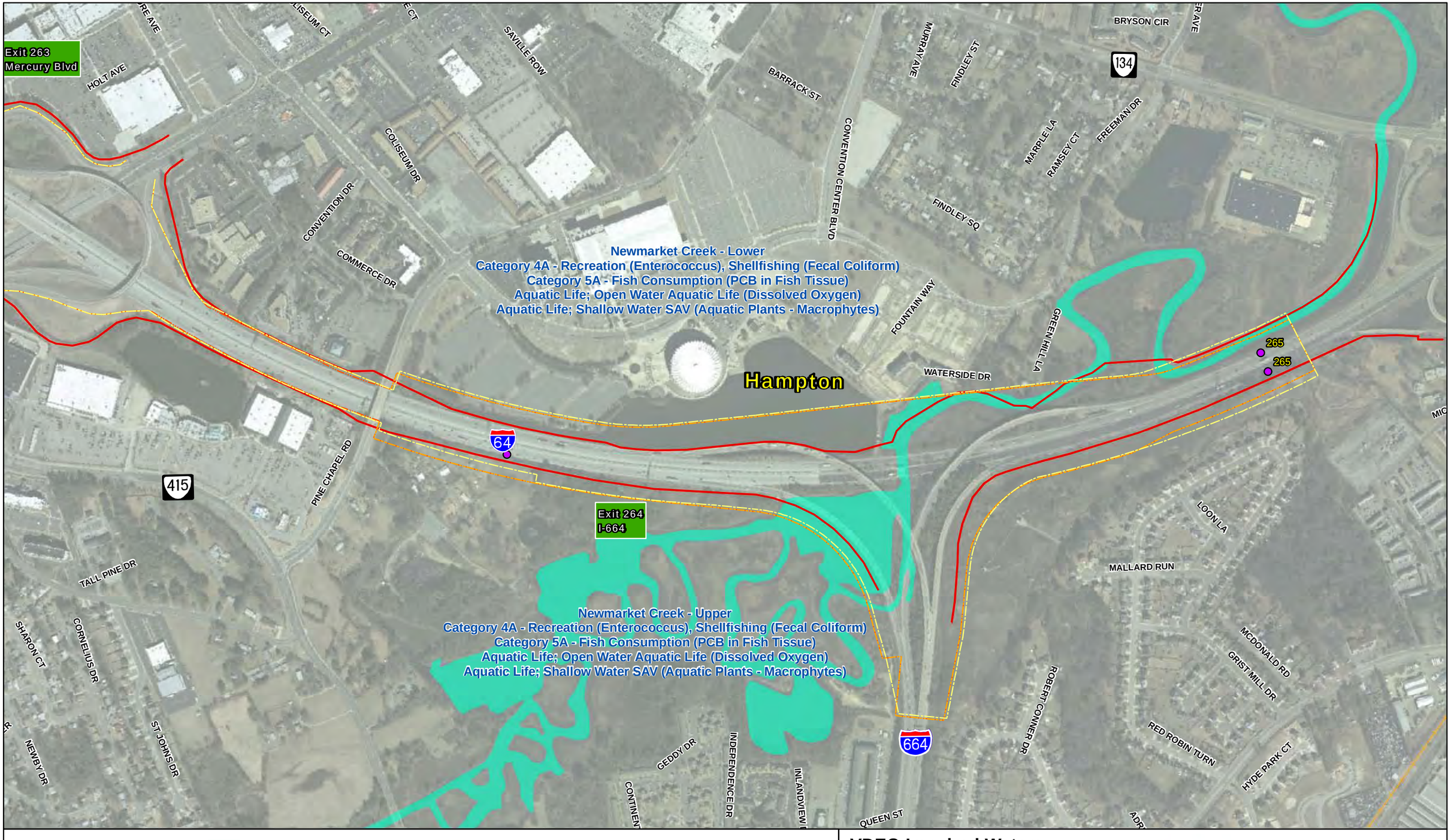
Map 42 of 43

Notes:

Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

0 185 370 740
Feet



INTERSTATE 64 PENINSULA STUDY

- 2010 VDEQ Impaired Waters
- Locality/ Jurisdiction
- 210 Mile Marker
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint
- Limits of Existing Right of Way

VDEQ Impaired Waters Categories 4 and 5 (2010)

Map 43 of 43

Notes:

Roads layer courtesy of VGIN.
2010 Impared Waters data courtesy of Virginia Department of Environmental Quality
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

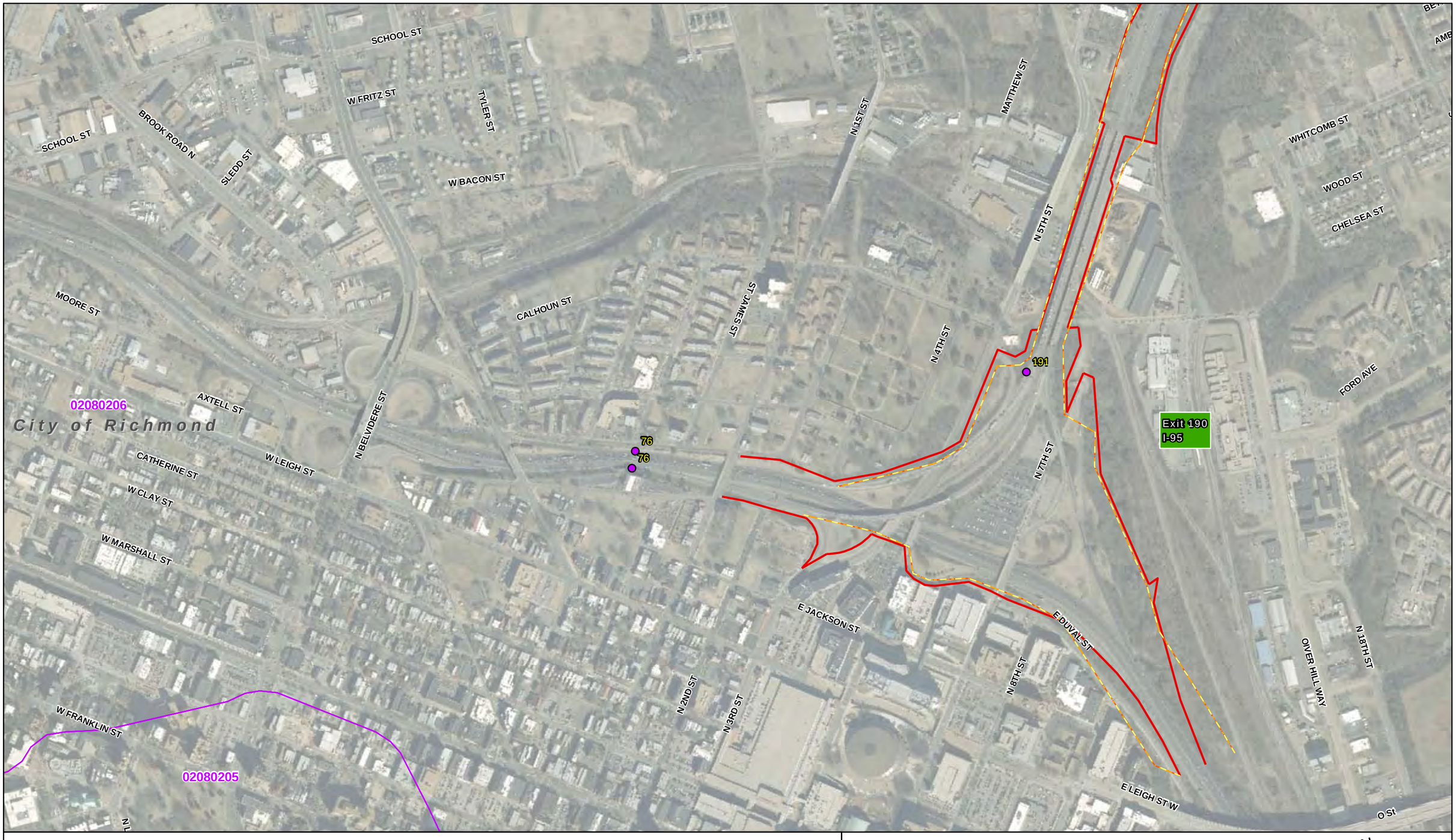
N W E S

0 185 370 740
Feet

INTERSTATE 64 PENINSULA STUDY

APPENDIX

FEMA 100-Year Floodplain Mapping



INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 1 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet

INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 2 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet

INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 3 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet

INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 4 of 43

Notes:

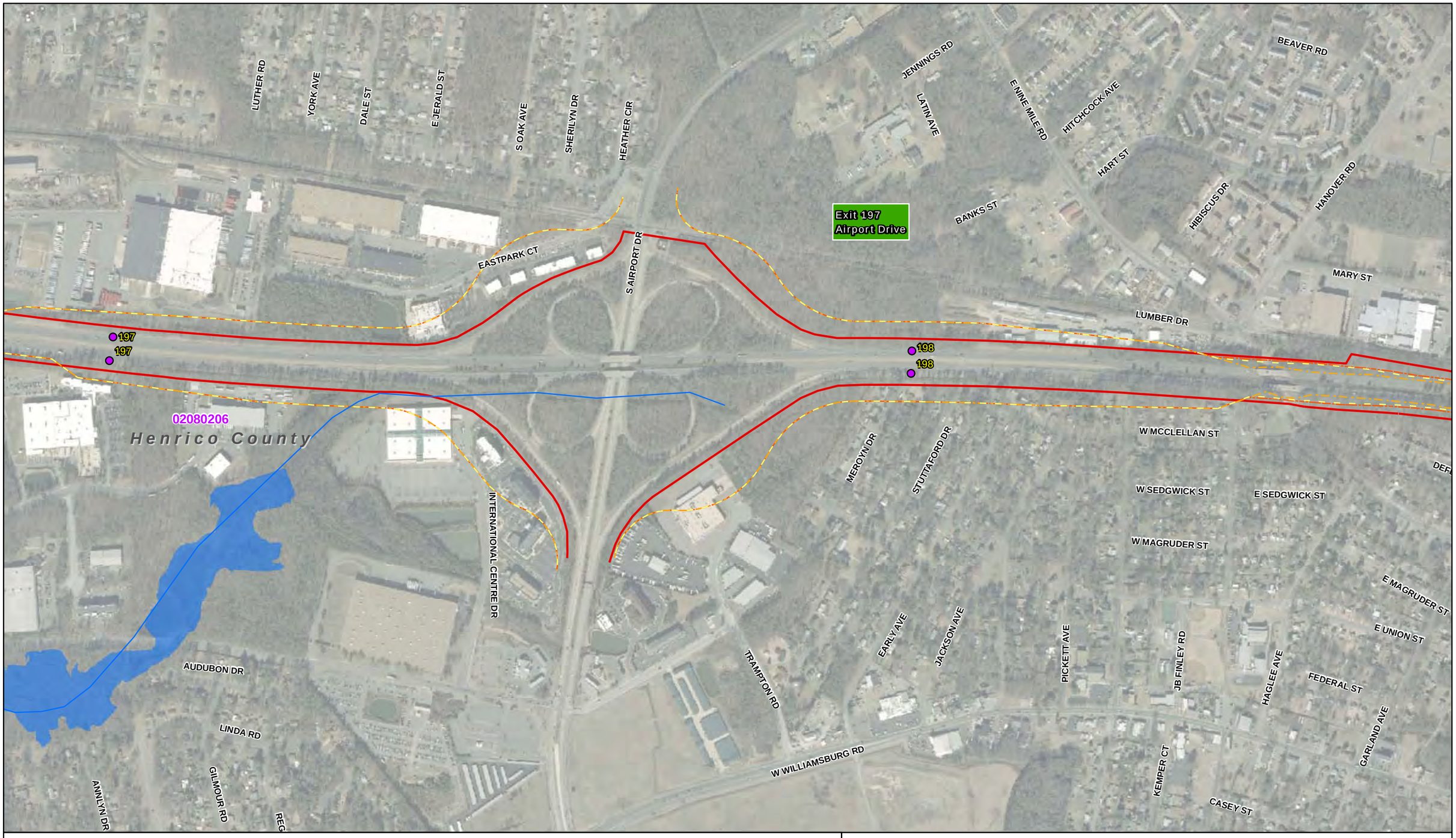
Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800

Feet



INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 5 of 43

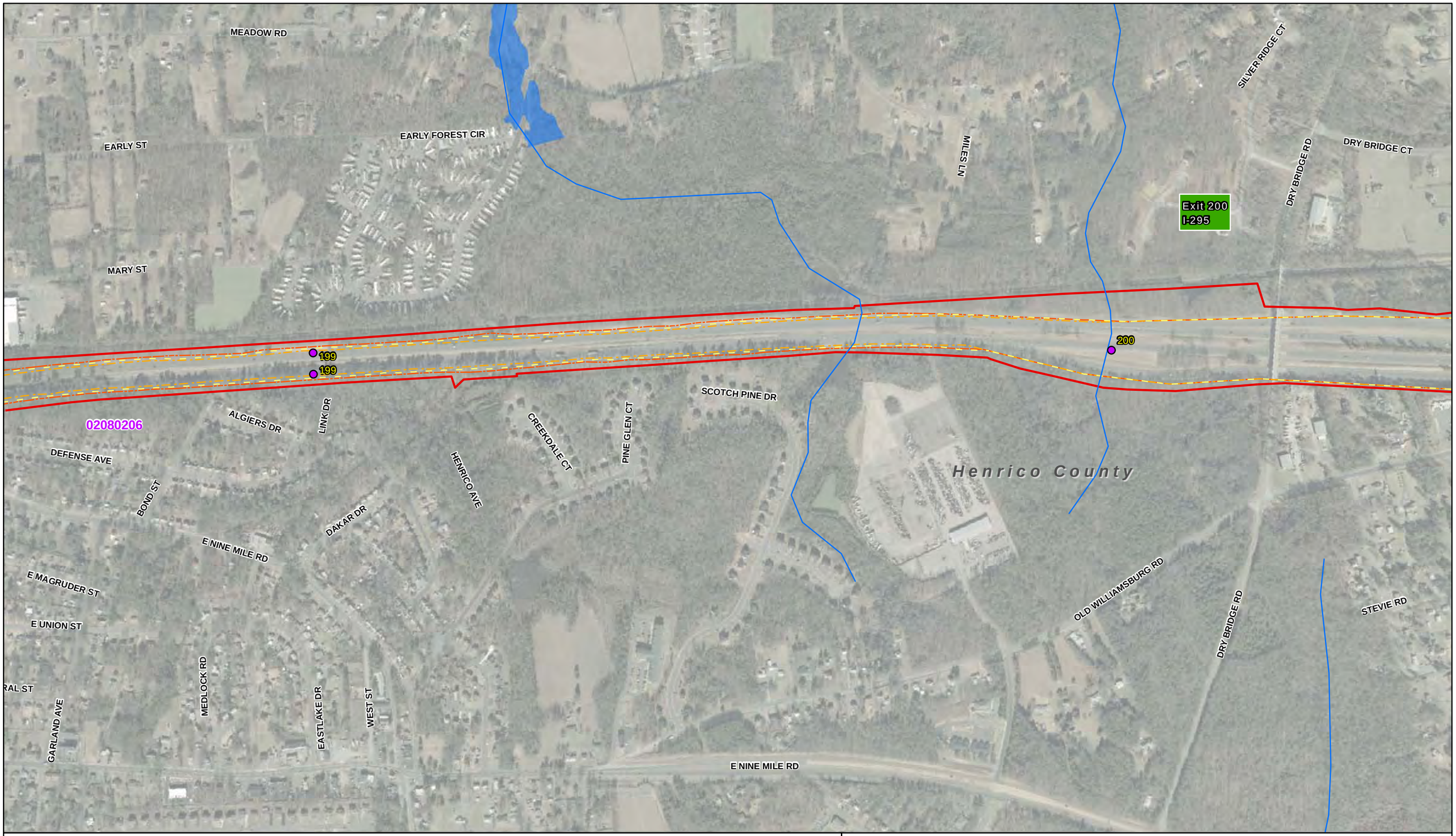
Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet



INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 6 of 43

Notes:

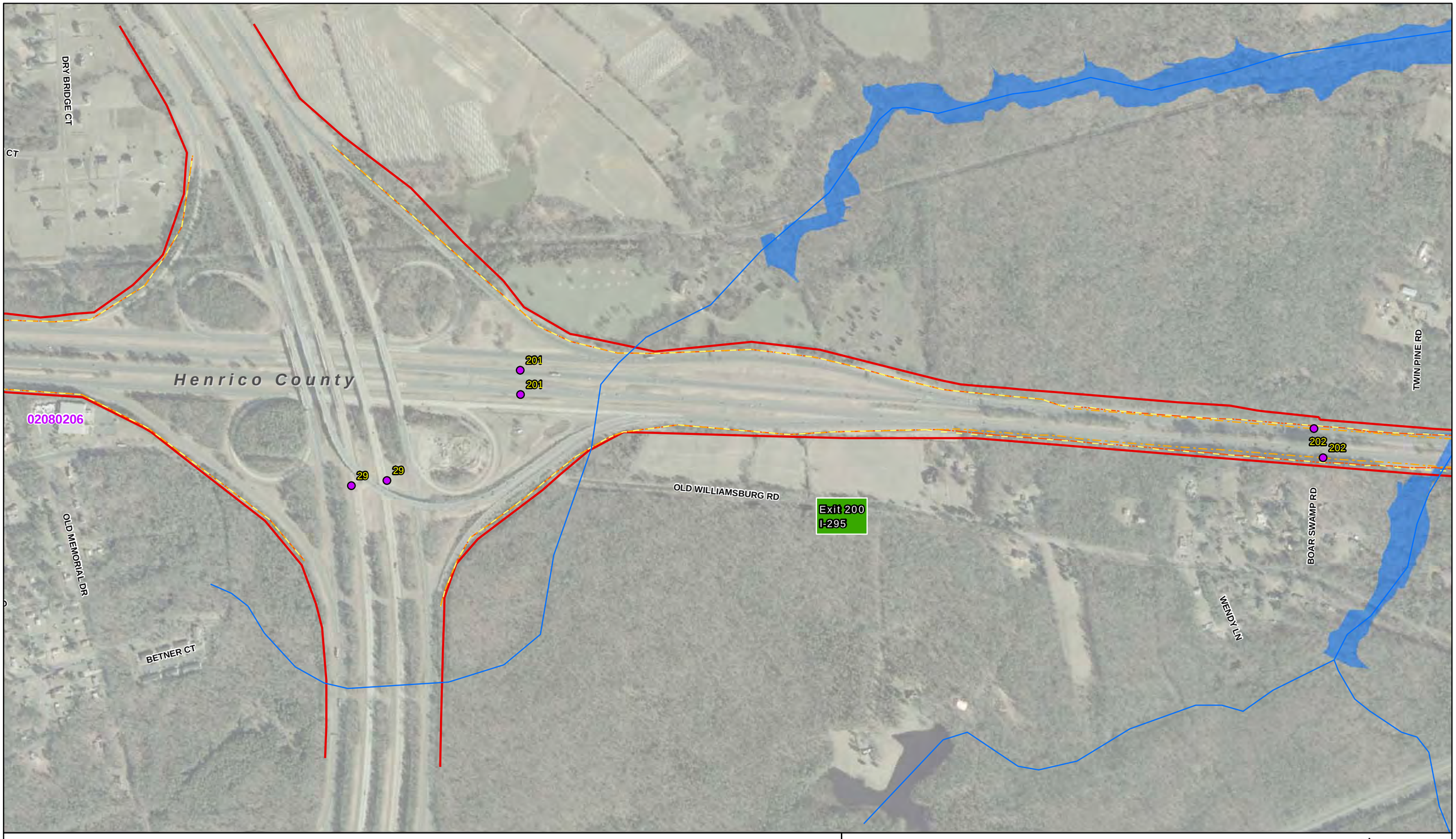
Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800

Feet



INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 7 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet

INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 8 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet

Higgins Swamp

New Kent County

Exit 205
Bottom Bridge

NEW KENT HWY

KINGS CROSS QUAY

QUAY CT

BATTLEFIELD CMNS

N FRANKLINS WAY

KIMBALL LN

S FRANKLINS WAY

CUMBERLAND STATION RD

MARKET PLACE DR

POCAHONTAS TRL

205

205

204

204

02080206

Henrico County

E WILLIAMSBURG RD

WHITE OAK RD

OLD WILLIAMSBURG RD

Chickahominy River

INTERSTATE 64 PENINSULA STUDY

Existing Right of Way

210 Mile Marker

Locality Jurisdiction

1% Annual Chance Flood Hazard (100 year FP)

Hydrologic Unit Code Boundary

USGS Topoquadrangle Surface Water (Non-Assessed)

Limits of Alternative 1A/2A Footprint

Limits of Alternative 1B/2B Footprint

Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 9 of 43

Notes:

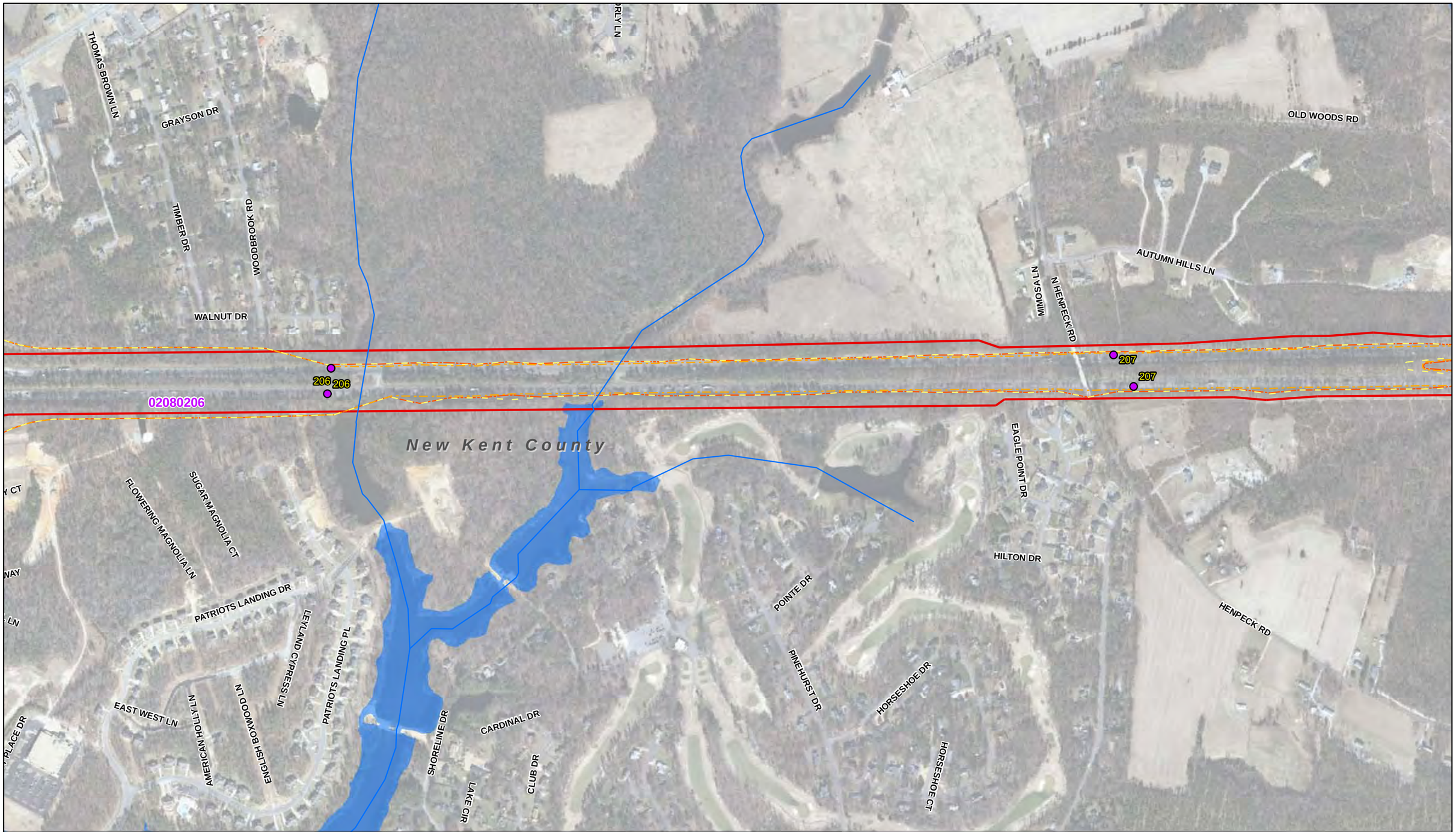
Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800

Feet



INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 10 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet

OLD NOTTINGHAM RD
MARCELLA LN
Crump Swamp
PINE FORK RD
209
209
208
208
AIRPORT RD
New Kent County
02080206
OLD FIELD LN
ASHLAND FARM RD
OLD ROXBURY RD
TIMBER RIDGE RD
CROSSES GROVE RD
HENPECK RD
HEMLOCK RD

INTERSTATE 64 PENINSULA STUDY

Existing Right of Way
210 Mile Marker
Locality Jurisdiction
1% Annual Chance Flood Hazard (100 year FP)
Hydrologic Unit Code Boundary
USGS Topoquadrangle Surface Water (Non-Assessed)
Limits of Alternative 1A/2A Footprint
Limits of Alternative 1B/2B Footprint
Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 11 of 43

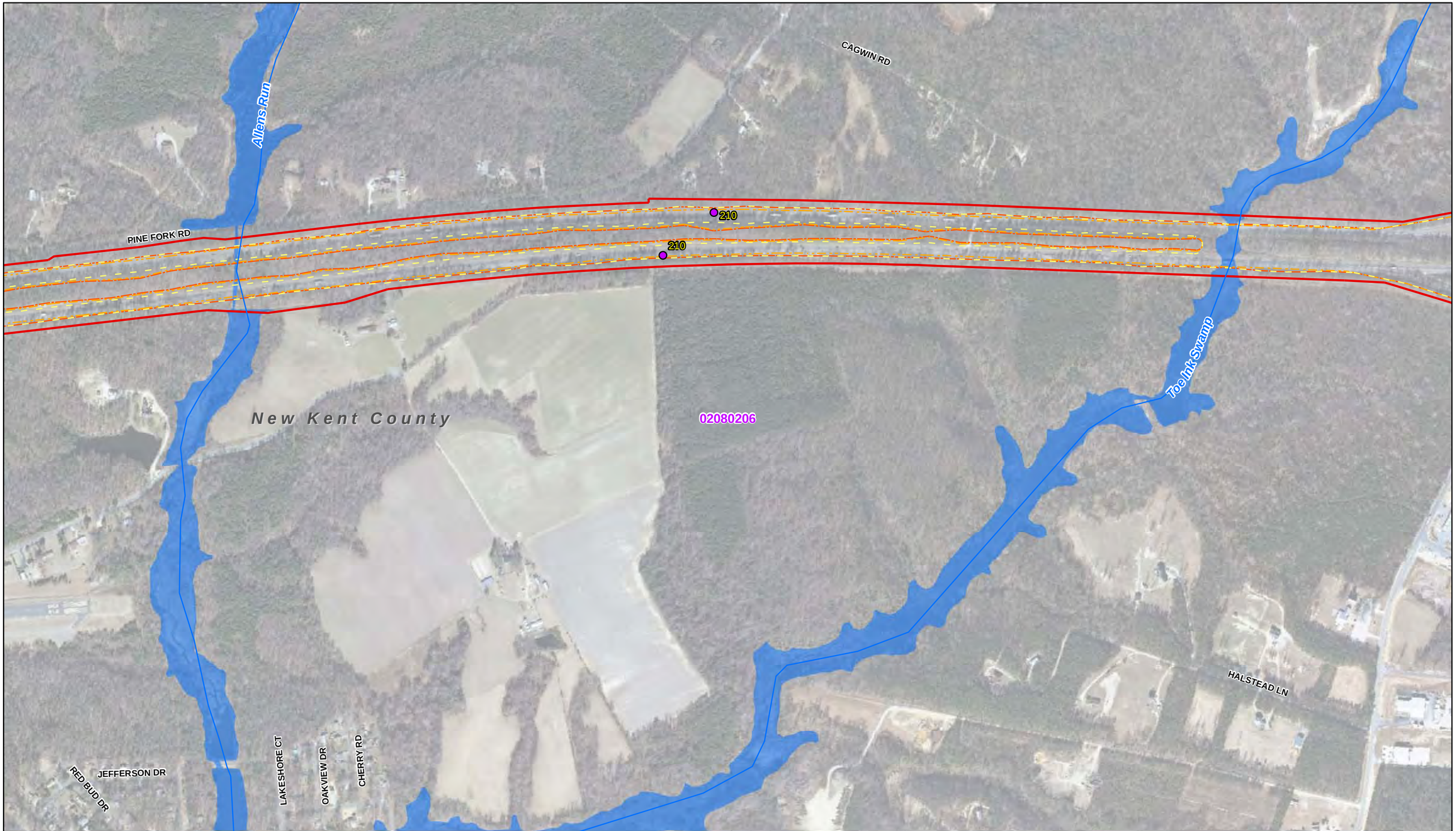
Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet



INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 12 of 43

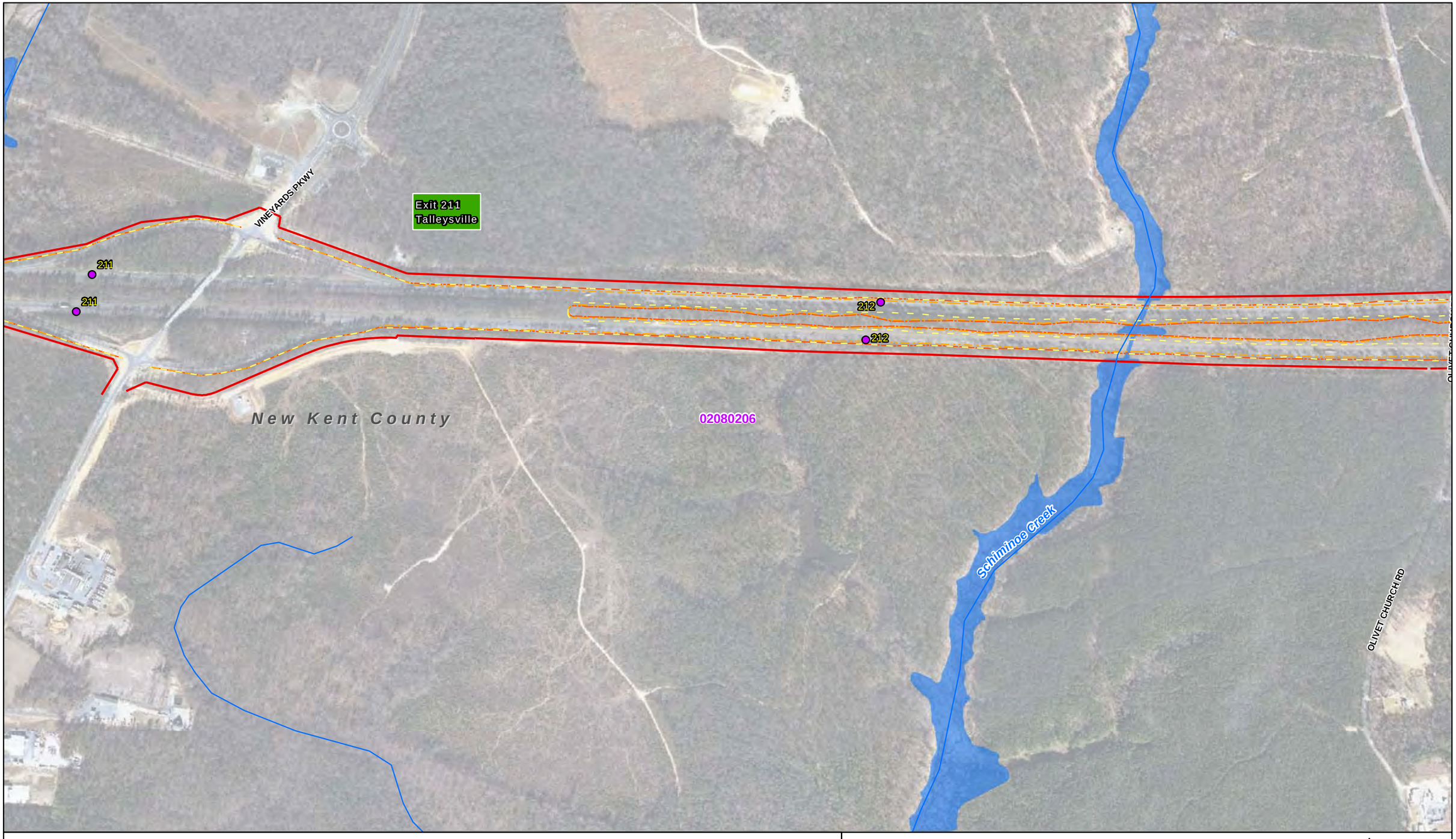
Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet



INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 13 of 43

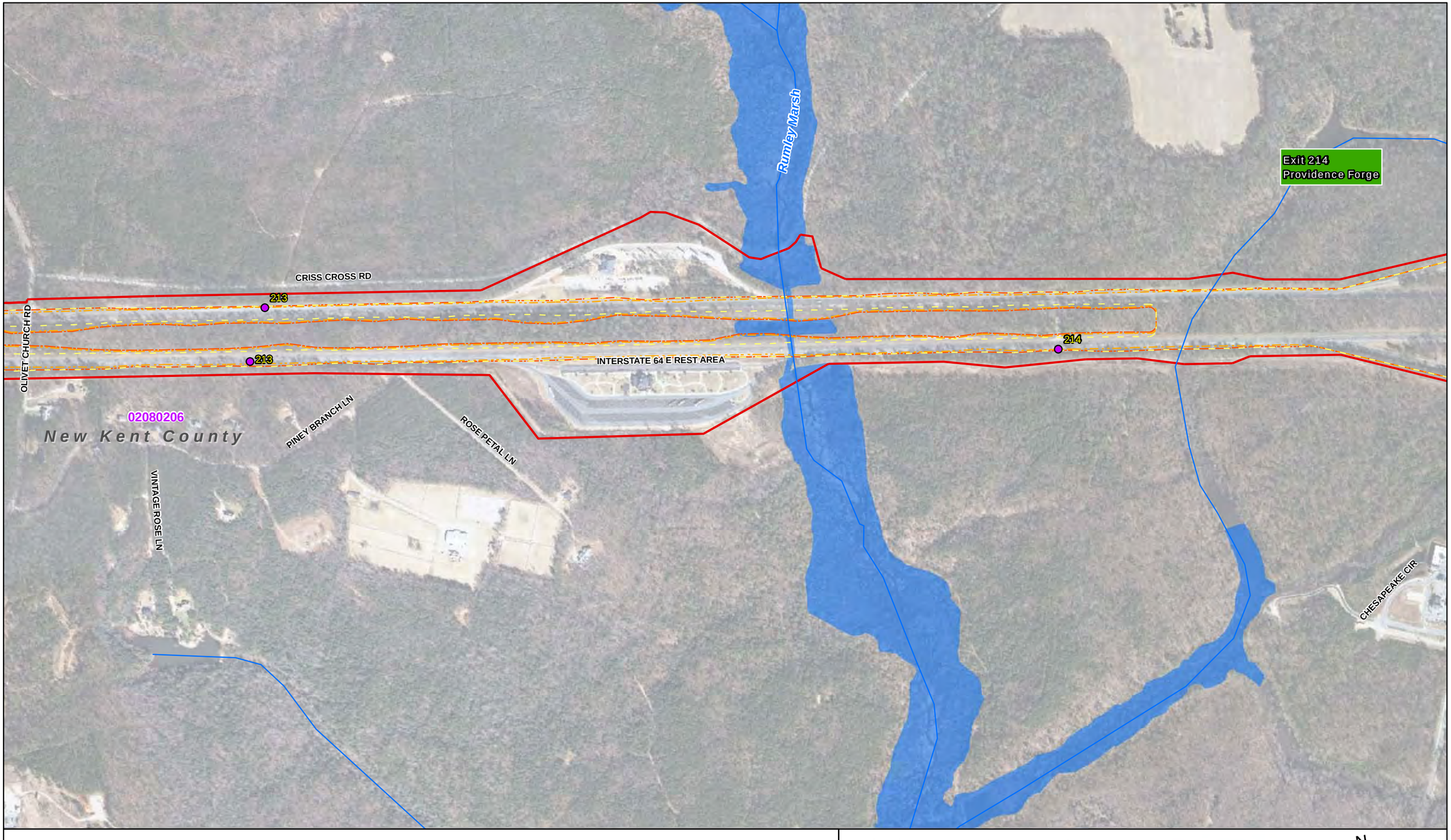
Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet



INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 14 of 43

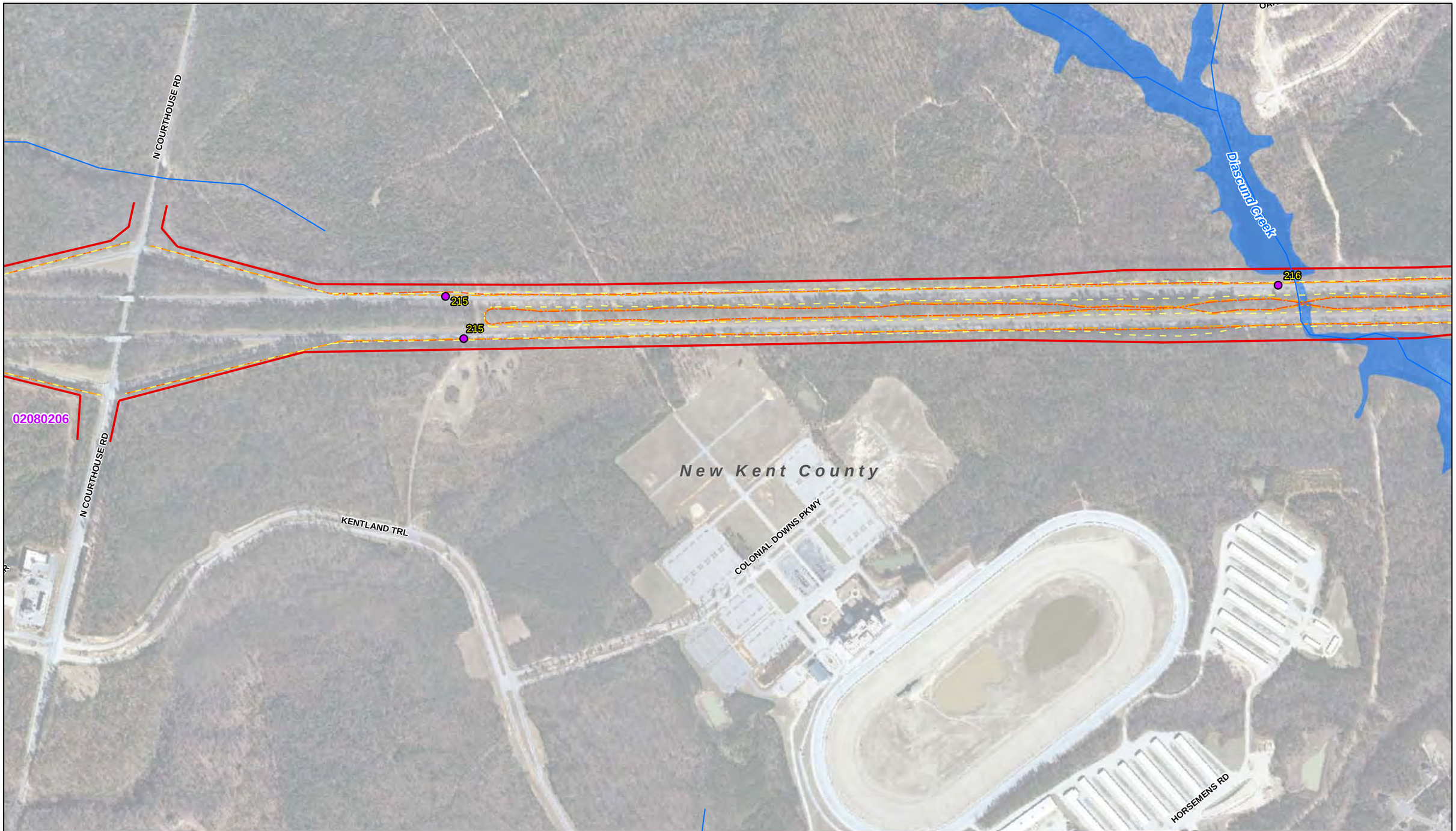
Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet



INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 15 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet

EGYPT RD

LOFTY RETREAT D

217

217

218

218

New Kent County

02080206

Diascund Creek

BRICKSHIRE DR

REGAL LN

CHAUCER DR

EGYPT RD

KRUG LN

MT PLEASANT RD

Diascund Creek

INTERSTATE 64 PENINSULA STUDY

Existing Right of Way

210 Mile Marker

Locality Jurisdiction

1% Annual Chance Flood Hazard (100 year FP)

Hydrologic Unit Code Boundary

USGS Topoquadrangle Surface Water (Non-Assessed)

Limits of Alternative 1A/2A Footprint

Limits of Alternative 1B/2B Footprint

Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 16 of 43

Notes:

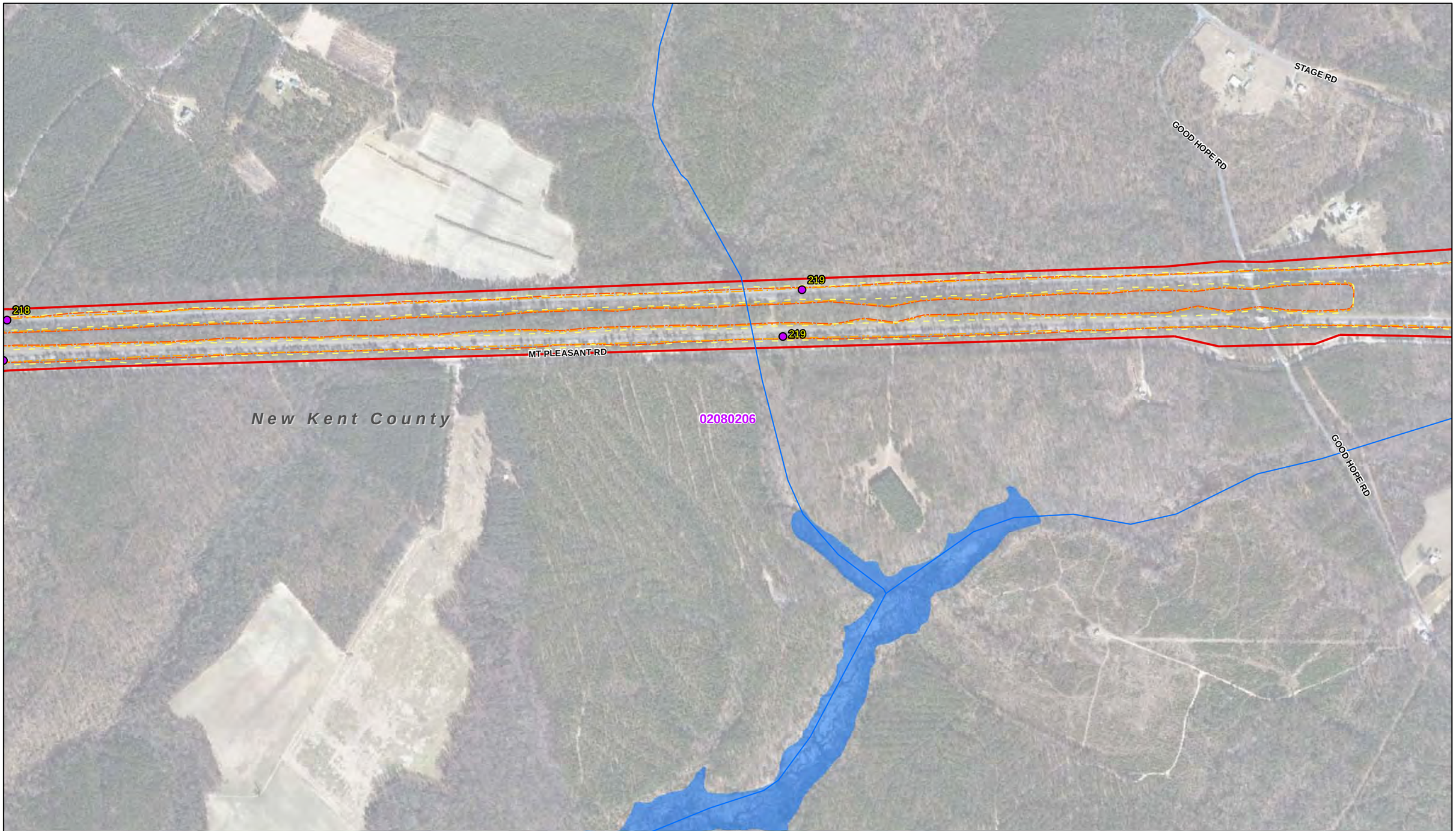
Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800

Feet



INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 17 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

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Feet

EBB CIR
STAGE RD
Exit 220
West Point
OLD HUNT CLUB RD
Beaver Dam Creek
220
220
MARINE CORPS DR
221
221
02080206
New Kent County
JACK'S CORNER DR

INTERSTATE 64 PENINSULA STUDY

Existing Right of Way
210 Mile Marker
Locality Jurisdiction
1% Annual Chance Flood Hazard (100 year FP)
Hydrologic Unit Code Boundary
USGS Topoquadrangle Surface Water (Non-Assessed)
Limits of Alternative 1A/2A Footprint
Limits of Alternative 1B/2B Footprint
Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 18 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

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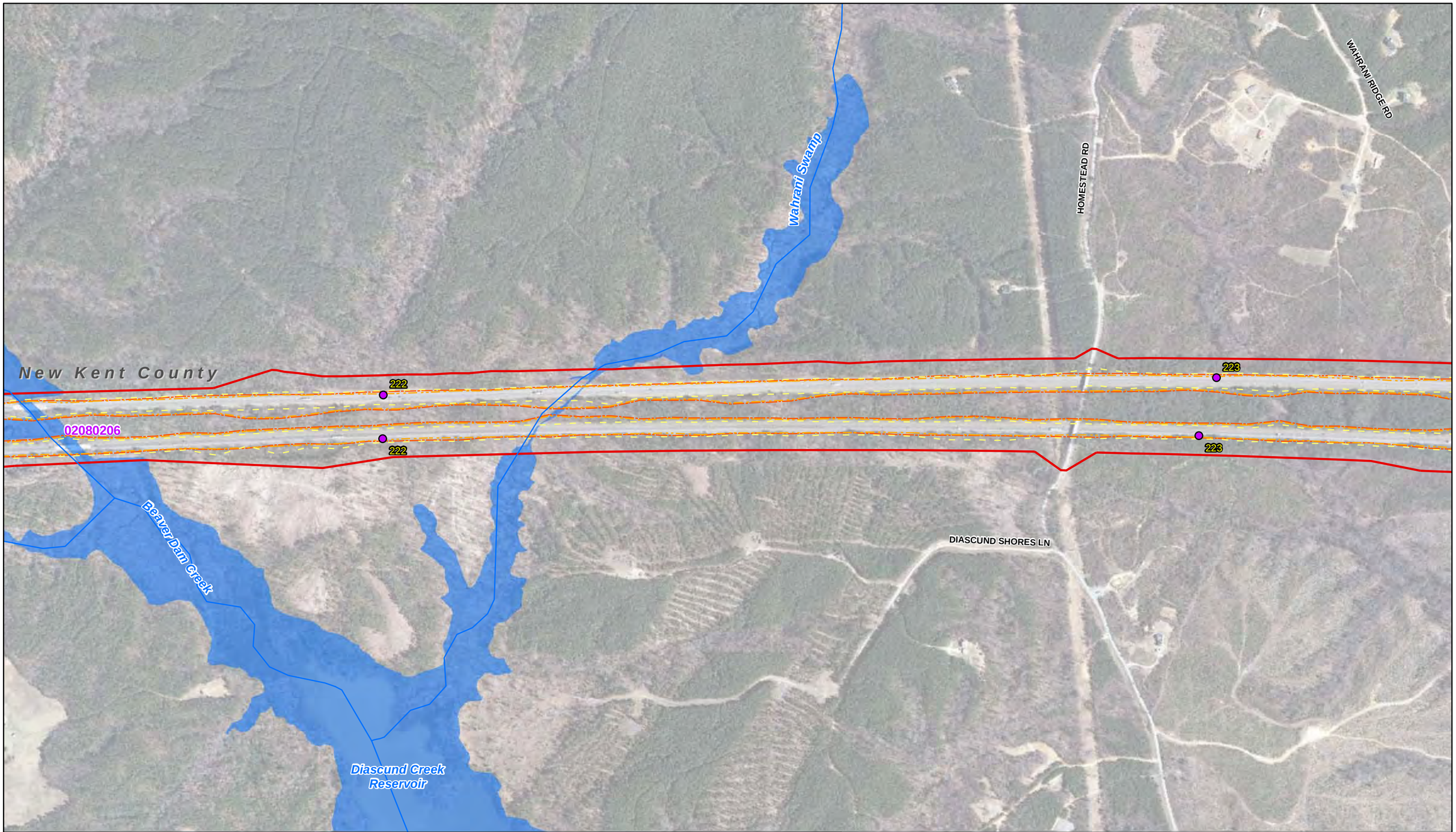
Feet



INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 19 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

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Feet

WEDGEWOOD DR
WEDGEWOOD CT
MOORES LN
TILFORD MILL LN
Barnes Swamp
ROPERS CHURCH RD
New Kent County
02080206
James City County
224
224
225
225
Diascund Creek Reservoir

INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
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- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 20 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

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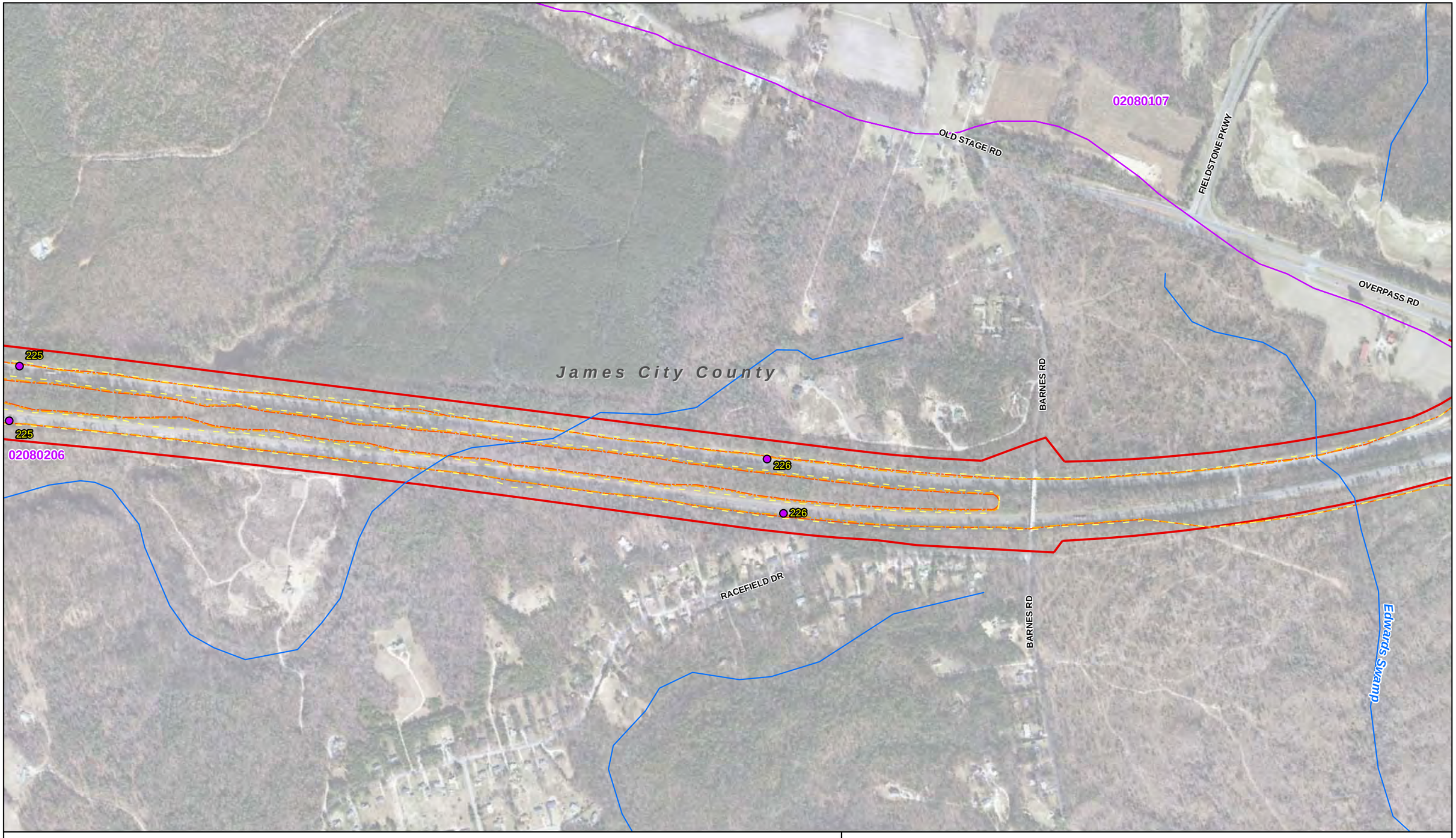

INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
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- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 21 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

