



# Natural Resources Technical Report

I-95 RAPPAHANNOCK RIVER CROSSING

City of Fredericksburg

Stafford County

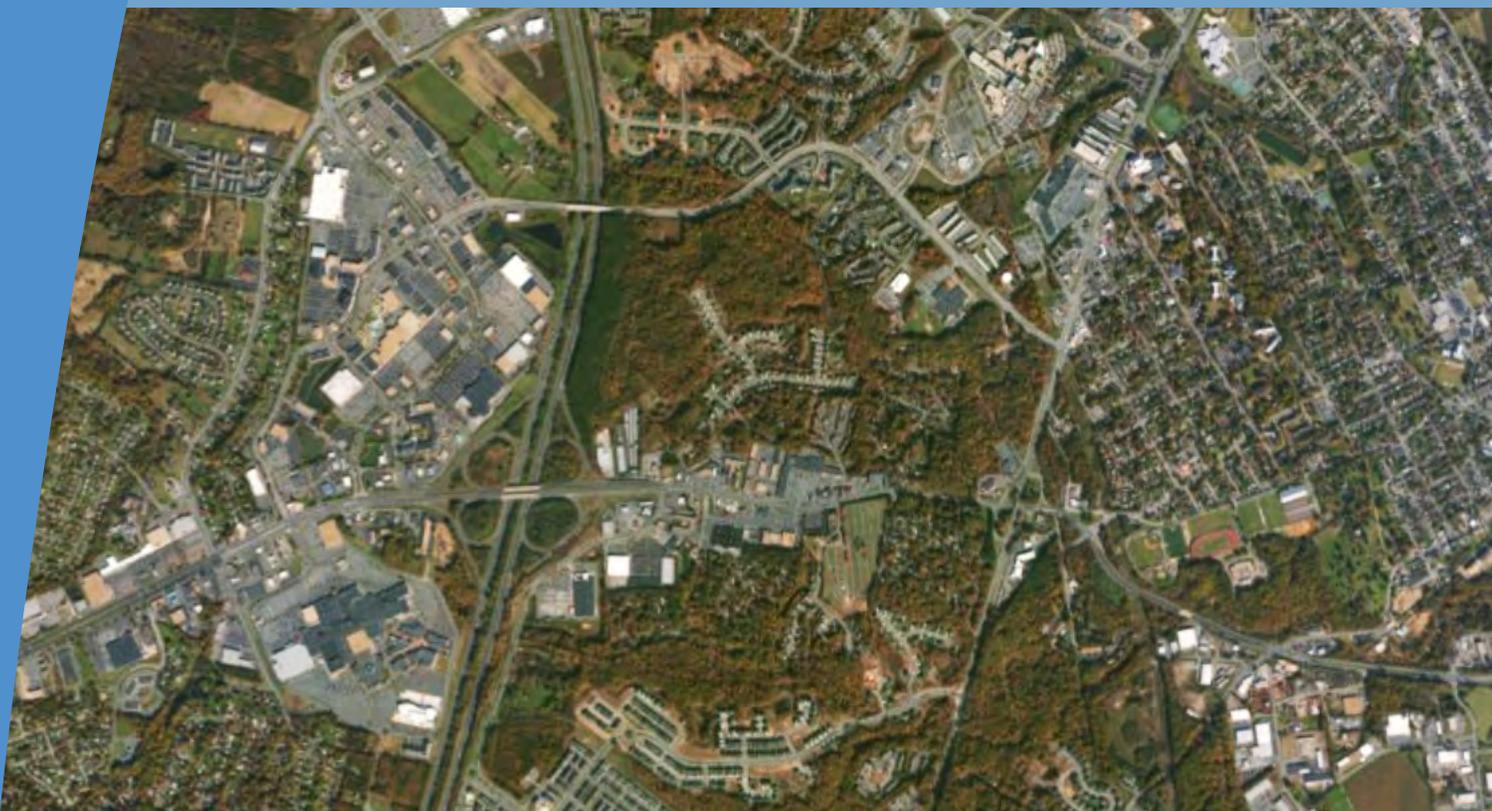
Spotsylvania County

State Project No.: 0095-111-259, P101

UPC 101595

0095-111-270, P101

UPC 105510



# **NATURAL RESOURCES TECHNICAL REPORT**

for

## **I-95 Rappahannock River Crossing ENVIRONMENTAL ASSESSMENT**

State Project Nos.:  
0095-111-259, P101; UPC 101595  
0095-111-270, P101; UPC 105510

City of Fredericksburg, Spotsylvania County, and Stafford County, VA

**May 2015**

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## ACRONYMS

CCB	Center for Conservation Biology
Corps	U.S. Army Corps of Engineers
CWA	Clean Water Act
CZMA	Coastal Zone Management Area
CZMP	Coastal Zone Management Program
DNH	Division of Natural Heritage
Eagle Act	Bald and Golden Eagle Protection Act
ESA	Endangered Species Act
FE	Federally Endangered
FEMA	Federal Emergency Management Agency
FT	Federally Threatened
FHWA	Federal Highway Administration
GIS	Geographic Information System
GPS	Global Positioning System
GWMA	Ground Water Management Act

HUC	Hydrologic Unit Code
MBT Act	Migratory Bird Treaty Act
MSL	Mean Sea Level
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
NWP	Nationwide Permit
PCB	Polychlorinated Bi-Phenyls
RMA	Resource Management Area
RPA	Resource Protection Area
SDWA	Safe Drinking Water Act
SE	State Endangered
ST	State Threatened
SWPPP	Stormwater Pollution Prevention Plan
SYIP	Six-Year Improvement Program
The Bay Act	Chesapeake Bay Preservation Act
TMDL	Total Maximum Daily Load
USCG	U.S. Coast Guard
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geologic Survey
USM	Unified Stream Methodology
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
VDOF	Virginia Department of Forestry
VDOT	Virginia Department of Transportation
VESCL	Virginia Erosion and Sediment Control Law
VESCR	Virginia Erosion and Sediment Control Regulation
VFWIS	Virginia Fish and Wildlife Information Service
VGP	Virginia General Permit
VMRC	Virginia Marine Resources Commission
VWP	Virginia Water