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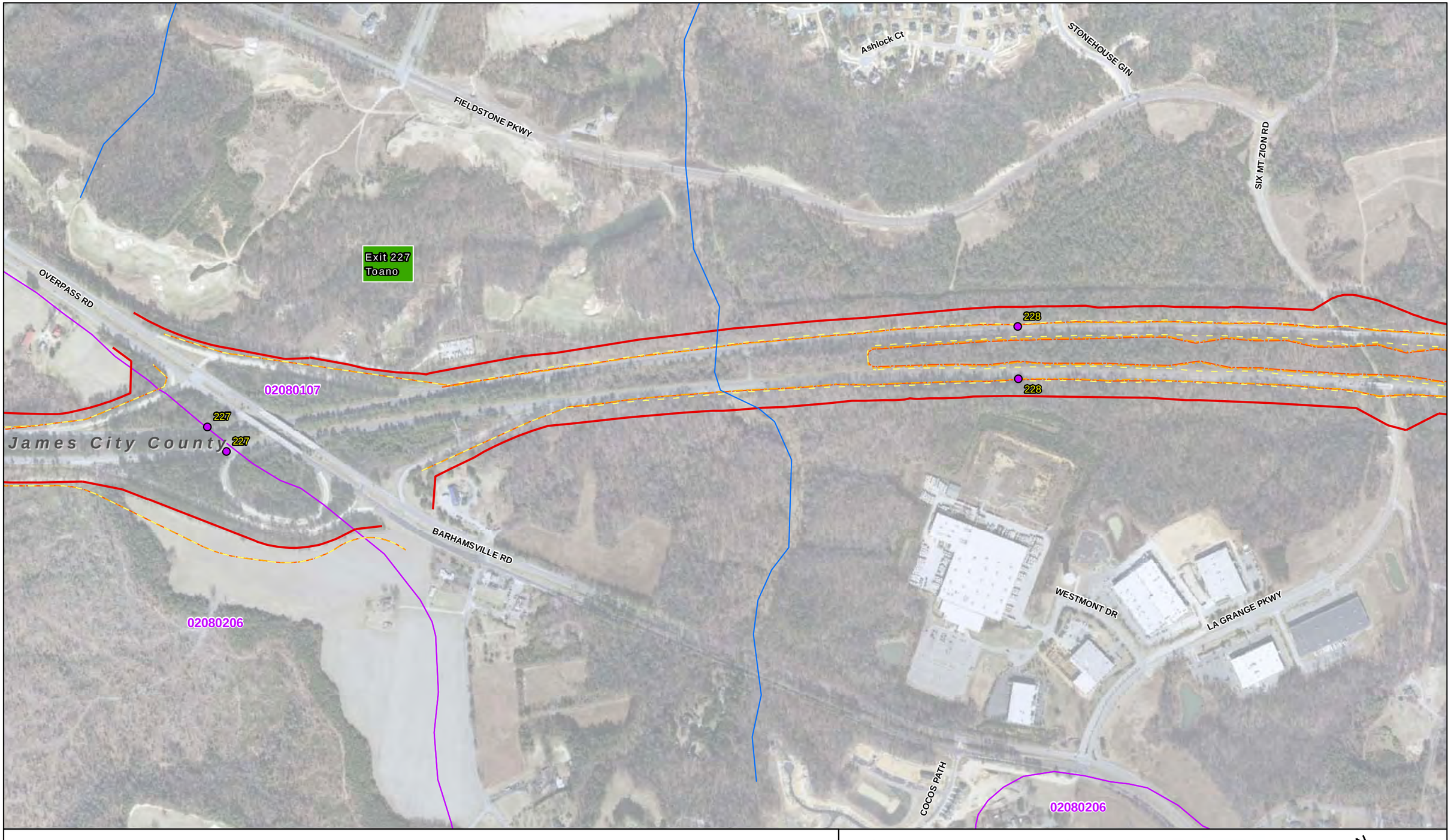
Feet



INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
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- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 22 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

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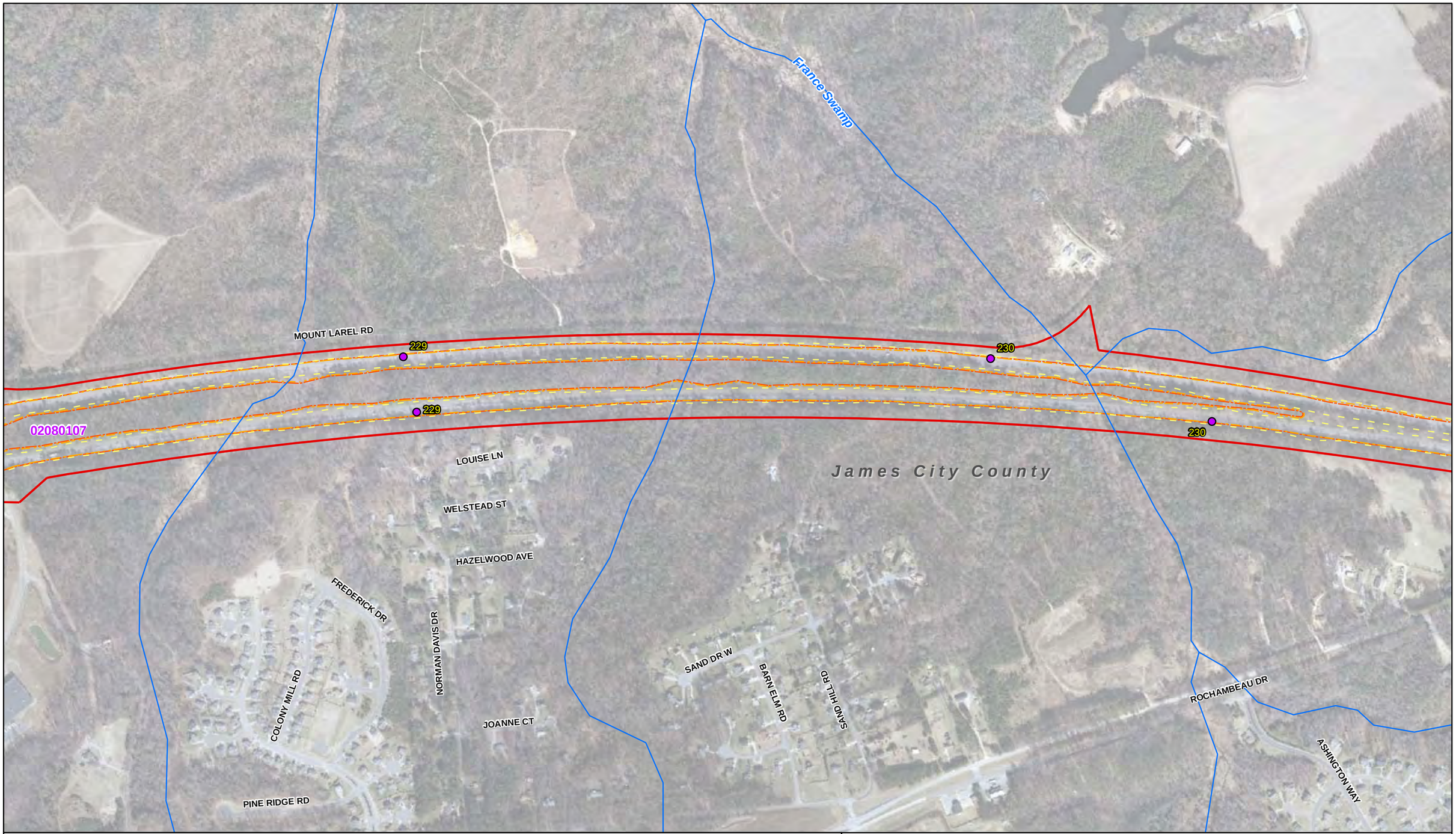
Feet



INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 23 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet

INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
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- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 24 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

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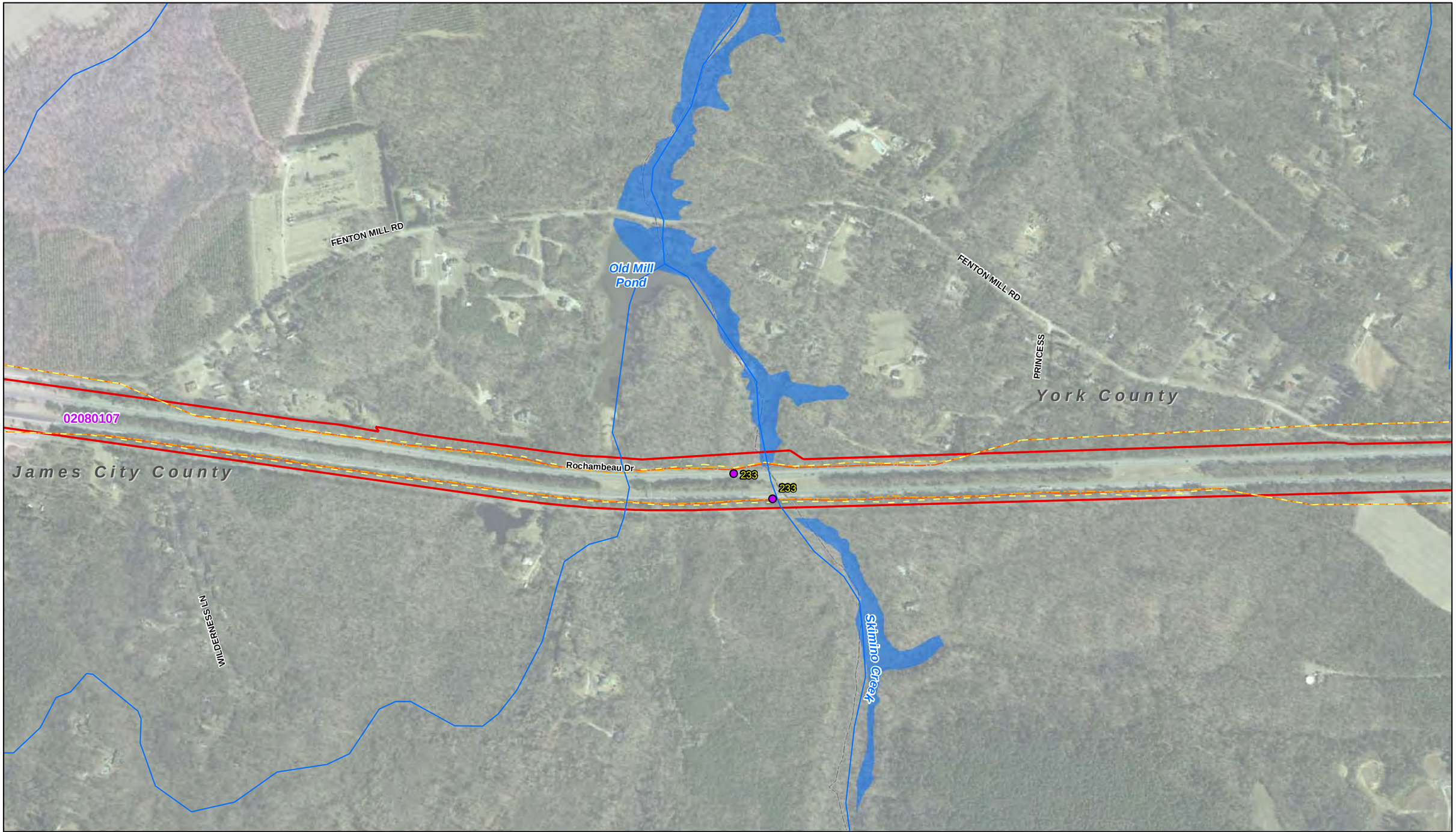
Feet



INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 25 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

0 400 800
Feet

INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 26 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

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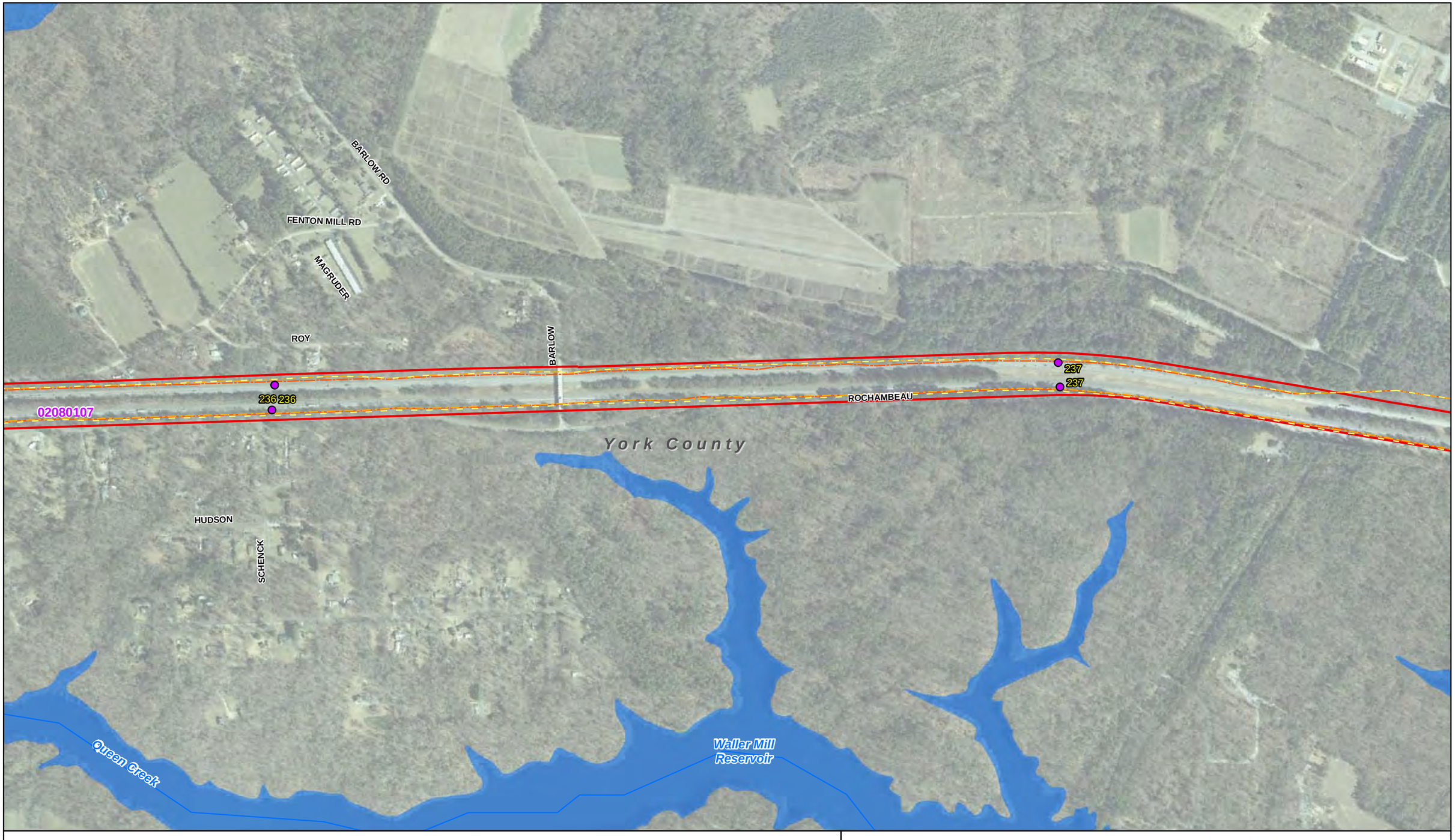


INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

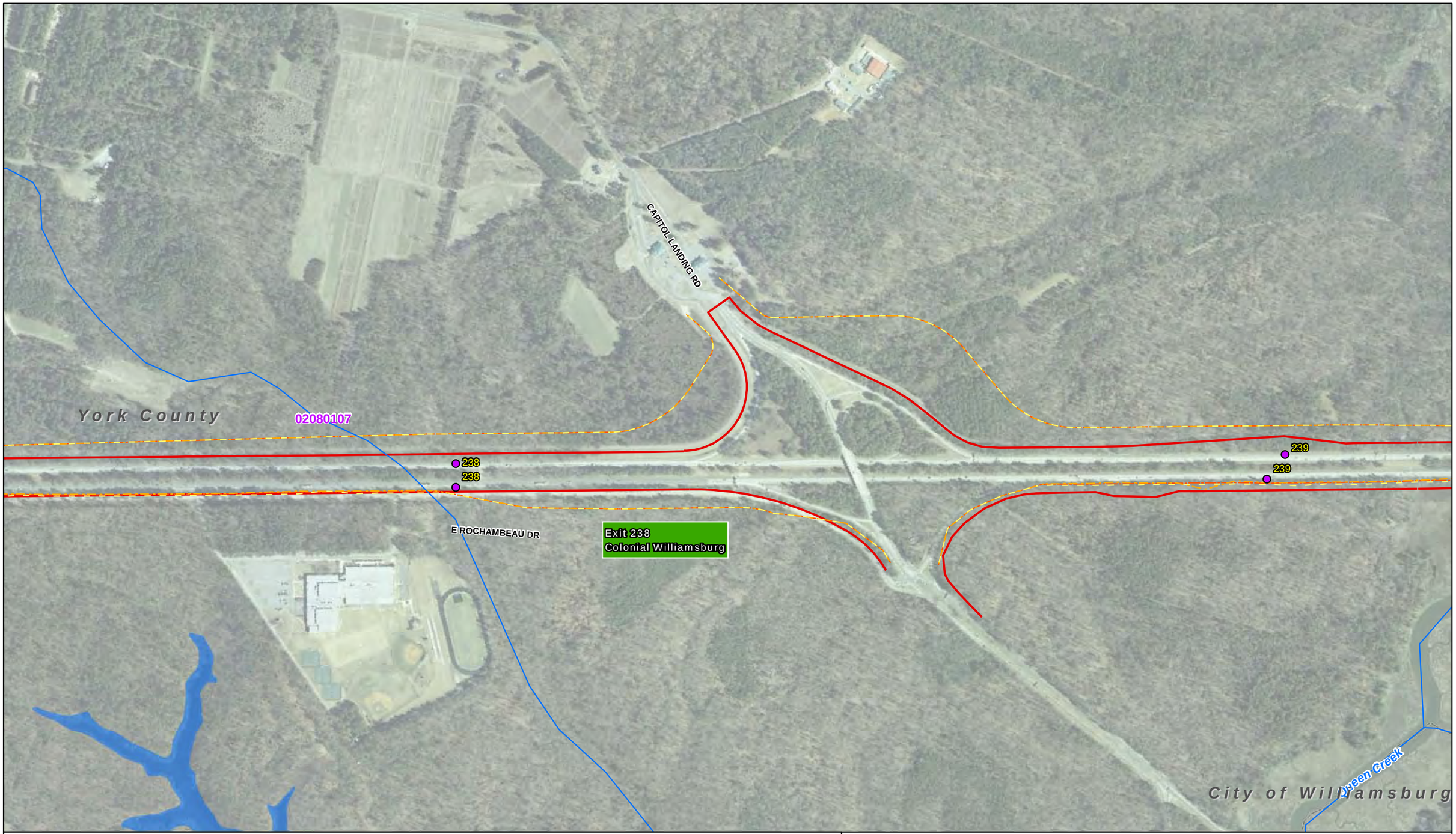
Map 27 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

0 400 800
Feet



INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 28 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

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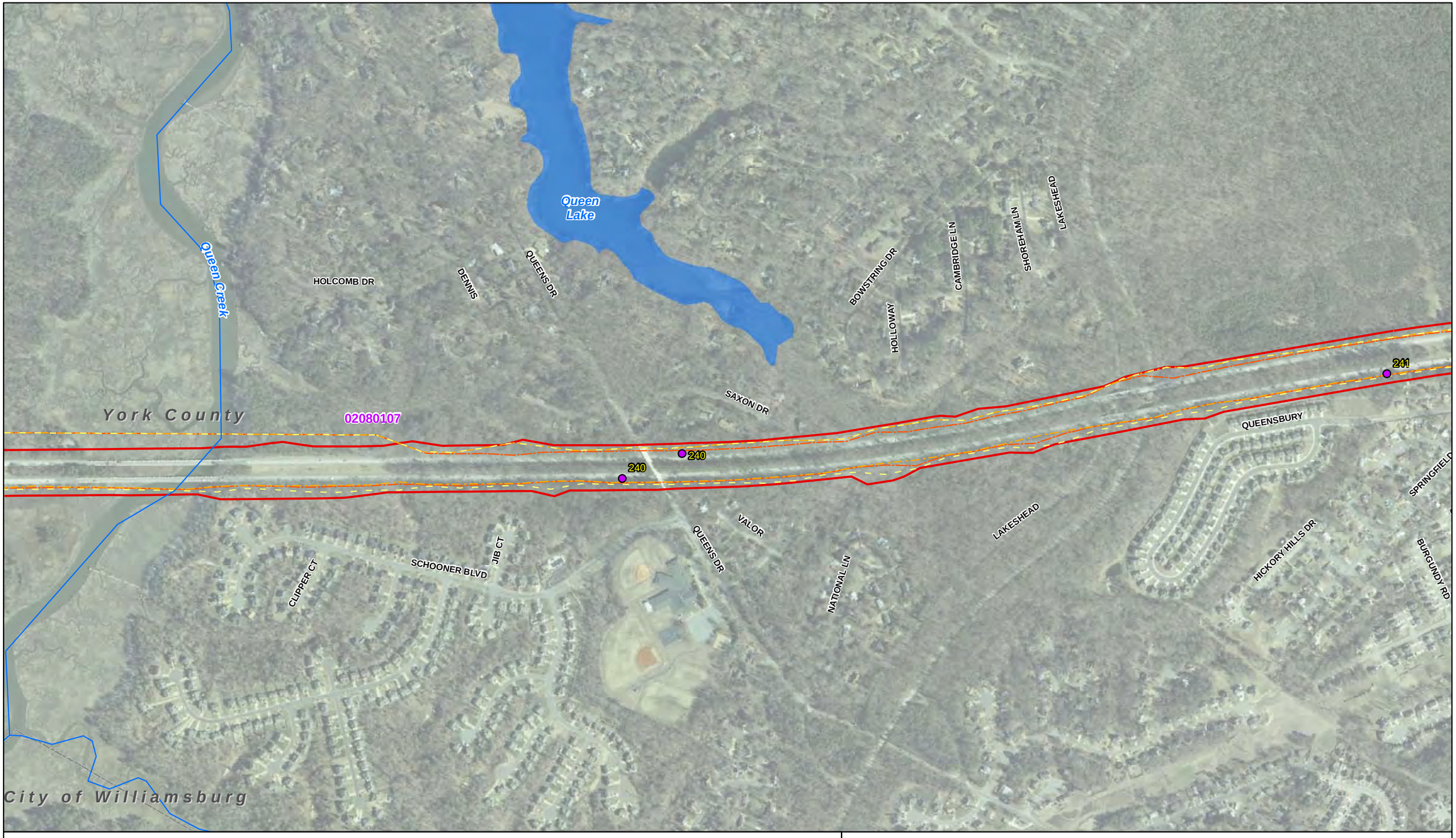
Feet



INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 29 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
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VDOT

0 400 800
Feet

INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 30 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet

King Creek

Exit 243
Busch Gardens

York County
02080107

243
243

SERPENTINE

ROLLING HILLS

BURMA

244
244

MERRIMAC

CHEESECAKE RD

MERRIMAC TRL

60

02080206

James City County

BUSCH GARDENS BLVD

INTERSTATE 64 PENINSULA STUDY

Existing Right of Way

210 Mile Marker

Locality Jurisdiction

1% Annual Chance Flood Hazard (100 year FP)

Hydrologic Unit Code Boundary

USGS Topoquadrangle Surface Water (Non-Assessed)

Limits of Alternative 1A/2A Footprint

Limits of Alternative 1B/2B Footprint

Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 31 of 43

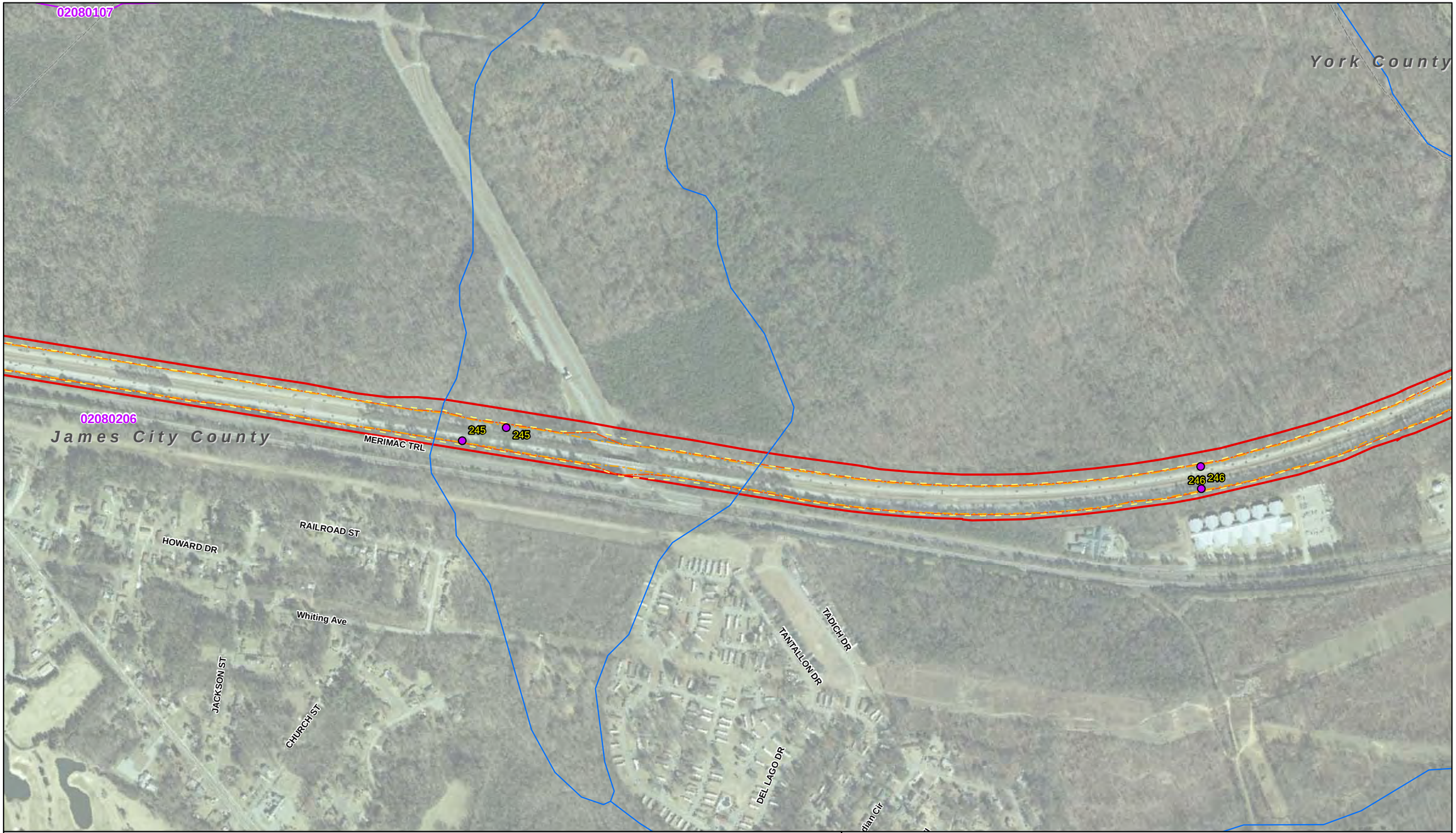
Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet



INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 32 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet

INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 33 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

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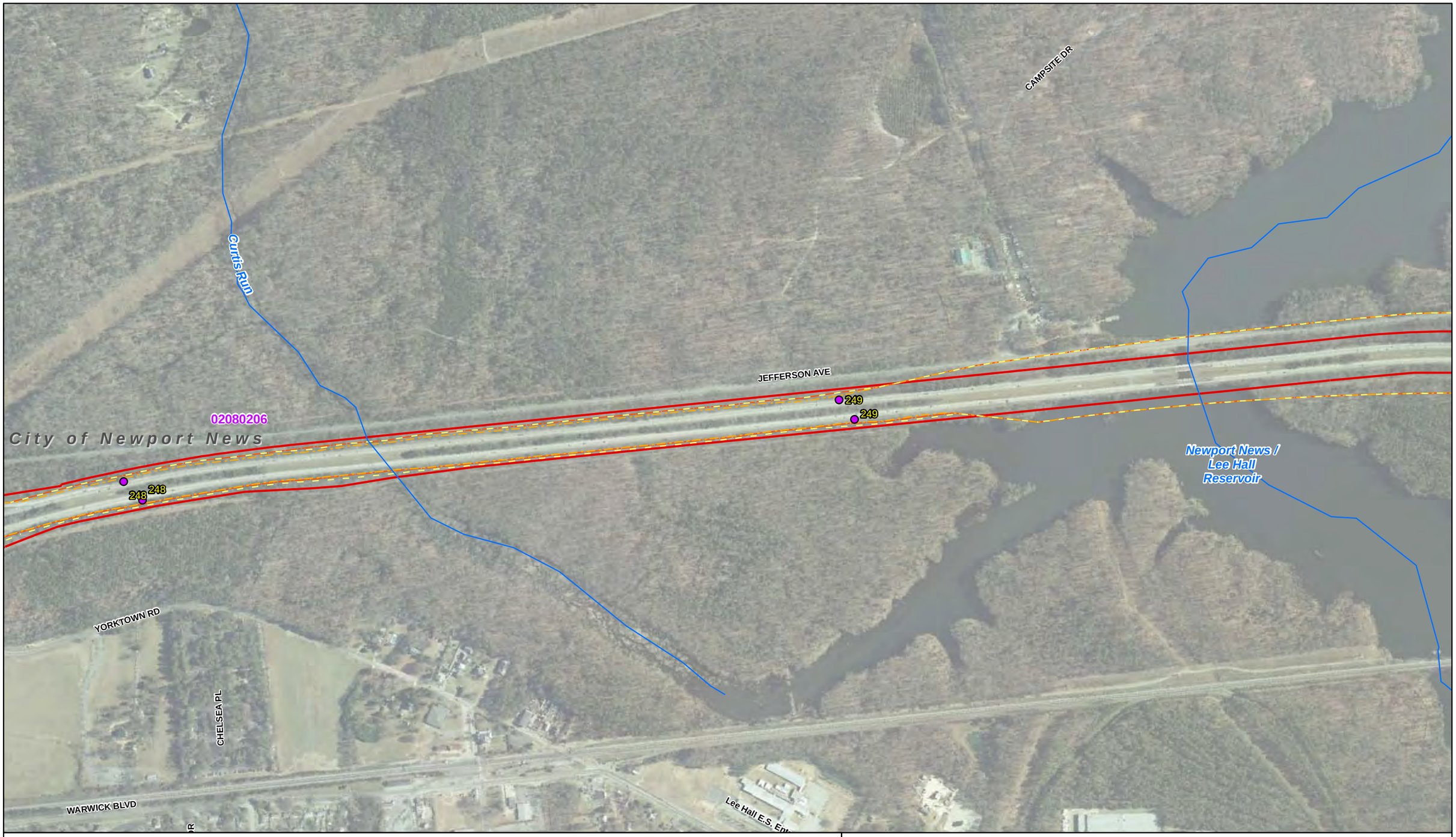

INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 34 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

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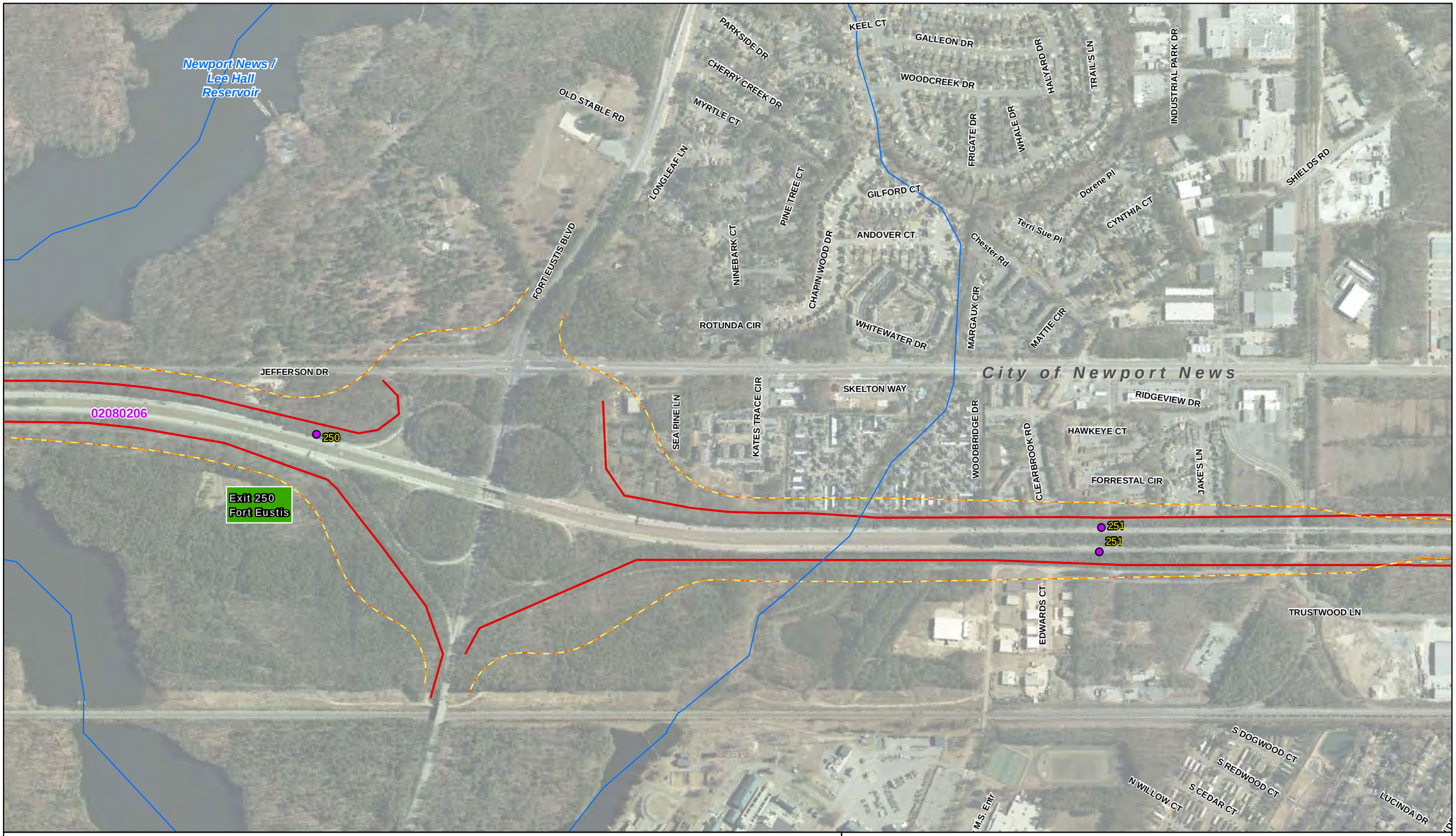
Feet



INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 35 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

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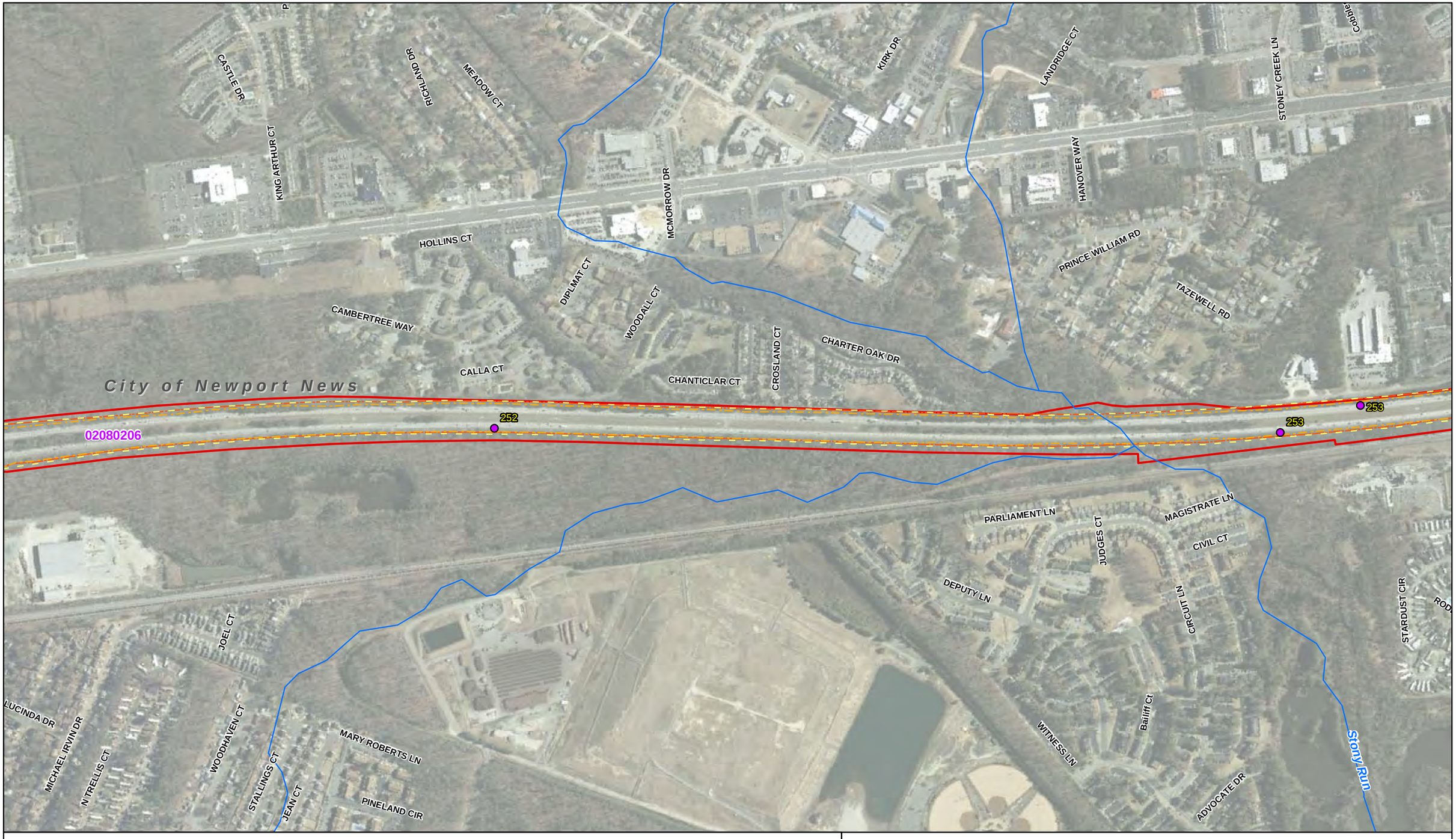
Feet



INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 36 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
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VDOT

N

0 400 800

Feet

INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 37 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

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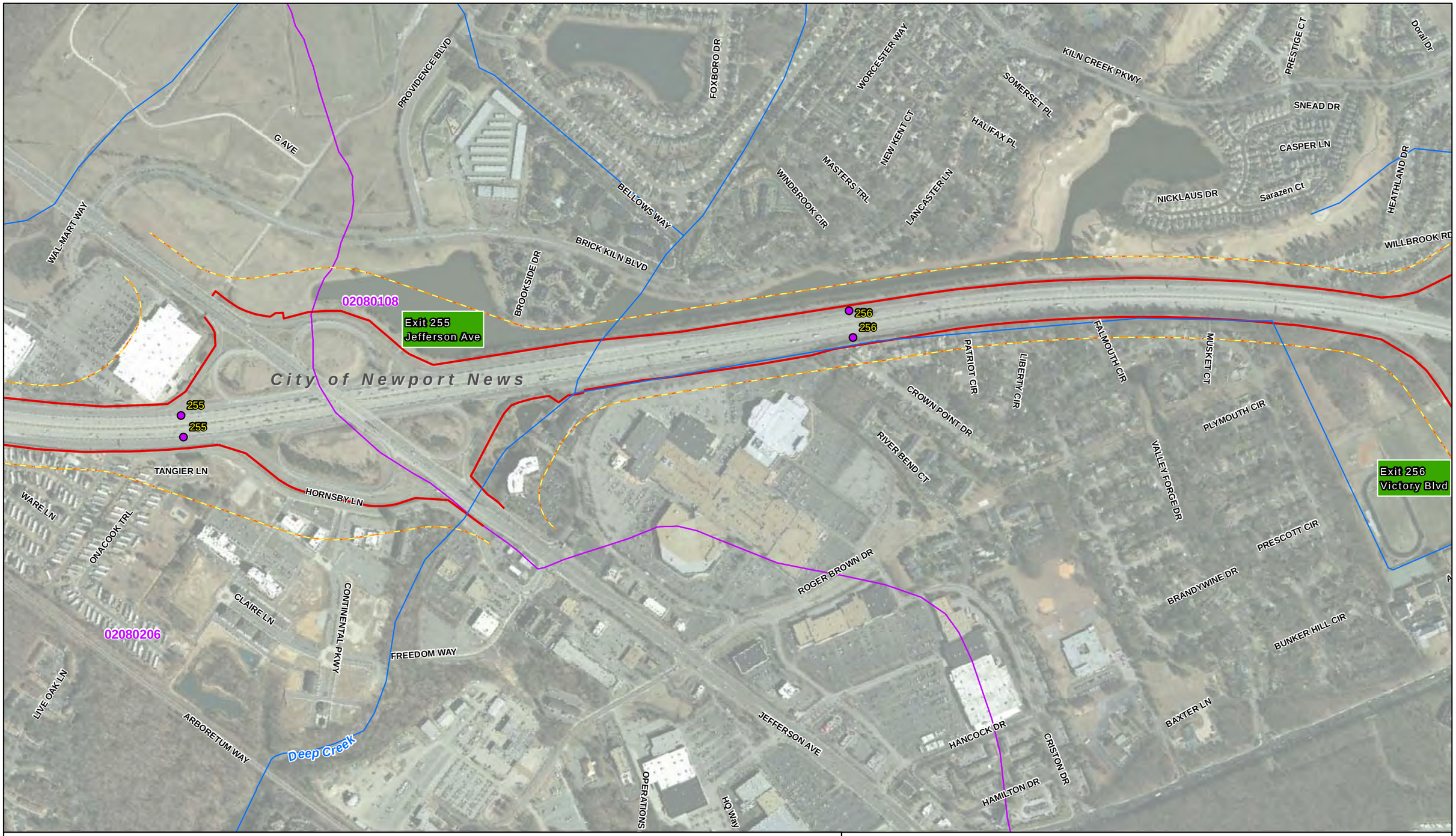
Feet



INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 38 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet

INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
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- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 39 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

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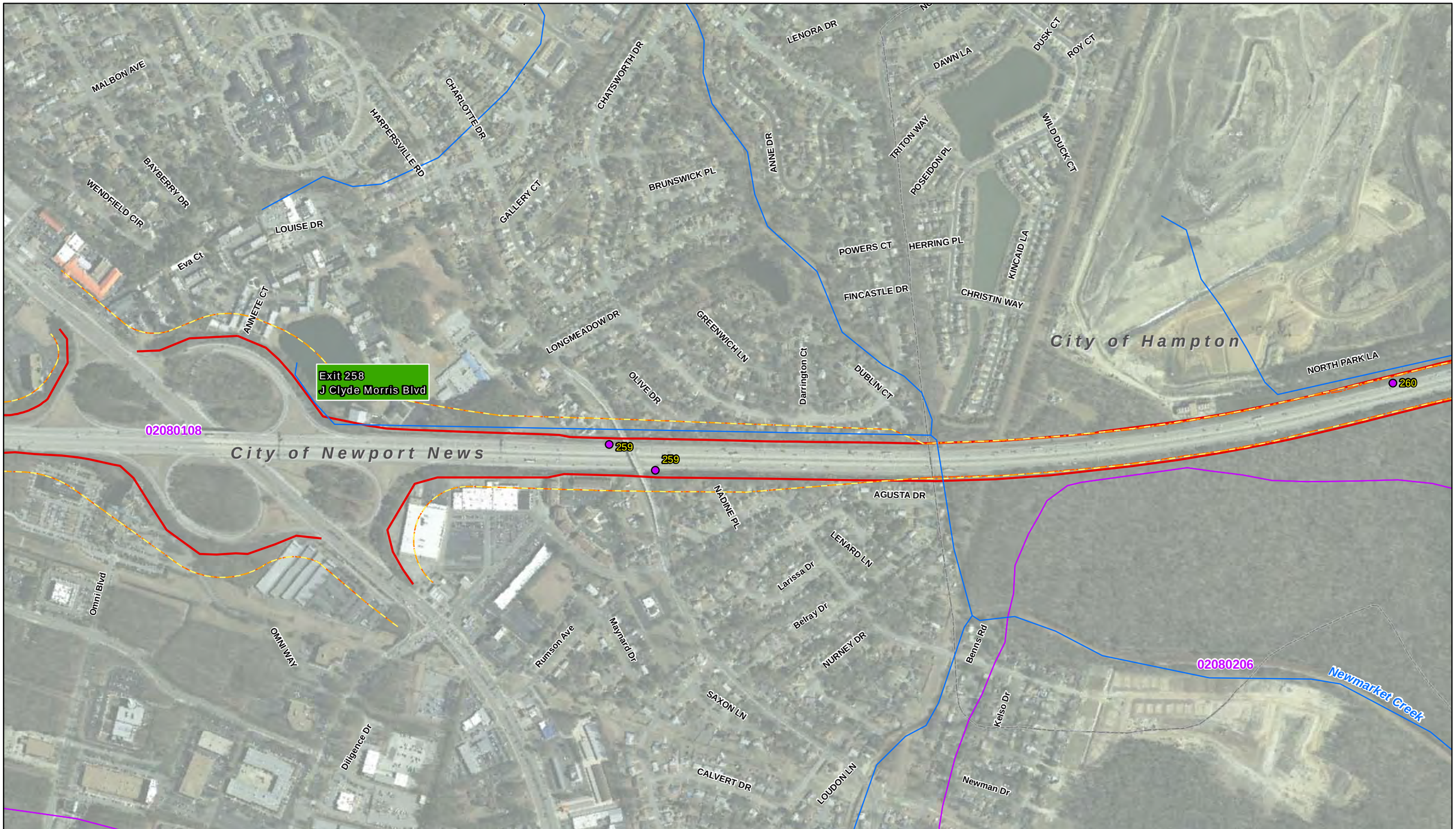
Feet



INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
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- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 40 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

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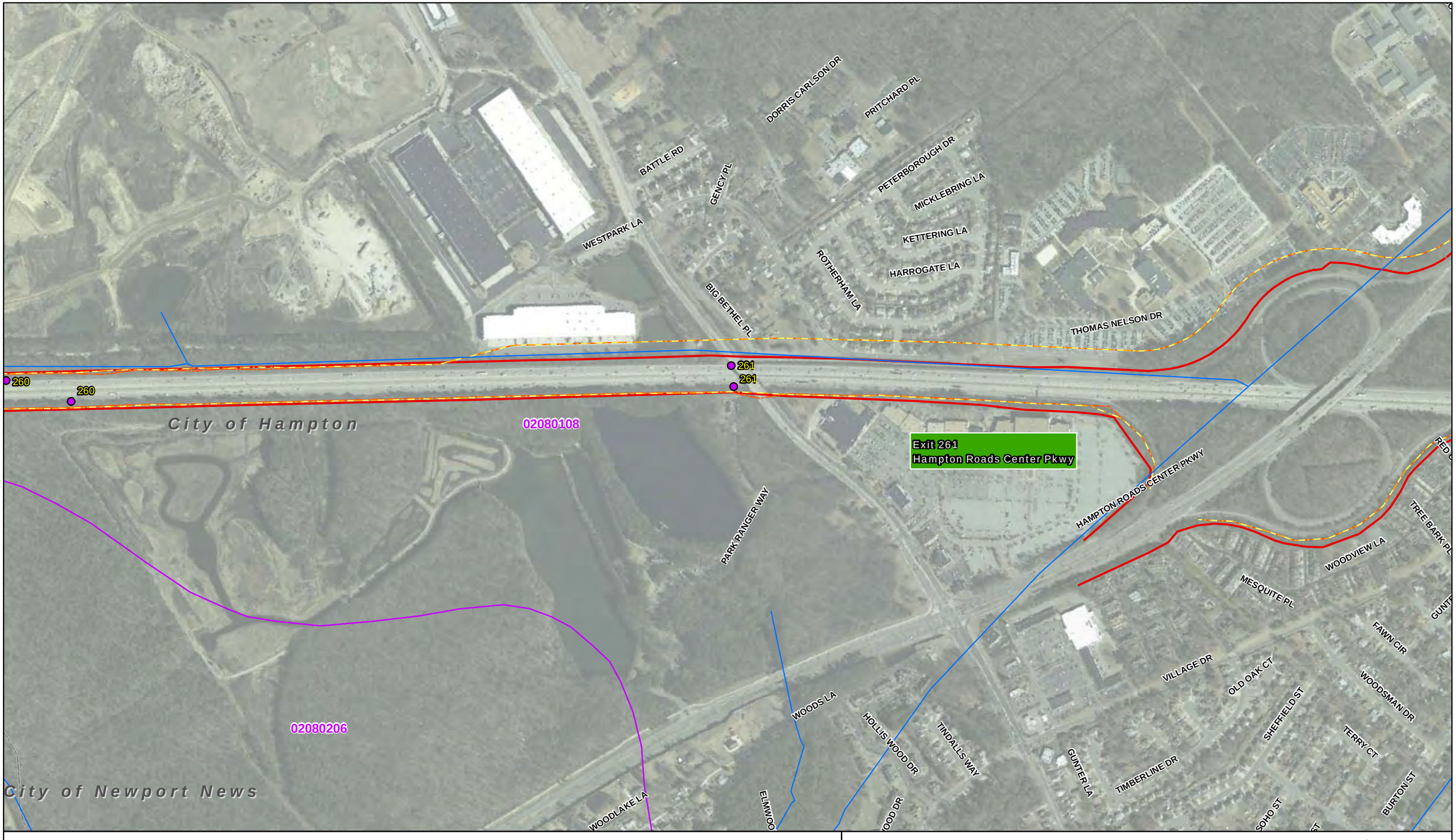
Feet



INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
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- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 41 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

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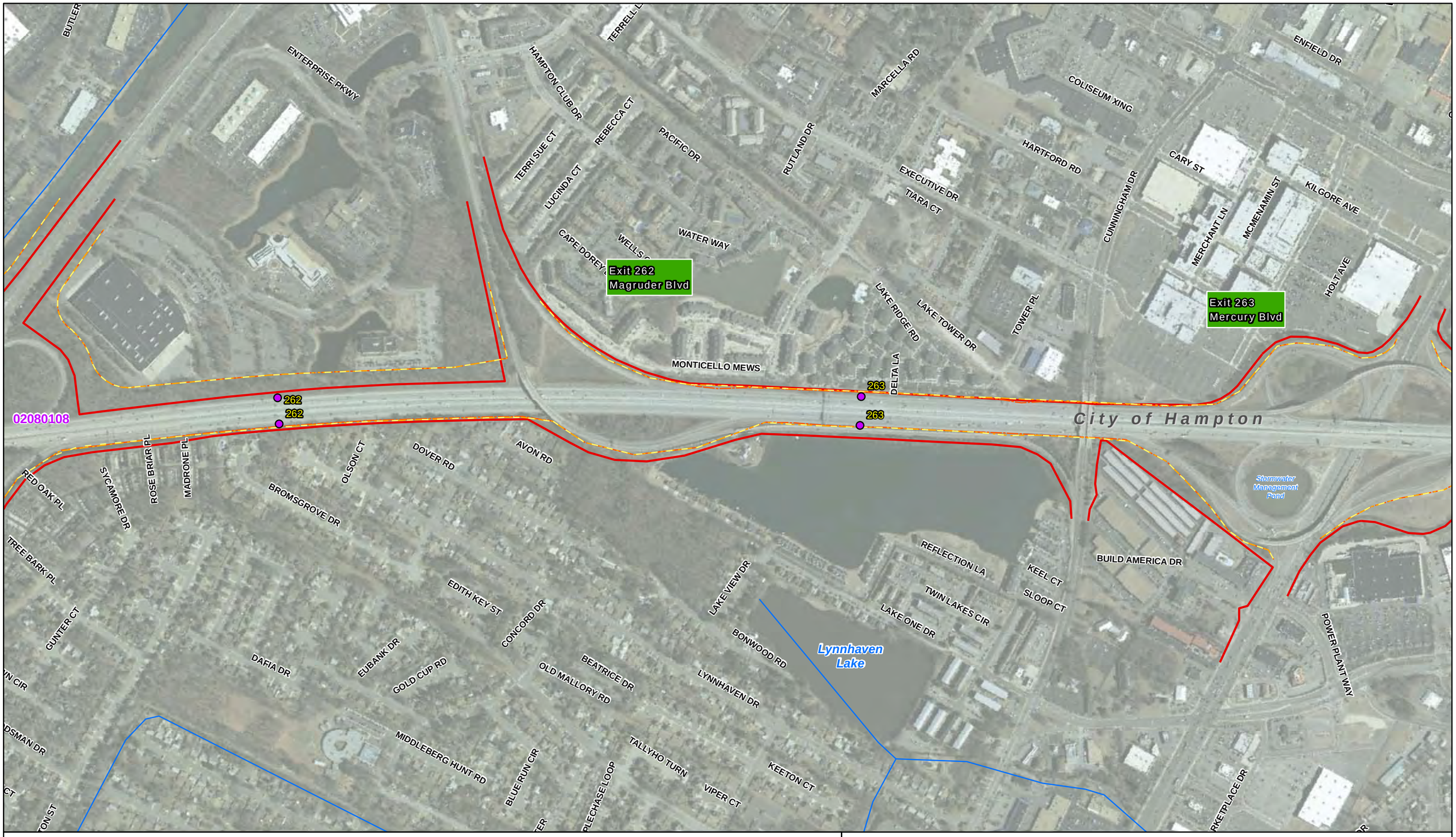
Feet



INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
- Limits of Alternative 1A/2A Footprint
- Limits of Alternative 1B/2B Footprint
- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 42 of 43

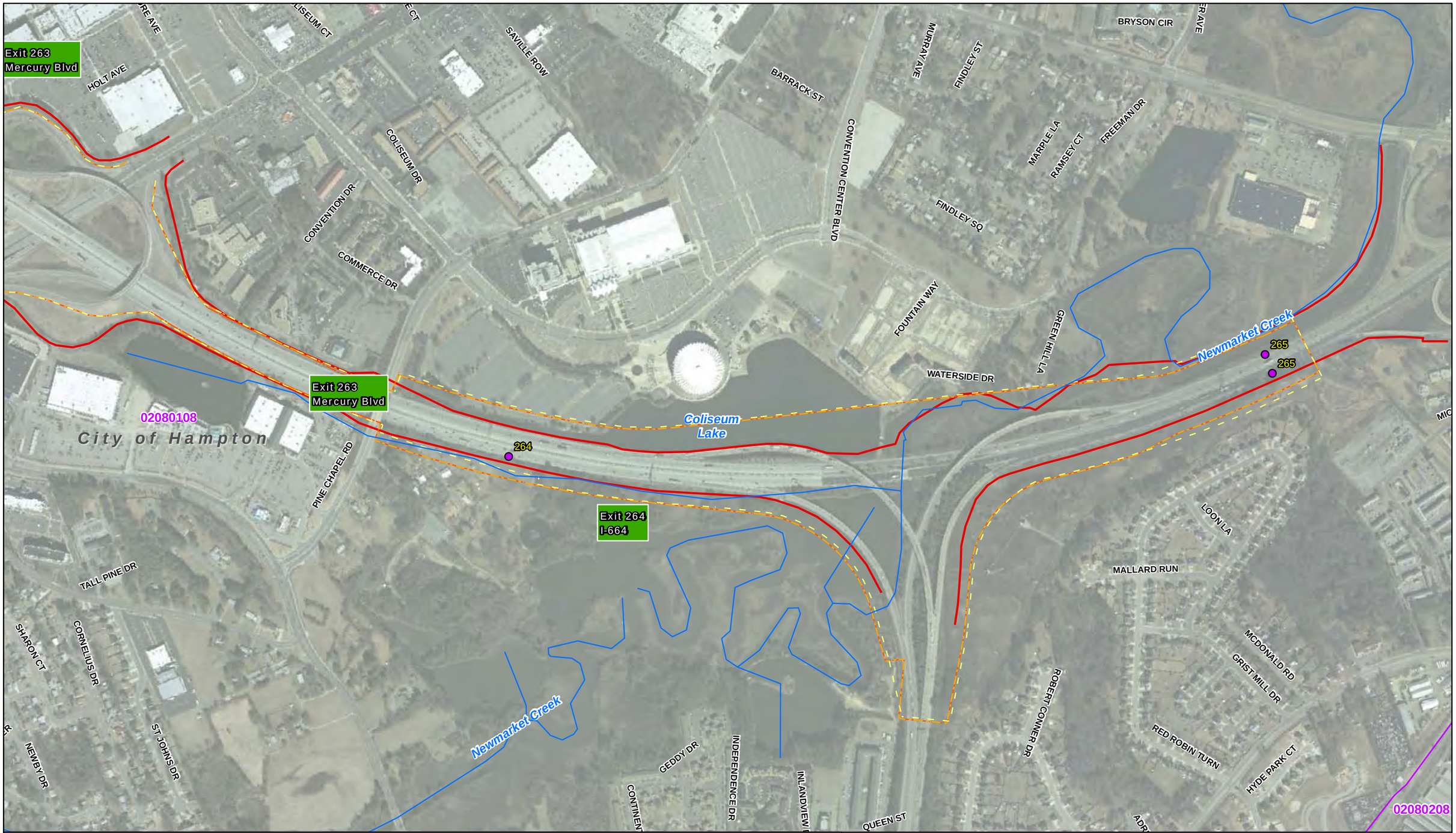
Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

VDOT

N

0 400 800
Feet



INTERSTATE 64 PENINSULA STUDY

- Existing Right of Way
- 210 Mile Marker
- Locality Jurisdiction
- 1% Annual Chance Flood Hazard (100 year FP)
- Hydrologic Unit Code Boundary
- USGS Topoquadrangle Surface Water (Non-Assessed)
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- Limits of Alternative 3 Footprint

Federal Emergency Management Agency Floodplains

Map 43 of 43

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
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VDOT

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0 400 800
Feet

INTERSTATE 64 PENINSULA STUDY

APPENDIX J

Threatened and Endangered Species, and Other Natural Heritage Resources Information

Douglas W. Domenech
Secretary of Natural Resources

David A. Johnson
Director

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

203 Governor Street
Richmond, Virginia 23219-2010
(804) 786-1712

MEMORANDUM

DATE: March 14, 2011

TO: Nicholas Niess, VDOT

FROM: Roberta Rhur, Environmental Impact Review Coordinator

SUBJECT: DCR 11-003, VDOT I-64 Peninsula Study

Division of Planning and Recreational Resources

The Department of Conservation and Recreation (DCR), Division of Planning and Recreational Resources (PRR), develops the *Virginia Outdoors Plan* and coordinates a broad range of recreational and environmental programs throughout Virginia. These include the Virginia Scenic Rivers program; Trails, Greenways, and Blueways; Virginia State Park Master Planning and State Park Design and Construction.

The project crosses the Chickahominy River, a potential scenic resource. As such we recommend that any impacts to the river crossing be mitigated using native plants to stabilized land disturbance in the project area.

Division of Natural Heritage

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in our files, numerous natural heritage resources have been documented within 2 miles of the project area (see attached table).

In addition, according to Chris Ludwig, DCR chief biologist, there is potential for Small whorled pogonia (*Isotria medeoloides*, G2/S2/LT/LE) and Swamp pink (*Helonias bullata*, G3/S2S3/LT/LE) to occur in the project area. Small whorled pogonia grows in a variety of woodland habitats in Virginia, but tends to favor mid-aged woodland habitats on gently north or northeast facing slopes often within small draws. It is quite natural for plants of this species to remain dormant in the soil for long periods of time. Direct destruction, as well as habitat loss and alteration, are principle reasons for the species' decline (Ware, 1991). Please note that this species is currently classified as threatened by the United States Fish and Wildlife Service (USFWS) and as endangered by the Virginia Department of Agriculture and Consumer Services (VDACS).

Swamp pink inhabits groundwater-influenced, perennially saturated, nutrient-poor headwater wetlands and is sensitive to hydrologic alterations to its habitat. The major direct threat to this species is habitat loss. Indirect threats result from activities that affect the hydrologic regime including such upslope activities as timber harvesting, land clearing and development, and agriculture. Downstream threats to the hydrology of a swamp pink habitat arise from flooding caused by road crossings with culverts that become blocked and beaver activity (VanAlstine, 1994). In Virginia, swamp-pink is currently known from 45 locations, 3 of which are historic. Please note that this species is currently classified as threatened by the USFWS and as endangered by the VDACS.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the Virginia Department of Conservation and Recreation (DCR), DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. Survey results should be coordinated with DCR-DNH and USFWS. Upon review of the results, if it is determined the species is present, and there is a likelihood of a negative impact on the species, DCR-DNH will recommend coordination with VDACS to ensure compliance with Virginia's Endangered Plant and Insect Species Act.
Furthermore, DCR recommends contacting the Center for Conservation Biology at the College of William and Mary, phone: 757-221-1645 or email: conbio@wm.edu to obtain updated bald eagle information. If bald eagle nests are identified within .25 miles of the project area, DCR recommends coordination with VDGIF to ensure compliance with protected species legislation.

Our files also indicate the Grafton Ponds Natural Area Preserve under DCR's jurisdiction in the project vicinity. For more information concerning this Natural Area Preserve, please contact Rebecca Wilson, Chesapeake Bay Region Steward at (804)225-2303 or rebecca.wilson@dcr.virginia.gov.

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

The Virginia Department of Game and Inland Fisheries maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from http://vafwis.org/fwis/ or contact Shirl Dressler at (804) 367-6913.

Division of Soil and Water Conservation

Erosion & Sediment Control:
Virginia Department of Transportation (VDOT) projects that undertake land-disturbing activities of greater than 2,500 square feet must comply with the most current version of the VDOT erosion and sediment control (ESC) annual specifications approved by DCR. All regulated land-disturbing activities must have a project specific ESC plan developed in accordance with the DCR approved VDOT ESC annual specifications. However, the project specific ESC plan need not be submitted to DCR for approval since VDOT has DCR approved annual specifications. All regulated land-disturbing activities associated with the project, including on and off site access roads, staging areas, borrow areas, stockpiles, and soil intentionally transported from the project must be covered by the project specific ESC plan. Annual specifications must be prepared in accordance with the Virginia Erosion & Sediment Control Law (VESCL) and Regulations (VESCR) and the most current version of the *Virginia Erosion & Sediment Control Handbook*. [Reference: VESCL §10.1-560, §10.1-564; VESCR §4VAC50-30-30, VESCR §4VAC50-30-40, §4VAC50-30-100]

Stormwater Management:
VDOT projects that undertake land-disturbing activities equal to or greater than 2,500 square feet must comply with the most current version of the VDOT stormwater management (SWM) annual specifications approved by DCR. All regulated land-disturbing activities must have a project specific SWM plan developed in accordance with the DCR approved VDOT SWM annual specifications. However, the project specific SWM plan need not be submitted to DCR for approval since VDOT has DCR approved annual specifications. Annual specifications must be prepared in accordance with the Virginia Stormwater Management Act (VSMA) and the Virginia Stormwater Management Program (VSMP) Permit Regulations. [Reference: VSMA §10.1-603.5; VSMP Permit Regulations §4VAC50-60-160]

General Permit for Discharges of Stormwater from Construction Activities in CBPA:
The operator or owner of construction activities involving land disturbing activities equal to or greater than 2,500 square feet in areas designated as subject to the Chesapeake Bay Preservation Area Designation and Management Regulations adopted pursuant to the Chesapeake Bay Preservation Act are required to register for coverage under the General Permit for Discharges of Stormwater from Construction Activities and develop a project specific stormwater pollution prevention plan (SWPPP). The SWPPP must be prepared prior to submission of the registration statement for coverage under the general permit and the SWPPP must address water quality and quantity in accordance with the Virginia Stormwater Management Program (VSMP) Permit Regulations. General information and registration forms for the General Permit are available on DCR's website at
http://www.dcr.virginia.gov/soil_and_water/index.shtml
[Reference: Virginia Stormwater Management Law Act §10.1-603.1 et seq.; VSMP Permit Regulations §4VAC50-60 et seq.]

The remaining DCR divisions have no comments regarding the scope of this project. Thank you for the opportunity to comment.

CC: William Hester, USFWS
Tylan Dean, USFWS
Ernie Aschenbach, VDGIF

Literature Cited

Ware, D.M.E. 1991. Small whorled pogonia. In Virginia's Endangered Species: Proceedings of a Symposium. K. Terwilliger ed. The McDonald and Woodward Publishing Company, Blacksburg, Virginia.

VanAlstine, N.E. 1994. Information on Swamp Pink (*Helonias bullata*). Compiled for Endangered Species Workshop.

DCR 11-003, VDOT I-64 PENINSULA STUDY

NATURAL HERITAGE RESOURCES WITHIN TWO MILES

GROUP NAME	SCIENTIFIC NAME	COMMON NAME	LAST OBSERVATION	GLOBAL RANK	FEDERAL SPECIES OF CONCERN	STATE RANK	FEDERAL STATUS	STATE STATUS	SITE NAME
Vertebrate Animal	Haliaeetus leucocephalus	Bald Eagle	2002-	G5		S2S3B,S3N		LT	GROVE CREEK
Vascular Plant	Utricularia striata	Fibrous Bladderwort	1975-07-09	G4G5		S1			
Vertebrate Animal	Crotalus horridus [Coastal Plain population]	Canebrake Rattlesnake	2008-10-16	G4		S1		LE	AIRPORT-TABB
Vascular Plant	Zornia bracteata	Viperina	1940-07-13	G5?		S1			
Vascular Plant	Carex lupuliformis	False Hop Sedge	1950	G4		S2			
Vascular Plant	Trillium pusillum var. virginianum	Virginia Least Trillium	1983-04-20	G3T2	SOC	S2			
Vascular Plant	Cuscuta coryli	Hazel Dodder	1973-08-09	G5?		S2?			
Vascular Plant	Cyperus diandrus	Umbrella Flatsedge	1937-09-18	G5		S1			
Vascular Plant	Tillandsia usneoides	Spanish Moss	1965-	G5		S2			
Vascular Plant	Trillium pusillum var. virginianum	Virginia Least Trillium	1990-04-20	G3T2	SOC	S2			
Nonvascular Plant	Sphagnum flexuosum	Flexuose Peatmoss	1973-04-13	G5		S1S2			
Vascular Plant	Lysimachia radicans	Trailing Loosestrife	1939-09-18	G4G5		SH			
Vascular Plant	Hypericum setosum	A St. John's-wort	1972-08-21	G4G5		S1S2			
Vascular Plant	Chelone cuthbertii	Cuthbert Turtlehead	1990-09-19	G3		S2			GRAFTON PONDS
Vascular Plant	Stewartia ovata	Mountain Camellia	1989-09-21	G4		S2			LOWER QUEEN CREEK
Vascular Plant	Liparis loeselii	Loesel's Twayblade	1997-06-05	G5		S2			LOWER QUEEN CREEK
Vertebrate Animal	Crotalus horridus [Coastal Plain population]	Canebrake Rattlesnake	1993-09-07	G4		S1		LE	
Vascular Plant	Chelone cuthbertii	Cuthbert Turtlehead	1995-09-13	G3		S2			GRAFTON PONDS
Vertebrate Animal	Ambystoma mabeei	Mabee's Salamander	2006-04-14	G4		S1S2		LT	GRAFTON PONDS
Vascular Plant	Sabatia campanulata	Slender Marsh Pink	1995-09-13	G5		S2			GRAFTON PONDS
Vertebrate Animal	Ambystoma mabeei	Mabee's Salamander	1990-02-13	G4		S1S2		LT	LACKEY PONDS
Vascular Plant	Trillium pusillum var. virginianum	Virginia Least Trillium	1994-06-06	G3T2	SOC	S2			RUMLEY MARSH TRIBUTARY
Vascular Plant	Tillandsia usneoides	Spanish Moss	1990-10-08	G5		S2			BEAVERDAM CREEK
Natural Community	Mesic Mixed Hardwood Forest	Mesic Mixed Hardwood Forest	1990-08-01	G5		SNR			GRICES RUN NATURAL AREA HABITAT ZONE
Vascular Plant	Hypericum setosum	A St. John's-wort	1995-08-16	G4G5		S1S2			GRAFTON PONDS
Vascular Plant	Verbena scabra	Sandpaper Vervain	1974-08-25	G5		S2			
Vertebrate Animal	Haliaeetus leucocephalus	Bald Eagle	2000-	G5		S2S3B,S3N		LT	UPPER DIASCUND CREEK HABITAT ZONE
Natural Community	Basic Mesic Forest	Basic Mesic Forest	1990-08-01	G2?		SNR			GRICES RUN NATURAL AREA HABITAT ZONE
Vascular Plant	Chelone cuthbertii	Cuthbert Turtlehead	1995-08-16	G3		S2			GRAFTON PONDS
Natural Community	Coastal Plain Depression Wetland	Coastal Plain Depression Wetland	1991-06-25	G1G2		SNR			KENTUCKY FARMS
Vertebrate Animal	Ambystoma mabeei	Mabee's Salamander	1985-11-16	G4		S1S2		LT	
Vertebrate Animal	Ambystoma tigrinum	Tiger Salamander	1993-05-21	G5		S1		LE	
Natural Community	Coastal Plain Depression Wetland	Coastal Plain Depression Wetland	1990-07-23	G4G5		SNR			NEW KENT POND HABITAT ZONE
Animal Assemblage	Colonial Wading Bird Colony		1991-	G5		S2			BEAVERDAM CREEK
Vascular Plant	Fimbristylis perpusilla	Harper's Fimbristylis	2008-09-24	G2	SOC	S1		LE	GRAFTON PONDS
Vascular Plant	Calamovilfa brevipilis	Pine-barren Reed-grass	1995-08-09	G4		S1			GRAFTON PONDS
Vertebrate Animal	Ardea alba	Great Egret	1991-	G5		S2S3B,S3N			BEAVERDAM CREEK
Vertebrate Animal	Crotalus horridus [Coastal Plain population]	Canebrake Rattlesnake	1988-09-01	G4		S1		LE	
Vascular Plant	Trillium pusillum var. virginianum	Virginia Least Trillium	1997-03	G3T2	SOC	S2			BIG BETHEL FLATWOODS
Vertebrate Animal	Ambystoma mabeei	Mabee's Salamander	1998-06-24	G4		S1S2		LT	AIRPORT-TABB
Vascular Plant	Scutellaria incana	Hoary Skullcap	1994-07-27	G5		S2			
Natural Community	Tidal Freshwater Marsh	Tidal Freshwater Marsh	1991-08-21	G4?		SNR			WARE CREEK
Vascular Plant	Isotria medeoloides	Small Whorled Pogonia	2007-07-11	G2		S2	LT	LE	WARE CREEK
Natural Community	Tidal Oligohaline Marsh	Tidal Oligohaline Marsh	1991-08-21	G4		SNR			WARE CREEK
Natural Community	Coastal Plain / Piedmont Basic Seepage Swamp	Coastal Plain/Piedmont Basic Seepage Swamp	1997-10-22	G2		SNR			LOWER QUEEN CREEK
Natural Community	Coastal Plain / Piedmont Basic Seepage Swamp	Coastal Plain/Piedmont Basic Seepage Swamp	1998-04-29	G2		SNR			LOWER QUEEN CREEK
Vertebrate Animal	Haliaeetus leucocephalus	Bald Eagle	2002-	G5		S2S3B,S3N		LT	WOOD CREEK HABITAT ZONE
Natural Community	Basic Mesic Forest	Basic Mesic Forest	2002-09-23	G2?		SNR			GROVE CREEK
Vertebrate Animal	Haliaeetus leucocephalus	Bald Eagle	2002-	G5		S2S3B,S3N		LT	POND #11
Vertebrate Animal	Haliaeetus leucocephalus	Bald Eagle	2002-	G5		S2S3B,S3N		LT	BIG BETHEL FLATWOODS
Vascular Plant	Liparis loeselii	Loesel's Twayblade	1997-06-05	G5		S2			LOWER QUEEN CREEK
Vascular Plant	Wisteria frutescens	American Wisteria	1994-05-04	G5		S2			BLAINE LANDING ROAD UPLAND
Vertebrate Animal	Ambystoma mabeei	Mabee's Salamander	2007-03-30	G4		S1S2		LT	BLACK SWAMP RAVINES AND FLATWOODS
Natural Community	Coastal Plain / Piedmont Basic Seepage Swamp	Coastal Plain/Piedmont Basic Seepage Swamp	2002-09-23	G2		SNR			GROVE CREEK
Vascular Plant	Stewartia ovata	Mountain Camellia	2002-09-23	G4		S2			GROVE CREEK
Vascular Plant	Eupatorium incarnatum	Pink Thoroughwort	2002-10-03	G5		S2			
Vertebrate Animal	Haliaeetus leucocephalus	Bald Eagle	2002-	G5		S2S3B,S3N		LT	BEAVERDAM CREEK
Vertebrate Animal	Haliaeetus leucocephalus	Bald Eagle	2002-	G5		S2S3B,S3N		LT	JONES MILLPOND

DCR 11-003, VDOT I-64 PENINSULA STUDY

NATURAL HERITAGE RESOURCES WITHIN TWO MILES

Vascular Plant	Asclepias purpurascens	Purple Milkweed	2002-06-18	G5?		S2			NEWMARKET CREEK POWERLINE
Natural Community	Coastal Plain Depression Wetland	Coastal Plain Depression Wetland	2002-09-25	G1G2		SNR			HALSTEAD ROAD SINKHOLE PONDS
Invertebrate Animal	Sphinx franckii	Franck's Sphinx	2002-06-26	G4		S2S3			JONES MILLPOND
Natural Community	Coastal Plain Dry Calcareous Forest / Woodland	Coastal Plain Dry Calcareous Forest / Woodland	2002-09-23	G1		SNR			GROVE CREEK
Vascular Plant	Liparis loeselii	Loesel's Twayblade	1989-06-09	G5		S2			LOWER QUEEN CREEK
Natural Community	Coastal Plain / Piedmont Basic Seepage Swamp	Coastal Plain/Piedmont Basic Seepage Swamp	2002-09-06	G2		SNR			KING CREEK RAVINE
Natural Community	Basic Mesic Forest	Basic Mesic Forest	2002-09-27	G2?		SNR			BLACK SWAMP RAVINES AND FLATWOODS
Natural Community	Oak / Heath Forest	Oak / Heath Forest	2002-09-26	G4G5		SNR			BLACK SWAMP RAVINES AND FLATWOODS
Natural Community	Coastal Plain / Piedmont Basic Seepage Swamp	Coastal Plain/Piedmont Basic Seepage Swamp	2002-09-19	G2		SNR			BLACK SWAMP RAVINES AND FLATWOODS
Natural Community	Coastal Plain / Piedmont Basic Seepage Swamp	Coastal Plain/Piedmont Basic Seepage Swamp	2002-09-05	G2		SNR			BLACK SWAMP RAVINES AND FLATWOODS
Natural Community	Basic Mesic Forest	Basic Mesic Forest	2002-09-05	G2?		SNR			BLACK SWAMP RAVINES AND FLATWOODS
Natural Community	Mesic Mixed Hardwood Forest	Mesic Mixed Hardwood Forest	2002-09-27	G5		SNR			BLACK SWAMP RAVINES AND FLATWOODS
Natural Community	Coastal Plain Dry Calcareous Forest / Woodland	Coastal Plain Dry Calcareous Forest / Woodland	2002-09-27	G1		SNR			BLACK SWAMP RAVINES AND FLATWOODS
Natural Community	Basic Mesic Forest	Basic Mesic Forest	2002-09-06	G2?		SNR			BLACK SWAMP RAVINES AND FLATWOODS
Natural Community	Coastal Plain Depression Wetland	Coastal Plain Depression Wetland	2002-09-25	G1G2		SNR			BLACK SWAMP RAVINES AND FLATWOODS
Natural Community	Coastal Plain Dry Calcareous Forest / Woodland	Coastal Plain Dry Calcareous Forest / Woodland	2002-10-03	G1		SNR			GROVE CREEK
Vascular Plant	Lythrum lanceolatum	Lance-leaved Loosestrife	1940-08-20	G5T5		SH			
Invertebrate Animal	Stylurus laurae	Laura's Clubtail	1931-08-02	G4		S2			
Vascular Plant	Stewartia ovata	Mountain Camellia	1978-06-23	G4		S2			
Vascular Plant	Stewartia ovata	Mountain Camellia	1972-07-05	G4		S2			
Vascular Plant	Stewartia ovata	Mountain Camellia	1954-04-24	G4		S2			
Vascular Plant	Helonias bullata	Swamp-pink	2007-05-07	G3		S2S3	LT	LE	BROADWATER CREEK
Vascular Plant	Isotria medeoloides	Small Whorled Pogonia	1941-05-11	G2		S2	LT	LE	
Vascular Plant	Isotria medeoloides	Small Whorled Pogonia	1929-05-11	G2		S2	LT	LE	
Natural Community	Non-Riverine Flatwood / Swamp	Non-Riverine Flatwood / Swamp	2006-05-05	G2?		SNR			CHICKAHOMINY FLATS
Vertebrate Animal	Crotalus horridus [Coastal Plain population]	Canebrake Rattlesnake	2007-05-31	G4		S1		LE	
Natural Community	Piedmont / Coastal Plain Oak - Beech / Heath Forest	Piedmont / Coastal Plain Oak - Beech / Heath Forest	2006-09-13	G4		SNR			TASKINAS CREEK
Natural Community	Coastal Plain Depression Wetland	Coastal Plain Depression Wetland	2009-10-08	G4G5		SNR			GRAFTON PONDS
Natural Community	Coastal Plain Depression Wetland	Coastal Plain Depression Wetland	2008-09-24	G3?		SNR			GRAFTON PONDS
Natural Community	Coastal Plain Depression Wetland	Coastal Plain Depression Wetland	2009-10-08	G1G2		SNR			GRAFTON PONDS
Vertebrate Animal	Falco peregrinus	Peregrine Falcon	2007-03-12	G4		S1B,S2N		LT	LEE BRIDGE
Vertebrate Animal	Crotalus horridus [Coastal Plain population]	Canebrake Rattlesnake	2010-08-08	G4		S1		LE	
Vascular Plant	Heteranthera multiflora	Multiflowered Mud-plantain	1974-08-25	G4		S1			
Vascular Plant	Ludwigia hirtella	Hairy Seedbox	1972-08-10	G5		S1			
Vascular Plant	Cuscuta indecora	Pretty Dodder	1963-08-05	G5		S2?			

Matthew J. Lohr
Commissioner

COMMONWEALTH of VIRGINIA

Department of Agriculture and Consumer Services

PO Box 1163, Richmond, Virginia 23218
Phone: 804/786-3501 • fax: 804/371-2945 • Hearing Impaired: 800/828-1120
www.vdacs.virginia.gov

April 5, 2011

Mr. Rich Butala
McCormick Taylor, Inc.
North Shore Commons A
4951 Lake Brook Drive, Suite 275
Glen Allen, VA 23060

Dear Mr. Butala:

Nicholas Nies, Project Studies Manager, Virginia Department of Transportation (VDOT), has requested that VDACS provide you comments regarding the I-64 Peninsula Study that was the subject of an agency scoping meeting held on March 22, 2011.

VDACS has responsibility for farmland preservation and the protection of endangered and threatened plant and insect species. Regarding the first matter, we encourage those involved in planning highway construction to seek to minimize the loss of agricultural land that may occur. Regarding endangered and threatened species, my staff advises that, although it is unlikely, there is the possibility that endangered plants or insects could occur in the vicinity of the I-64 corridor. There are a number of endangered species which are known to occur in the localities impacted by this project; however, it is not known if these species are found near the interstate. Of those species, the Small Whorled Pogonia, the New Jersey Rush, and the Swamp-pink have the greatest potential for occurring along I-64.

I am sure that VDOT will follow the State Environmental Review Process (SERP) policies to formally consult with the state and federal agencies involved in protection of natural and historic resources. The Department of Conservation and Recreation (DCR) will conduct an initial review of the study area regarding natural resources, including endangered plant and insect species. DCR will then report their findings to VDOT and VDACS.

In closing, VDACS recommends that VDOT consult with appropriate state and federal agencies in order to provide protection for the Commonwealth's natural resources.

Thank you for this opportunity to comment.

Sincerely,

Matthew J. Lohr
Commissioner

cc: Sandra J. Adams, Deputy Commissioner
Andy Alvarez, Director, Division of Consumer Protection
Charles Green, Director, Division of Marketing
Roy Seward, Director, Office of Policy, Planning and Research

United States Department of the Interior

FISH AND WILDLIFE SERVICE
VIRGINIA ECOLOGICAL SERVICES FIELD OFFICE
6669 SHORT LANE
GLOUCESTER, VA 23061
PHONE: (804)693-6694 FAX: (804)693-9032
URL: www.fws.gov/northeast/virginiafield/

Consultation Tracking Number: 05E2VA00-2013-SLI-0013 October 02, 2012
Project Name: I-64 Widening

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project.

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, and proposed species, designated critical habitat, and candidate species that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having

similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: I-64 Widening

Official Species List

Provided by:

VIRGINIA ECOLOGICAL SERVICES FIELD OFFICE
6669 SHORT LANE
GLOUCESTER, VA 23061
(804) 693-6694
http://www.fws.gov/northeast/virginiafield/

Consultation Tracking Number: 05E2VA00-2013-SLI-0013
Project Type: Transportation
Project Description: Improvements to I-64 from the 1-95 in the City of Richmond to the I-664 in the City of Hampton. EIS purposes only.

United States Department of Interior
Fish and Wildlife Service

Project name: I-64 Widening

Project Location Map:

Project Coordinates: MULTIPOLYGON (((-77.4006711 37.5192278, -77.406771 37.528786, -77.4067741 37.5287968, -77.4067741 37.5290146, -77.4067726 37.5290223, -77.4067682 37.5290287, -77.4067618 37.5290331, -77.4067541 37.5290346, -77.4067464 37.5290331, -77.40674 37.5290287, -77.4067356 37.5290223, -77.4067341 37.5290146, -77.4067341 37.5288026, -77.4006199 37.519222, -77.3680266 37.5155288, -77.2529463 37.5201036, -77.2529443 37.5201036, -77.175766 37.5155288, -77.0881506 37.5159645, -77.0881422 37.5159627, -77.0496926 37.4985335, -76.9615308 37.4850227, -76.9065999 37.4806636, -76.906591 37.4806607, -76.8299613 37.4331309, -76.8299612 37.4331308, -76.7255911 37.3676734, -76.7255869 37.3676699, -76.6541758 37.2890456, -76.6541748 37.2890444, -76.610232 37.2322123, -76.5553039 37.2015928, -76.5552969 37.2015863, -76.489379 37.1008856, -76.4893788 37.1008852, -76.4509269 37.0395239, -76.4069824 36.9781136, -76.3850101 36.9517799, -76.3850059 36.9517713, -76.3792381 36.9249887, -76.3792381 36.9249803, -76.3792416 36.9249727, -76.3792479 36.9249671, -76.3792559 36.9249646, -76.3792642 36.9249656, -76.3792714 36.9249699, -76.4125051 36.9561422, -76.4125061

36.9561432, -76.4894104 37.0394992, -76.4894135 37.0395036, -76.5553301 37.1665526, -76.6651911 37.2846476, -76.7530793 37.3676401, -76.9068833 37.4505407, -77.0497022 37.4854189, -77.1702748 37.5024163, -77.2856298 37.5024163, -77.2856318 37.5024164, -77.3735214 37.5111315, -77.3954931 37.5111315, -77.3954997 37.5111326, -77.3955055 37.5111358, -77.39551 37.5111407, -77.4006434 37.5191844, -77.4064817 37.5198459, -77.4064891 37.5198483, -77.406495 37.5198533, -77.4064986 37.5198603, -77.4064993 37.5198681, -77.4064969 37.5198755, -77.4064919 37.5198814, -77.4064849 37.519885, -77.4064771 37.5198857, -77.4006711 37.5192278), (-77.4005921 37.5191786, -77.3954821 37.5111715, -77.3735204 37.5111715, -77.3735184 37.5111714, -77.2856288 37.5024563, -77.1702734 37.5024563, -77.1702706 37.5024561, -77.0496956 37.4854584, -77.0496937 37.485458, -76.9068714 37.4505789, -76.9068666 37.4505771, -76.753058 37.3676741, -76.7530538 37.367671, -76.6651632 37.2846762, -76.6651623 37.2846753, -76.555299 37.1665778, -76.5552958 37.1665734, -76.4893792 37.0395244, -76.4124772 36.9561709, -76.3792907 36.9250429, -76.385044 36.9517581, -76.4070136 36.9780886, -76.4070145 36.9780898, -76.4509598 37.0395012, -76.4509604 37.0395022, -76.4894125 37.1008638, -76.5553276 37.2015602, -76.610255 37.2321793, -76.6102611 37.2321846, -76.6542059 37.2890193, -76.7256147 37.367641, -76.8299824 37.4330969, -76.9066079 37.4806241, -76.9615347 37.4849829, -76.9615361 37.484983, -77.0497014 37.4984943, -77.0497067 37.4984959, -77.0881548 37.5159245, -77.1757664 37.5154888, -77.1757677 37.5154888, -77.2529457 37.5200636, -77.3680265 37.5154888, -77.3680296 37.5154889, -77.4005921 37.5191786)))

Project Counties: Hampton, VA | Henrico, VA | James City, VA | New Kent, VA | Newport News, VA | Portsmouth, VA | Richmond (city), VA | York, VA

Endangered Species Act Species List

Species lists are not entirely based upon the current range of a species but may also take into consideration actions that affect a species that exists in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Please contact the designated FWS office if you have questions.

Piping Plover *(Charadrius melodus)*

Population: except Great Lakes watershed

Listing Status: Threatened

Sensitive joint-vetch *(Aeschynomene virginica)*

Listing Status: Threatened

Small Whorled pogonia *(Isotria medeoloides)*

Listing Status: Threatened

Swamp pink *(Helonias bullata)*

Listing Status: Threatened

Species Conclusions Table
Date: October 2012

Species Name	Conclusion	ESA Section 7 / Eagle Act Determination	Notes / Documentation
Small whorled pogonia *(Isotria medeoloides)*	Potential suitable habitat. Species assessment was conducted as part of this study to identity potential habitat. See assessment report in **Appendix L** of the ***Natural Resources Technical Memorandum*** for details.	May adversely affect. Additional coordination required during design phase of this project.	This orchid grows in older hardwood stands of beech, birch, maple, oak, and hickory that have an open understory. Sometimes it grows in stands of softwoods such as hemlock. It prefers acidic soils with a thick layer of dead leaves, often on slopes near small streams.
Swamp pink (*Helonias bullata*)	Potential suitable habitat. Numerous wetland habitats including swampy forests were identified along the corridor.	May adversely affect. Additional coordination required during design phase of this project.	Variety of wetland habitats including Appalachian bogs and swamps, swampy forests bordering small streams, boggy meadows, and spring seepage areas. Requires constant saturated, but not flooded, forest habitat. Commonly associated with some evergreens, including pitch pine *(Pinus rigida)*, Atlantic white cedar, American larch, black spruce, red spruce, and with red maple. Often grows on hummocks formed by trees, shrubs, and sphagnum moss. The hummocks keep the roots moist but not submerged.
Piping plover (*Charadrius melodus*)	No suitable habitat present. Not listed on state agency databases.	No effect.	Piping plovers use wide, flat, open, sandy beaches with very little grass or other vegetation. Nesting territories often include beaches, sand flats, and washovers.
Sensitive joint-vetch (*Aeschynomene virginica*)	Potential suitable habitat. Non-tidal and tidal systems were identified along the corridor. Not listed on state agency databases.	May adversely affect. Additional coordination required during design phase of this project.	The Sensitive joint-vetch occurs in fresh to slightly brackish tidal river systems, within the intertidal zone where populations are flooded twice daily. It typically occurs at the outer fringe of marshes or shores; its presence in marsh interiors may be a result of nutrient deficiencies, ice scouring, or muskrat herbivory. The Sensitive joint-vetch is found in

Species Name	Conclusion	ESA Section 7 / Eagle Act Determination	Notes / Documentation
			localities where plant diversity is high and annual species are prevalent. Bare to sparsely vegetated substrates appear to be a habitat feature of critical importance for establishment and growth of this species.
Bald eagle *(Haliaeetus leucocephalus)*	Potential suitable habitat. Unlikely to disturb nesting Bald eagles. Bald eagle concentration areas are located along the James River (and tributaries) in the vicinity of the project corridor.	An Eagle Act Permit is not likely required; however, coordination with the agencies will continue through the design and permitting phase of the project.	The Bald eagle prefers habitats near seacoasts, rivers, large lakes, oceans, and other large bodies of open water with an abundance of fish. The Bald eagle requires old-growth and mature stands of coniferous or hardwood trees for perching, roosting, and nesting. The Center for Conservation Biology did not list any records of eagle nests within 660' of the project corridor.
Rafinesque's eastern big-eared bat *(Corynorhinus rafinesquii macrotis)*	Potential suitable habitat. Numerous forest systems and stream / wetland habitats were identified along the corridor.	May adversely affect. Additional coordination required during design phase of this project.	This bat is rare in Virginia with both subspecies at the edge of their ranges in Virginia. They are uncommon to rare throughout their range, and both seem to be declining. They prefer roosting sites near mature forests and adjacent to rivers and other permanent bodies of water;
Peregrine falcon *(Falco peregrinus)*	No suitable habitat present.	No effect.	The species breed in open landscapes with cliffs (or skyscrapers) for nest sites. They can be found up to about 12,000 feet, as well as along rivers and coastlines or in cities. In migration and winter you can find Peregrine falcons in nearly any open habitat, but with a greater likelihood along barrier islands, mudflats, coastlines, lake edges, and mountain chains.

Species Name	Conclusion	ESA Section 7 / Eagle Act Determination	Notes / Documentation
Canebrake rattlesnake *(Crotalus horridus)*	Potential suitable habitat. Numerous forest habitats were identified along the corridor.	May adversely affect. Additional coordination required during design phase of this project.	Mature hardwood forests are the preferred habitat of Canebrake rattlesnakes, but the snakes also are found in mixed hardwood-pine forests, cane thickets, and in the ridges and glades of swamps. They prefer areas with numerous logs and a substantial layer of leaves and humus. Canebrakes overwinter in the bases of hollow trees and stumps, and in the underground tunnels resulting from stump and root decomposition.
Mabee's salamander *(Ambystoma mabee)*	Potential suitable habitat. Wet woods and swamps were identified along the corridor.	May adversely affect. Additional coordination required during design phase of this project.	Known populations are low in number and tend to be isolated. Their range is restricted to the lower Coastal Plain of the Carolinas and Virginia. The species are found in savannas in burrows at the edges of bogs or ponds and in low wet woods and swamps. Breeding sites in Virginia are fish-free vernal ponds or ephemeral coastal plain sinkholes up to 1.5 meters deep, with surrounding forests generally composed of hardwoods mixed with pine. It is also found in low areas adjacent to coastal rivers and pine savannas, and in bogs, ponds, low wet woods, and swamps.

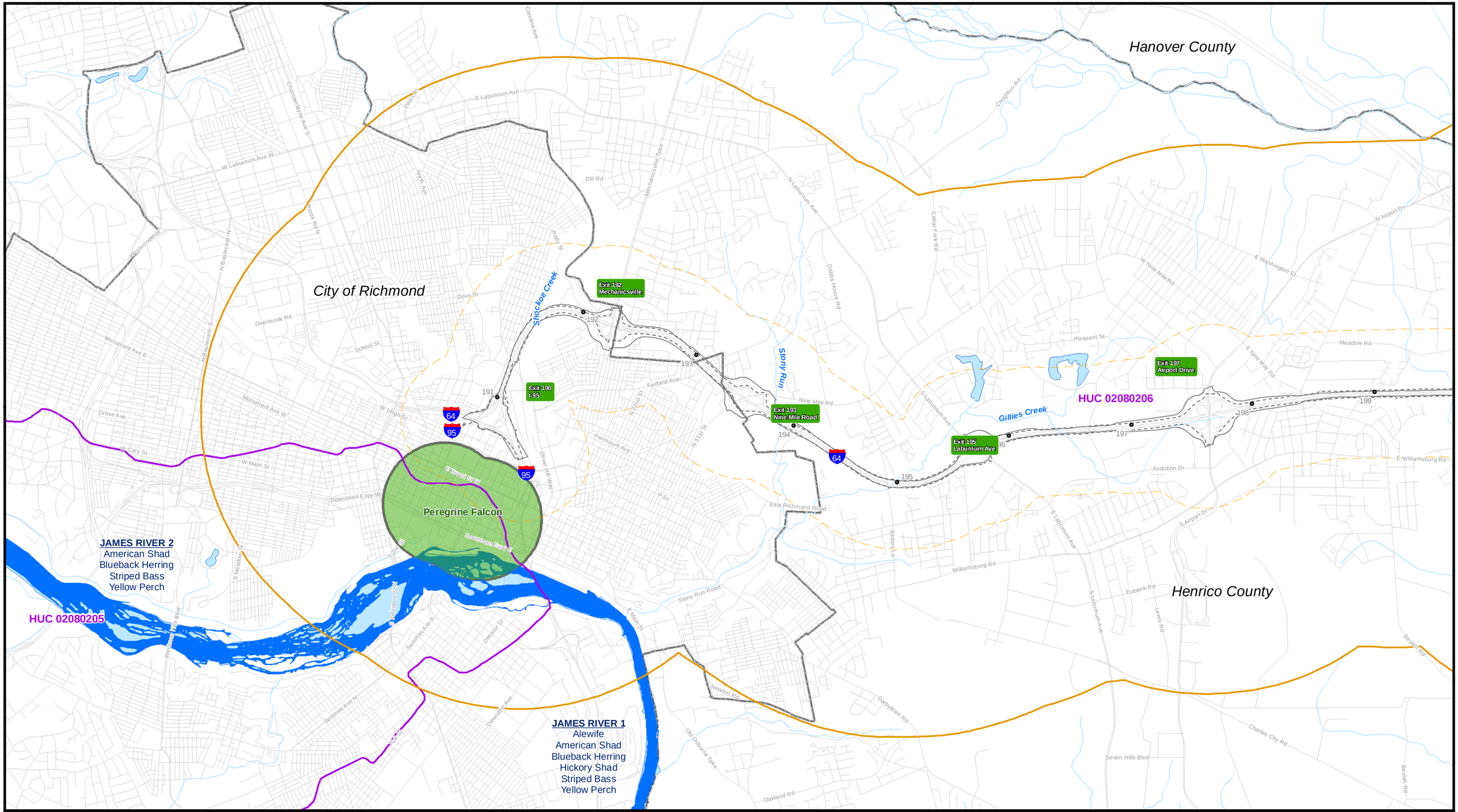
Species Name	Conclusion	ESA Section 7 / Eagle Act Determination	Notes / Documentation
Eastern tiger salamander *(Ambystoma tigrinum tigrinum)*	Potential suitable habitat. Numerous forests and wetland systems were identified along the corridor.	May adversely affect. Additional coordination required during design phase of this project.	Breeding habitats include limestone sinkhole ponds and Coastal Plain vernal pools associated with wetlands. The terrestrial habitat is only generally described as that with a substrate suitable for burrowing, or sandy areas near shallow pools, chiefly in pine savannas. Unique habitat associations include springs and seeps, vernal pools, bottomland hardwoods and freshwater wetlands. They may inhabit any type of woodland or marshy grassland and are found in leaf letter, debris and humus. According to VDGIF, this species can be considered extant in only two sites in Virginia – Mathews and Augusta Counties.
Loggerhead sea turtle *(Caretta caretta)*	No suitable habitat present. Not listed on state agency databases.	No effect.	This species is found only in salt water, in the Chesapeake Bay from Baltimore south, in all the major rivers along Virginia's coast, and into channels between barrier islands. This species is a wanderer which prefers moderately deep bays, and has been found in streams, marshes and many miles into the sea. Nearly all nesting sites are on barrier islands in the United States. Nesting habitat is a sand beach that is high enough that it is not inundated by high tides nor soaked by groundwater rising from below. The Loggerhead forages in the bay and its estuaries primarily for horseshoe crabs. It would also consume other crustaceans, sea grasses, sponges, fish, mollusks, and snails.

Note: Additional information regarding threatened and endangered species is included in **Section J** of the ***Natural Resources Technical Memorandum***.

INTERSTATE 64 PENINSULA STUDY

APPENDIX K

Threatened and Endangered Species, Unique Wildlife Resources, and Habitat Mapping



INTERSTATE 64 PENINSULA STUDY

- Limits of Widest Alternative Footprint
- Existing Right of Way
- USGS Topoquadranlge Surface Water (Non-Assessed)
- Non-Assessed Water Bodies
- Locality Jurisdiction
- Two Mile Project Area Buffer
- Half Mile Project Area Buffer
- Anadromous Fish Use Area Confirmed
- Anadromous Fish Use Area Potential
- Colonial Water Birds
- T&E Species - Excluding Bald Eagles
- Bald Eagle Nest Location
- Grafton Ponds Natural Area Preserve
- Hydrologic Unit Code Boundary (HUC)

Potential Small Whorled Pogonia Assessed Habitat Areas (SWP)

- High
- Medium
- Low

Threatened and Endangered Species, Unique Wildlife Resources, and Habitat

Essential Fish Habitat: Bluefish, Atlantic Butterfish, Summer Flounder, Black Sea Bass, King Mackerel, Spanish Makerel, Cobia, Red Drum throughout the study area.

Essential Fish Habitat:Windowpane Flounder, Dusky Shark from Williamsburg to I-664 Interchange.

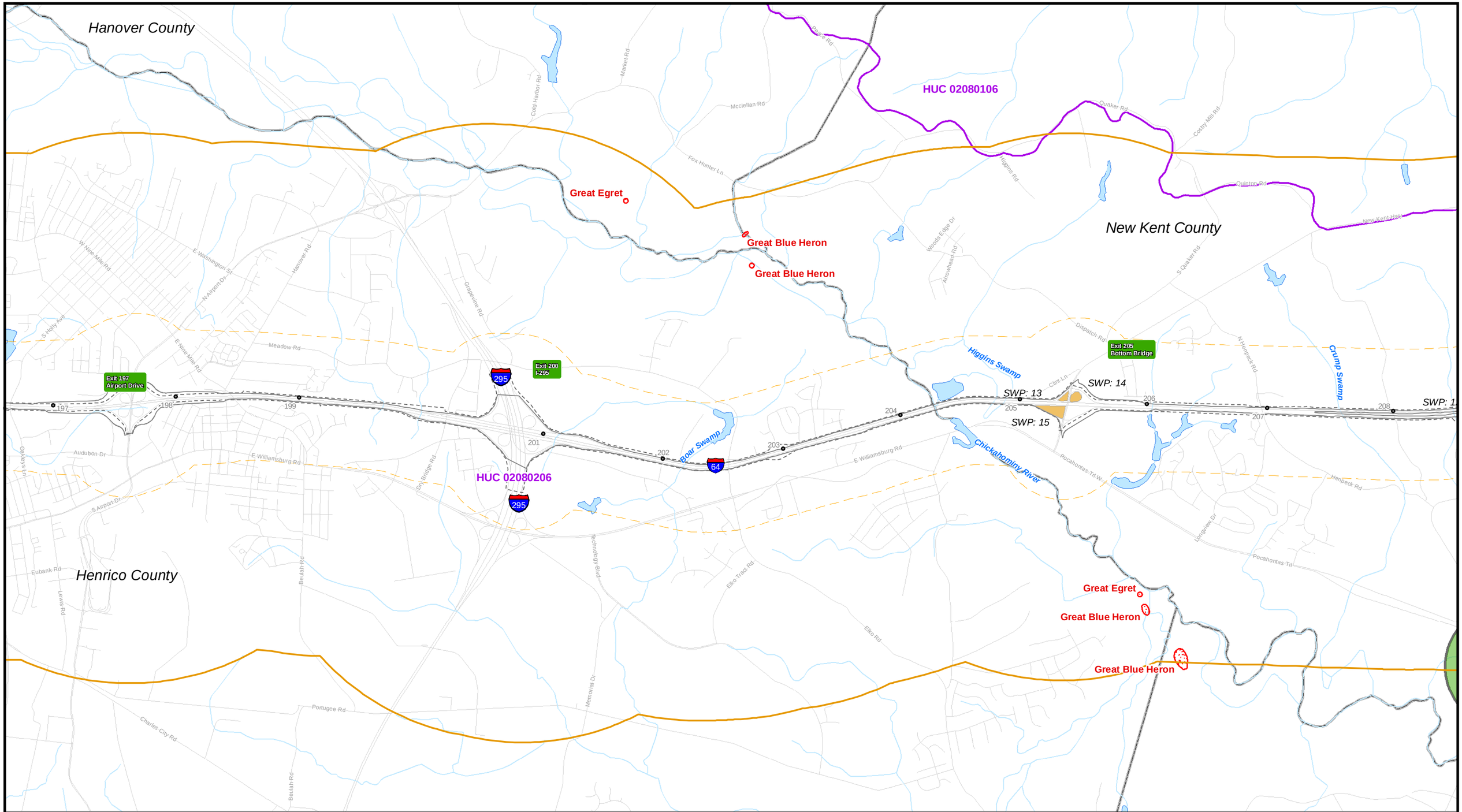
Habitat Area of Particular Concern: Sandbar Shark from MM 239 to I-664 Interchange.

Anadromous Fish, T&E Species and Colonial Waterbirds data courtesy of Virginia Fish and Wildlife Information Service;Bald Eagle nest data courtesy of the Center for Conservation Biology

N

VDOT Virginia Department of Transportation

0 0.25 0.5 1 Miles



INTERSTATE 64 PENINSULA STUDY

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Map 2 of 9

VDOT Virginia Department of Transportation

0 0.25 0.5 1 Miles

HUC 02080106

New Kent County

Exit 205
Bottom Bridge

Exit 211
Talleysville

Exit 214
Providence Forge

SWP: 14

SWP: 12

SWP: 11

SWP: 10

SWP: 9

SWP: 8

SWP: 7

206 207 208 209 210 211 212 213 215 216 217

64

Crump Swamp

Allens Run

Toe In K Swamp

Schiminoe Creek

Rumley Marsh

Diascund Creek

HUC 02080206

Great Egret

Great Blue Heron

Great Blue Heron

Rafinesque's Eastern Big-Eared Bat

New Kent County

INTERSTATE 64 PENINSULA STUDY

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N

Map 3 of 9

VDOT Virginia Department of Transportation

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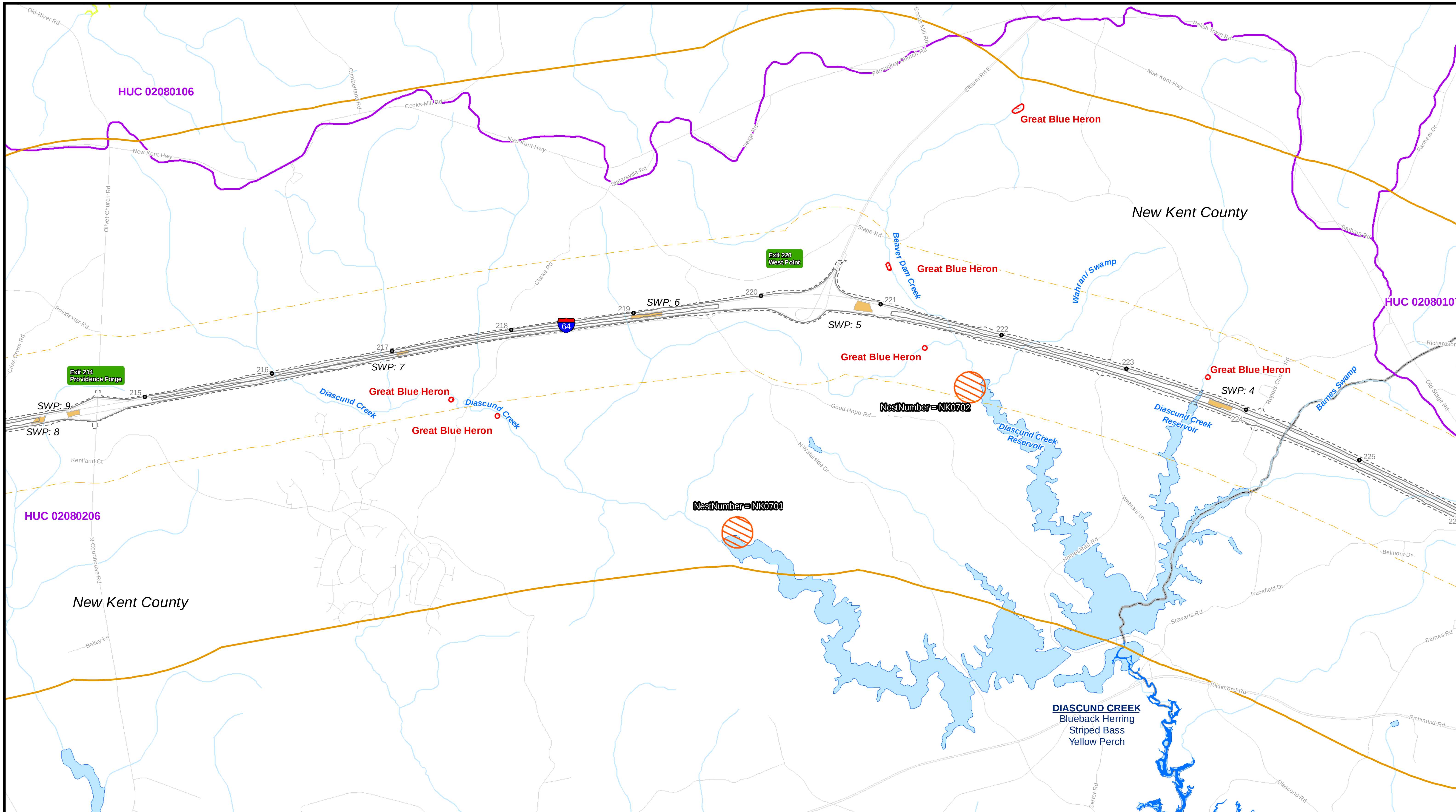

INTERSTATE 64 PENINSULA STUDY

Legend	
Limits of Widest Alternative Footprint	Anadromous Fish Use Area Confirmed
Existing Right of Way	Anadromous Fish Use Area Potential
USGS Topoquadrangle Surface Water (Non-Assessed)	Colonial Water Birds
Non-Assessed Water Bodies	T&E Species - Excluding Bald Eagles
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Half Mile Project Area Buffer	Hydrologic Unit Code Boundary (HUC)

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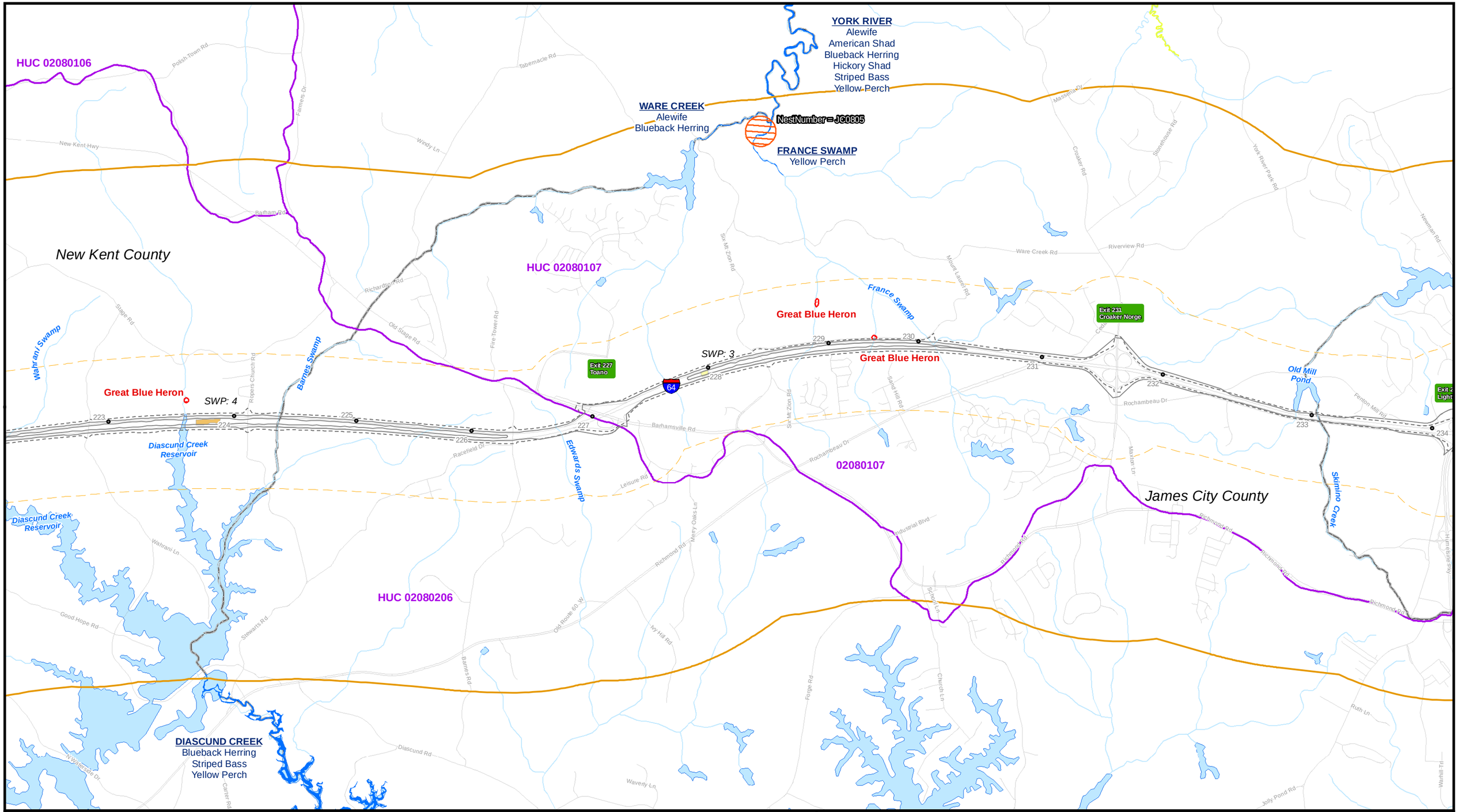
Map 4 of 9

0 0.25 0.5 1 Miles

VDOT Virginia Department of Transportation



INTERSTATE 64 PENINSULA STUDY

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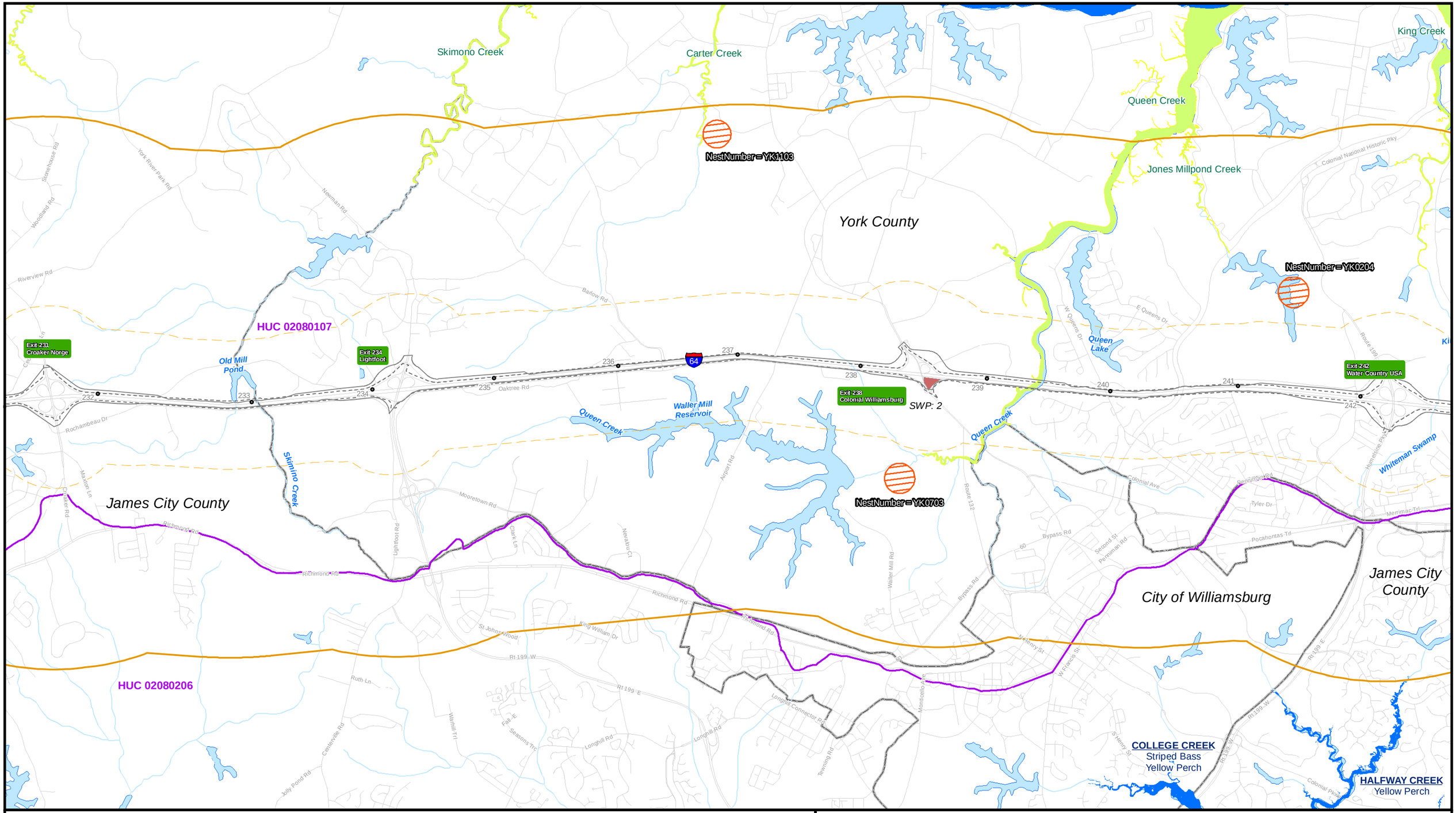

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VDOT Virginia Department of Transportation

Map 6 of 9

0 0.25 0.5 1 Miles

King Creek
Queen Creek
Jones Millpond Creek
HUC 02080107
York County
Mabee's Salamander
HUC 02080108
Great Blue Heron
Mabee's Salamander
NestNumber = YK0204
Exit 247 Yorktown
Curtis Run
Blows Mill Run
Exit 242 Water Country USA
Exit 243 Busch Gardens
King Creek
Mabee's Salamander
Exit 247 Yorktown
Skiffes Creek Reservoir
Newport News / Lee Hall Reservoir
SWP: 1
Exit 250 Fort Eustis
Whiteman Swamp
Skiffes Creek
City of Newport News
HUC 02080206
NestNumber = JC0401
NestNumber = JC0703
NestNumber = JC1108
NestNumber = JC1107
Skiffes Creek
City of Williamsburg
James City County
JAMES RIVER 1
Alewife
American Shad
Blueback Herring
Hickory Shad
Striped Bass
Yellow Perch
Warwick River
COLLEGE CREEK
Striped Bass
Yellow Perch
HALFWAY CREEK
Yellow Perch

INTERSTATE 64 PENINSULA STUDY

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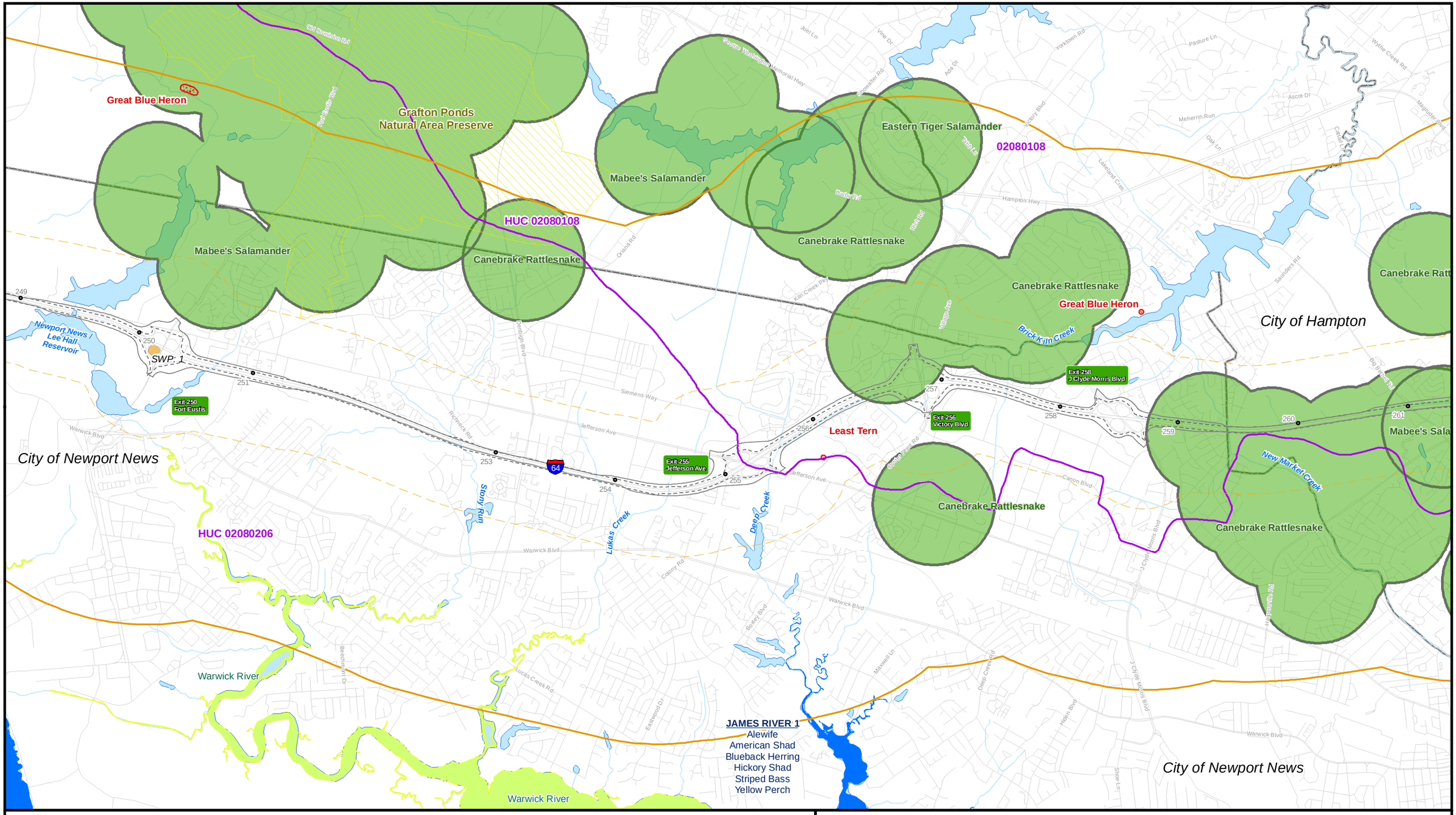
VDOT Virginia Department of Transportation

0 0.25 0.5 1 Miles



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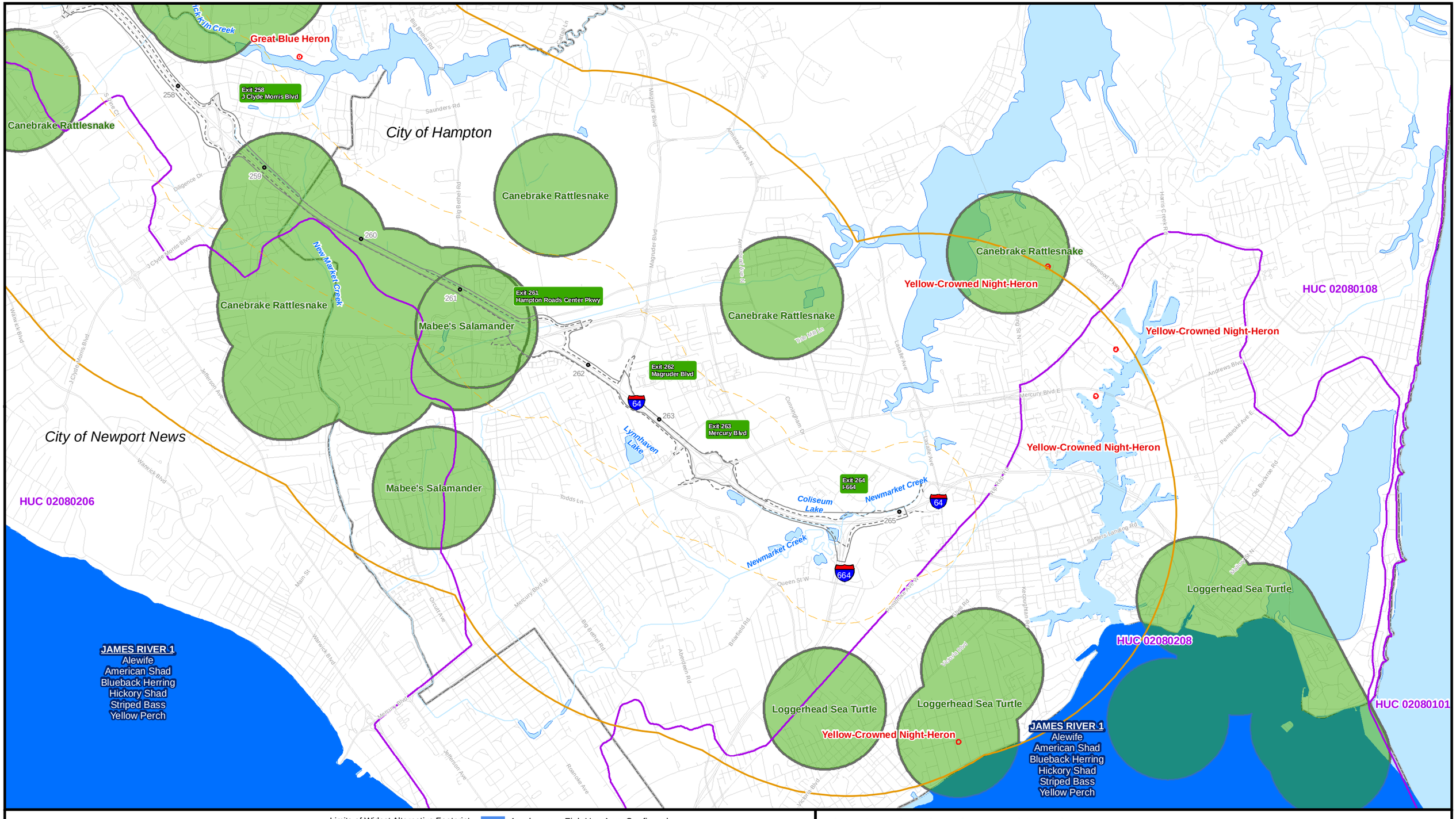
N

Map 8 of 9

VDOT Virginia Department of Transportation

0 0.25 0.5 1 Miles



INTERSTATE 64 PENINSULA STUDY

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N

Map 9 of 9

VDOT Virginia Department of Transportation

0 0.25 0.5 1 Miles

INTERSTATE 64 PENINSULA STUDY

APPENDIX L

Small Whorled Pogonia Habitat Assessment Report and Mapping

Habitat Reconnaissance for Small Whorled Pogonia (*Isotria medeoloides*)

I-64 Road Improvement
State Project No. 0064-M11-002, P101
Hampton to Richmond, Virginia

Prepared for:

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May 1, 2012

3e EEE Consulting, Inc.
Environmental, Engineering and Educational Solutions

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May 1, 2012

1.0 Executive Summary

EEE Consulting, Inc. (EEE) conducted a reconnaissance-level habitat evaluation for the Federally-threatened, State-endangered small whorled pogonia (*Isotria medeoloides*) within the existing (as of September 2011) Virginia Department of Transportation (VDOT) right-of-way (ROW) north of westbound travel lanes, south of eastbound travel lanes, within the median, and around interchanges from Richmond to Hampton, Virginia. Potential habitat was identified using a combination of "desktop" review of relevant data resources, "windshield" reconnaissance conducted from a vehicle, and field spot checks of the highest quality habitat areas that were identified by the "desktop" and "windshield" reviews. Fifteen areas identified during the "desktop/windshield" review were checked in the field. Of the fifteen areas that were field reviewed, thirteen were determined to be areas of medium potential habitat, one (Area 2) was characterized as high potential habitat, and one (Area 3) was determined to be low potential habitat. EEE recommends intensive pedestrian surveys of all areas of medium potential and high potential habitat within the project corridor.

The scope of this investigation was limited to a cursory review. Additional small whorled pogonia habitat not identified during this investigation may be present within the project corridor. As the project progresses to the design and permitting stage, a pedestrian survey of all forested areas within the project corridor should be conducted to identify all suitable habitat and to determine presence or absence of small whorled pogonia.

2.0 Introduction

The purpose of this investigation was to identify potential small whorled pogonia habitat within the existing VDOT ROW along the project corridor using "desktop" review, "windshield" surveys, and limited field spot checks. The project involves improvements to Interstate I-64 from Interstate 664 in Hampton to Interstate 95 in Richmond, Virginia. Potential improvements may include the addition of west and east bound travel lanes and interchange improvements.

3.0 Species Description and Habitat Associations

The small whorled pogonia was listed as Federally-endangered for protection under the Endangered Species Act on September 9, 1982 and was reclassified from endangered to threatened on October 6, 1994 (USFWS 1982, 1994). The small whorled pogonia is listed as State-endangered by the Commonwealth of Virginia.

Historically, small whorled pogonia has been documented in 21 states, Canada, and the District of Columbia; however, current estimates report that 93 extant sites representing fewer than 3,000

individuals occur across nine states (NatureServe 2011; USDA, NRCS 2009). In Virginia, most populations occur in the coastal plain and piedmont. Small whorled pogonia has been documented in 21 counties (and one city), including James City County, New Kent County, York County, and the City of Williamsburg (USFWS 2012).

The small whorled pogonia is an herbaceous, perennial orchid (family Orchidaceae) that consists of a single stem (rarely two or more) with a whorl of five or six leaves at the apex of the stem. The stem is hollow and smooth with a glaucous light-green appearance similar to a seedless green grape. Similar species include Indian cucumber root (*Medeola virginiana*), which has a solid, wiry, reddish-brown (sometimes green) stem with cobwebby pubescence and large whorled pogonia (*Isotria verticillata*), which has a reddish stem.

Small whorled pogonia is thought to remain dormant for extended periods (Correll 1950), but Mehrhoff (1989b) found that dormancy periods are typically less than three years. Size of an individual can be a good predictor of reproductive success the following year; with the largest individuals having the largest capsules and highest seed set (Vitt and Campbell 1997). Mehrhoff (1989b) found that the probability of flowering the following year is positively correlated with plant size and that flowering individuals are, on average, the largest plants. Small whorled pogonia is primarily self-pollinating and vegetative reproduction is infrequent (Mehrhoff 1983; Vitt and Campbell 1997). Flowering occurs from May to June when a greenish-yellow, odorless flower with green sepals less than 3 cm long emerges above the whorl of leaves (Radford et al. 1964; Gleason and Cronquist 1991).

Mehrhoff (1989a) found that the most consistent habitat features at sites occupied by the small whorled pogonia are vegetation structure and disturbance history. Small whorled pogonia typically occurs on mesic sites in mixed-deciduous or mixed-deciduous coniferous forests that are generally in second- or third-growth successional stages (USFWS 1992). Most occupied sites have been cutover in the past and allowed to regenerate for at least several decades (Mehrhoff 1989a). Occupied sites typically have sparse to moderate ground cover, a relatively open understory, and proximity to long persisting canopy breaks associated with logging roads, streams, and large tree falls (Mehrhoff 1989a).

In Virginia, the ages of older canopy trees have been estimated to be 45 to 80 years old (Ware 1987). Virginia sites typically contain dry-mesic to wet-mesic soils that are low-nutrient, acidic loams (Mehrhoff 1989a). In Virginia, the soils at occupied sites are typically acidic sandy loams with pH values of 4.3 to 5.5; however, the soil from one site in Virginia was described as a silt loam (Ware 1991). The forest floor is typically flecked with sunlight and is covered with a light to thick layer of leaf litter with limited exposed rock and soil (USFWS 1992; Mehrhoff 1989a). Small whorled pogonia generally occurs on gentle to moderate slopes with eastern or northern exposures, although the plant has been documented on all slope aspects (Ware 1991). Decaying woody debris is also present at most occupied sites and, like many orchids, mycorhizzal associations likely play a prominent role in nutrient uptake (USFWS 1992).

Mehrhoff (1989a) did not identify unique indicator species, but red oak (*Quercus rubra*) and red maple (*Acer rubrum*) were present in the canopy of all occupied sites. In Virginia, typical canopy species associated with small whorled pogonia are white oak (*Quercus alba*), black oak (*Q. velutina*), scarlet oak (*Q. coccinea*), sweetgum (*Liquidambar styraciflua*), tulip tree (*Liriodendron tulipifera*), and American beech (*Fagus grandifolia*). Typical understory and shrub species include flowering dogwood (*Cornus florida*), sourwood (*Oxydendrum arboreum*), mountain laurel (*Kalmia latifolia*), American chestnut (*Castanea dentata*), and witch hazel (*Hamamelis virginiana*). Typical ground cover species are partridge berry (*Mitchella repens*), Indian cucumber root, New York fern (*Thelypteris noveboracencis*), lowbush blueberry (*Vaccinium pallidum*), rattlesnake plantain (*Goodyera pubescens*), red maple seedlings, oak species seedlings, Virginia creeper (*Parthenocissus quinquefolia*), naked tick-trefoil (*Desmodium nudiflorum*), catbrier (*Smilax glauca*), and Christmas fern (*Polystichum acrostichoides*). (USFWS 1992).

Two known sites in Prince William County, Virginia, visited by EEE staff from 2008 to 2011 were noted to have the following associates:

Prince William County Location #1:

The canopy was dominated by American beech, red maple, white oak, pignut hickory (*Carya glabra*), southern red oak (*Quercus falcata*), tulip tree, and sweet gum. The dominant saplings were black gum (*Nyssa sylvatica*), American beech, red maple, American holly (*Ilex opaca*), and pignut hickory. The dominant herbs were southern ground cedar (*Lycopodium digitatum*), strawberry bush (*Euonymus americana*), lowbush blueberry, red maple, pignut hickory, beechdrops (*Epifagus virginiana*), mapleleaf viburnum (*Viburnum acerifolium*), black cherry (*Prunus serotina*), and Virginia creeper. No vine or shrubs were present at this location.

Prince William County Location #2:

The canopy was dominated by tulip tree, pignut hickory, white oak, and American beech. The sapling/shrub dominants were blackgum, American beech, ironwood (*Carpinus caroliniana*), and American holly. The herbaceous layer was dominated by southern ground cedar, American beech, naked-flowered tick-trefoil, sessile leaf bellwort (*Uvularia sessilifolia*), strawberry bush, New York fern, Christmas fern, partridgeberry, lowbush blueberry, and striped wintergreen (*Chimaphila maculata*).

4.0 Methodology

Potential small whorled pogonia habitat was initially identified using a combination of "desktop" review of relevant data resources (e.g., site topography, USGS topographic quadrangle maps, National Wetlands Inventory maps; NRCS soils map data, the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps, natural color aerial imagery, and color infrared aerial imagery) and "windshield" reconnaissance conducted from a vehicle. Field spot checks

were then conducted on 15 areas of potential habitat identified during the "desktop/windshield" review. This habitat reconnaissance was conducted within the existing (as of September 2011) VDOT ROW north of westbound travel lanes, south of eastbound travel lanes, within the median, and around interchanges from Richmond to Hampton, Virginia.

Field review of the 15 habitat areas was conducted by EEE environmental scientists Taylor S. Sprenkle and Tamara Doucette on August 30 and September 1, 2011. Mr. Sprenkle is included on the U.S. Fish and Wildlife Service's list of approved surveyors for the small whorled pogonia.

Potential small whorled pogonia habitat was evaluated based on criteria developed from literature review, research conducted in Virginia, and the personal experience of EEE staff. Habitat quality was divided into three categories: low potential, medium potential, and high potential as follows:

High potential habitat areas possess almost all of the physical and biological characteristics of optimal habitat described for small whorled pogonia in Virginia (Ware 1991; USFWS 1992).

Medium potential habitat approaches optimal habitat but lacks one or more key habitat characteristics. Habitat that would otherwise be considered high potential, would be considered medium potential if:

- steep slopes are present;
- the slope aspect faces a direction other than north to southeast (i.e., west);
- scattered individuals of "dry" species such as Virginia pine (*Pinus virginiana*), chestnut oak (*Quercus prinus*) or black locust (*Robinia pseudoacacia*) are present;
- the understory or ground cover is moderately dense; or
- soils are not typical of soil types associated with suitable habitat.

Low potential habitat would have little to no potential to support the small whorled pogonia. Habitat is considered low potential if:

- the area is dominated primarily by chestnut oak or Virginia pine;
- the forest is relatively young;
- the area is heavily disturbed
- the area is dominated by exotic species;
- the understory is extremely dense;
- the area is very dry or very wet; or
- very steep slopes are present with little leaf litter.

5.0 Habitat Evaluation Findings

The majority of the project corridor would be considered low potential habitat including non-forested areas (e.g., mowed roadsides and lawns, landscaped areas, buildings, pavement. etc.) and forested areas that are wetlands, are heavily disturbed, have an extremely dense understory, are heavily dominated by xeric species such as chestnut oak or Virginia pine, or are heavily dominated by invasive species such as Japanese honeysuckle, tree-of-heaven (*Ailanthus altissima*), common periwinkle (*Vinca minor*), or English ivy (*Hedera helix*).

Fifteen forested areas were identified during the "desktop/windshield" review as warranting field review. Of the fifteen areas that were field reviewed, thirteen were determined to be medium potential habitat, one (Area 2) was characterized as high potential habitat, and one (Area 3) was determined to be low potential habitat.

Area 1

This medium potential habitat is situated on level ground within the northwest loop of the interchange cloverleaf at exit 250. The canopy is dominated by red maple, American holly, white oak, loblolly pine, tulip tree, black gum and sweet gum. The sapling/shrub dominant is American beech. The herbaceous dominants include greenbrier (*Smilax rotundifolia*), lowbush blueberry, willow oak (*Quercus phellos*) and muscadine (*Vitis rotundifolia*). The understory is very sparse with thick leaf and pine needle litter and a wet feature at the bottom of a slight slope. Although several indicators of high quality habitat are present, field observations suggest that the hydrologic regime may be more hydric than ideal for small whorled pogonia; therefore, this habitat was classified as medium potential.

Area 2

This high potential habitat is located within a "triangle" of land bordered to the northeast by I-64, to the northwest by Merrimac Trail (Route 143), and to the south by the eastbound access ramp to I-64. This habitat has gentle slopes with an ephemeral channel at the base of the slope and sun flecking. The herbaceous layer was sparse with abundant leaf litter and abundant decaying woody material. The canopy in this area is dominated by white oak, American beech, American holly, loblolly pine, red oak, tulip tree and sweet gum. The sapling/shrub dominants include mockernut hickory (*Carya alba*), red oak, American beech, white oak, southern red oak, devil's walking stick (*Aralia spinosa*), eastern red cedar, southern magnolia (*Magnolia grandiflora*) and pignut hickory. The herbaceous layer dominants include partridge berry, lowbush blueberry, muscadine and multiflora rose (*Rosa multiflora*).

Area 3

This low potential habitat in the median at mile marker 228 is situated on a steep west facing slope. The canopy in this area is dominated by tulip tree, white oak, sweet gum and red maple. The sapling/shrub layer is dominated by mountain laurel and the herbaceous layer is dominated by muscadine and partridge berry. The shrub layer is thick and dominates the forest floor. Due

to the steep slope, west facing slope, and thick understory, this site was classified as low potential.

Area 4

This medium potential site is situated on a gentle to moderate slope in the median near mile marker 224. The tree canopy is dominated by American holly, white oak, American beech, sourwood, tulip tree, red oak, sweet gum and southern red oak. The sapling/shrub layer is dominated by mountain laurel, American holly, lowbush blueberry and white oak. The herbaceous layer is dominated by lowbush blueberry.

Area 5

This medium potential site is situated on an east facing slope in the median near mile marker 221. The tree canopy is dominated by red maple, sweet gum, white oak, tulip tree, southern red oak, American beech, loblolly, swamp white oak, American holly and mockernut hickory. The sapling/shrub layer is dominated by sweet gum, ironwood, devil's walking stick and mockernut hickory. The herbaceous layer is dominated by partridge berry. The understory in this area is sparse with sun flecking, thick leaf litter, east facing slope and a perennial stream and wet feature at the bottom of the slope. Although several indicators of suitable habitat are present, the slope in this area is moderate to steep and is therefore classified as medium potential.

Area 6

This medium potential habitat is located in the median at mile marker 219. This habitat area has a sparse understory and herbaceous layer, sun flecking, abundant woody debris, thick leaf litter, moderate west facing slope and a stream feature at the base of the slope. The tree canopy is dominated by white oak, American holly, American beech and loblolly. The sapling/shrub layer is dominated by American holly, red oak, sweet gum and red maple. The herbaceous layer is dominated by lowbush blueberry, mockernut hickory and smooth carionflower (*Smilax herbacea*).

Area 7

This medium potential site is located in the median near mile marker 217. The tree canopy is dominated by loblolly, white oak, pignut hickory, American beech, red maple and eastern red cedar. The sapling/shrub layer is dominated by pignut hickory and American holly. The herbaceous layer is dominated by smooth carionflower, muscadine, and partridge berry. The area has a sparse understory and herbaceous layer, sun flecking, abundance woody debris, thick leaf litter and a gentle west-facing slope. Although the area contains indicators of high quality habitat, the west-facing slope is not ideal for small whorled pogonia; therefore, this area is classified as medium potential habitat.

Area 8

This medium potential area is located in the median near mile marker 214. The tree canopy is dominated by American holly, white oak, pignut hickory, southern red oak, tulip tree and

loblolly. The sapling/shrub layer is dominated by American holly and eastern red cedar. The herbaceous layer is dominated by white oak, pignut hickory, red oak, longleaf woodoats (*Chasmanthium sessiliflorum*), Bosc's panicgrass (*Dichanthelium boscii)* and lowbush blueberry. The site has a sparse understory, thick leaf litter, moderate woody debris, moderate east facing slope and sun flecking.

Area 9

This medium potential site is located in the median approximately 500 feet west of exit 214. This habitat area is characterized by a sparse herbaceous layer and a gentle western facing slope. The tree canopy is dominated by fringe tree (*Chionanthus virginicus*), American holly, white oak, southern red oak, pignut hickory, sweet gum, red maple, tulip tree and red oak. The sapling/shrub layer is dominated by fringe tree, American holly, white oak, sweet gum and black cherry. The herbaceous layer is dominated by lowbush blueberry, muscadine, pignut hickory, poison ivy (*Toxicodendron radicans*), sassafras (*Sassafras albidum*) and poison oak (*Toxicodendron pubescens*).

Area 10

This medium potential site is located in the median near mile marker 212. It is characterized by gentle to moderate east and west facing slopes, spare to moderate herb cover and dense leaf litter. The tree canopy is dominated by red oak, white oak, American holly, American beech, Virginia pine, loblolly pine, sweet gum and pin oak (*Quercus palustris*). The sapling/shrub layer is dominated by red oak, American holly, sweet gum and black cherry. The herbaceous layer is dominated by red oak, white oak, sweet gum, muscadine, lowbush blueberry, greenbriar and poison ivy. Although this area has indicators of suitable habitat, the presence of exotics and xeric species such as Virginia pine and abundant herbaceous cover indicates moderate potential habitat.

Area 11

This medium potential site is located in the median near mile marker 210. The tree canopy is dominated by white oak, flowering dogwood (*Cornus florida*), tulip tree, American hornbeam (*Carpinus caroliniana*), sweet gum, red oak and black cherry. The sapling/shrub layer is dominated by tulip tree, sweet gum, read oak, sassafras, American holly, lowbush blueberry and pignut hickory. The herbaceous layer is dominated by pignut hickory, spicebush (*Lindera benzoin*), sweet gum, tulip tree, greenbriar, Virginia creeper and muscadine. This area has a sparse understory, sun flecking, moderate southeast facing slope and abundant leaf litter.

Area 12

This medium potential site is located in the median near mile marker 209. The tree canopy is dominated by ironwood, river birch (*Betula nigra*), white oak, American holly, sweet gum, tulip tree, loblolly and water oak (*Quercus nigra*). The sapling/shrub layer is dominated by American beech, ironwood, American holly and pignut hickory. The herbaceous layer is dominated by lady fern (*Athyrium filix-femina*), greenbriar, Virginia creeper and Japanese honeysuckle. The

slope is moderate to steep and southwest facing with a stream at the base. The herbaceous cover is moderate with leaf litter and woody debris.

Area 13

This medium potential site is located in the exit 205 interchange northwest of the intersection between I-64 and New Kent Highway (Route 249). The tree canopy is dominated by American holly, read oak, white oak, American beech, tulip tree, sweet gum and sassafras. The sapling/shrub layer is dominated by American holly, American beech and black gum. The herbaceous layer is dominated by American holly, white oak, muscadine, greenbrier, Virginia creeper and sweet gum. This area is relatively flat and does not have a stream or wetland in the vicinity, but abundant woody debris, sun flecking and thick leaf litter make this medium potential habitat.

Area 14

This medium potential area is located within the northeast loop of the exit 205 interchange . The tree canopy is dominated by beech, pignut hickory, white oak, tulip tree, sweetgum and loblolly. The sapling/shrub layer is dominated by American beech, American holly, sweet gum and black gum. The herbaceous layer is dominated by burning bush and American holly. The area lacks slope or a water feature but has abundant woody debris, sun flecking and thick leaf litter.

Area 15

This medium potential site is located in the exit 205 interchange on the south side of interstate 64 and the west side of New Kent Highway (Route 249). The tree canopy is dominated by American beech, red oak, tulip tree, sweet gum, white oak and loblolly. The sapling/shrub layer is dominated by American beech and American holly. The herbaceous layer is dominated by American burnweed (*Erechtites hieraciifolia*), white oak and muscadine. The area lacks slope or a water feature but has abundant woody debris, sun flecking and thick leaf litter with sparse herbaceous cover. The site has evidence of previous fire and a duff layer approximately 3 inches thick.

6.0 Conclusions

In our opinion, the areas of the project corridor that have little to no potential to support small whorled pogonia would not warrant a survey for small whorled pogonia (subject to concurrence from relevant resource agencies). These areas include non-forested areas (e.g., mowed roadsides and lawns, landscaped areas, buildings, pavement. etc.), wetlands, and areas that are forested but are heavily disturbed, have an extremely dense understory, are heavily dominated by xeric species such as chestnut oak or Virginia pine, or are heavily dominated by invasive species such as Japanese honeysuckle, tree-of-heaven (*Ailanthus altissima*), common periwinkle (*Vinca minor*), or English ivy (*Hedera helix*).

EEE recommends intensive pedestrian surveys of all areas of medium potential and high potential habitat within the project corridor.

7.0 Limitations

A presence/absence survey for small whorled pogonia was not conducted during this habitat reconnaissance. This habitat reconnaissance was conducted within the existing (as of September 2011) VDOT ROW north of westbound travel lanes, south of eastbound travel lanes, within the median, and around interchanges from Richmond to Hampton, Virginia. The scope of this investigation was limited to a cursory review. Additional small whorled pogonia habitat not identified during this investigation may be present within the project corridor. As the project progresses to the design and permitting stage, a pedestrian survey of all forested areas within the project corridor should be conducted to identify all suitable habitat and to determine presence or absence of small whorled pogonia. A presence/absence survey should be conducted within the timeframe recommended by the U.S. Fish and Wildlife Service (May 25 to July 15 for the project corridor). The determination whether or not to conduct a small whorled pogonia survey is subject to review and concurrence from the relevant resource agencies.

This study is based on examination of the habitat conditions at the time of this study and does not address conditions at a given time in the future as habitat conditions may change over time. Therefore, the conclusions of this study may differ from future observations.

EEE's habitat evaluation has been conducted in accordance with generally accepted guidelines for the conduct of surveys for rare, threatened, and endangered plants. EEE makes no warranties, either expressed or implied, and this report is not a recommendation for actions along the study corridor.

EEE Consulting, Inc.

Taylor S. Sprenkle, PWD
Environmental Scientist

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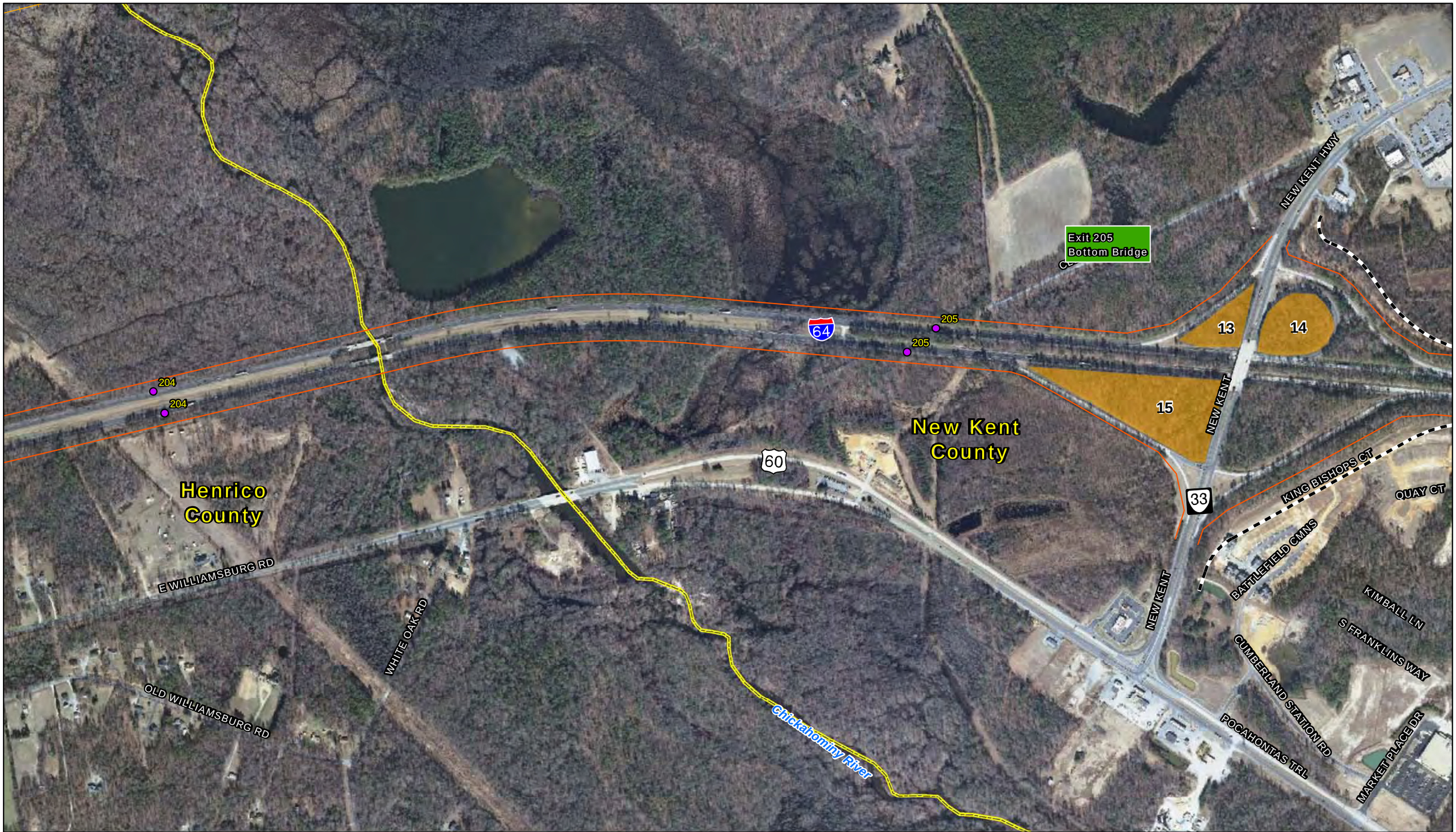

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Jurisdiction

Rail

210 Mile Marker

Interchange Limits of Impact

Right of Way

Potential Small Whorled Pogonia Habitat Areas

LOW MED HIGH

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

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N

0 300 600 Feet

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Jurisdiction

Rail

210 Mile Marker

Interchange Limits of Impact

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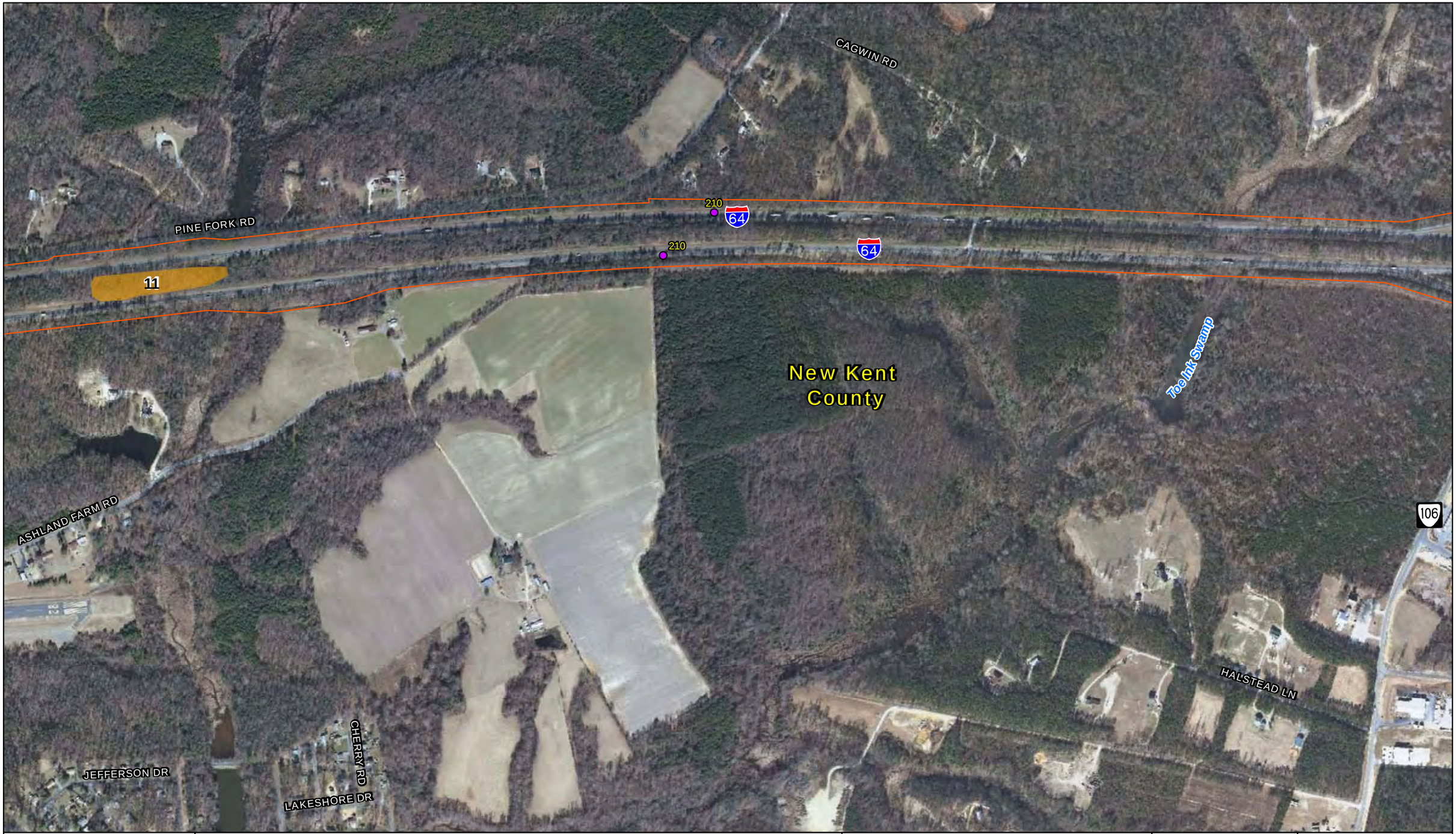

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Sheet 12 of 43

Jurisdiction

Rail

210 Mile Marker

Interchange Limits of Impact

Right of Way

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LOW MED HIGH

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Sheet 13 of 43

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Jurisdiction

Rail

210 Mile Marker

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Right of Way

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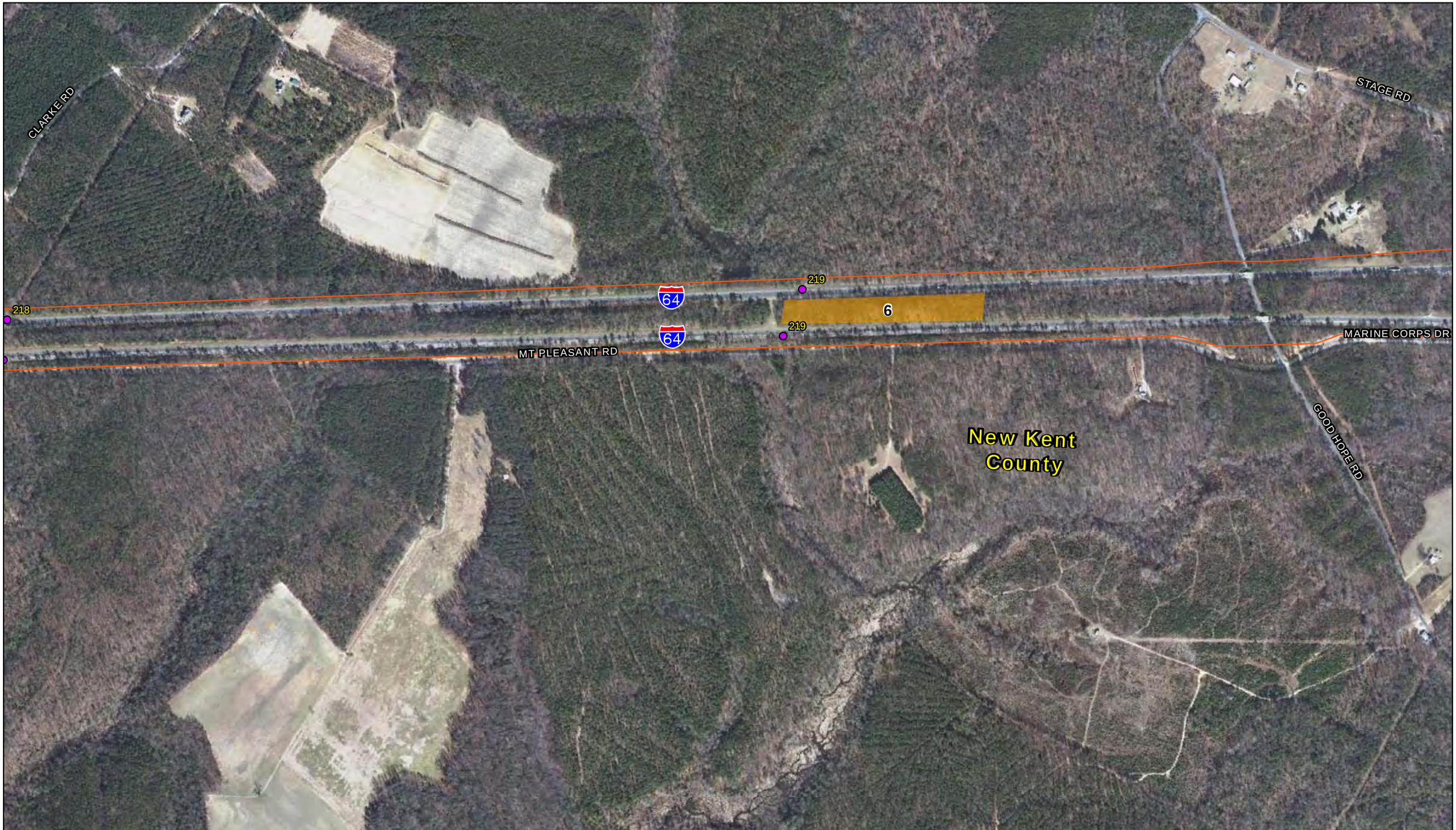

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Jurisdiction

Rail

210 Mile Marker

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Right of Way

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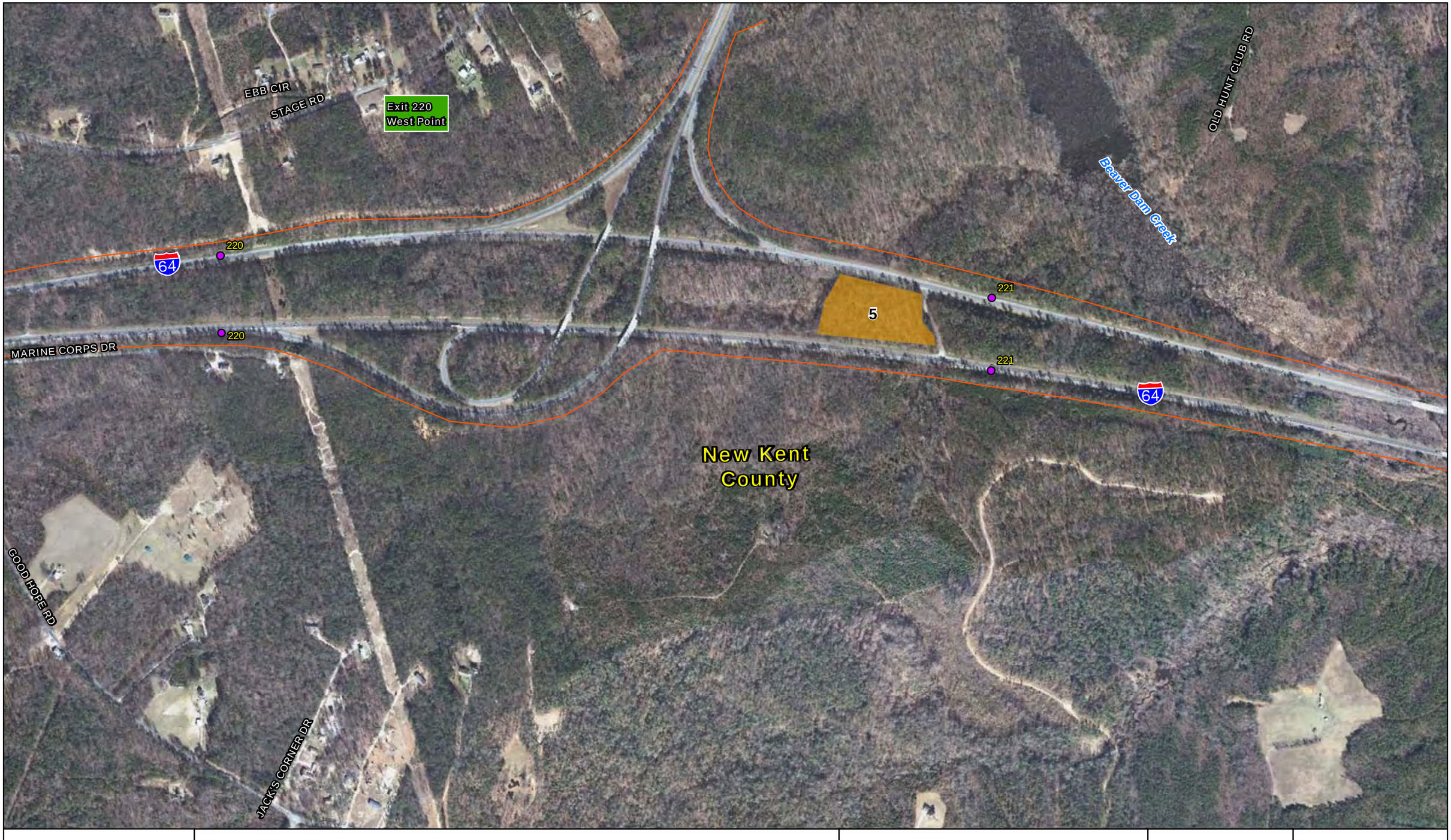
0 300 600

Feet



DRAFT

Sheet 18 of 43

Jurisdiction

Rail

210 Mile Marker

Interchange Limits of Impact

Right of Way

Potential Small Whorled Pogonia Habitat Areas

LOW MED HIGH

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
Aerial photography copyrighted by the Commonwealth of Virginia, 2009

DRAFT

N

0 300 600 Feet

DRAFT

Sheet 20 of 43

Jurisdiction

Rail

210 Mile Marker

Interchange Limits of Impact

Right of Way

Potential Small Whorled Pogonia Habitat Areas

LOW MED HIGH

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
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DRAFT

N

0 300 600 Feet

DRAFT

Sheet 22 of 43

Jurisdiction

Rail

210 Mile Marker

Interchange Limits of Impact

Right of Way

Potential Small Whorled Pogonia Habitat Areas

LOW MED HIGH

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
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DRAFT

N

0 300 600 Feet

DRAFT

Sheet 28 of 43

Jurisdiction

Rail

210 Mile Marker

Interchange Limits of Impact

Right of Way

Potential Small Whorled Pogonia Habitat Areas

LOW MED HIGH

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
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N

0 300 600 Feet

Campsite Dr
Newport News / Lee Hall Reservoir
Old Stable Rd
Old Fort Eustis Blvd
Plum Ct
Keel Ct
Galleon Dr
Halyard Dr
Chapman Way
Cherry Creek Dr
Woodcreek Dr
Constitution Way
Newport News
Longleaf La
Birchwood Ct
Chaplin Wood Dr
Lateen Ct
Frigate Dr
Whaler Dr
Dorene Pl
Rhoda Dr
Shields Rd
105
Andover Ct
Terri Sue Pl
Oakleaf Ct
Industrial Park Dr
Rotunda Cir
Christy La
Jefferson Ave
Jefferson Ave
143
Skelton Way
Sea Pine La
Kates Trace Cir
Woodbridge Dr
Clearbrook Rd
Mason Dr
Ridgeview Dr
Jake's La
250
Exit 250
Fort Eustis
1
Forrestal Cir
251
251
64
Edwards Ct
Truswood La
Fort Eustis Blvd
Merry Oaks Dr
Dogwood Ct
Wyn Dr
Lucinda Dr

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Sheet 35 of 43

Jurisdiction
Rail
210 Mile Marker
Interchange Limits of Impact
Right of Way

Potential Small Whorled Pogonia Habitat Areas

LOW MED HIGH

Notes:

Water features courtesy of National Hydrographic Dataset.
Roads layer courtesy of VGIN.
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0 300 600
Feet


Richmond
Wmsr
Ft Eustis Blvd
Ft Eustis
Exit
Ft Eustis Blvd
Yorktown


1971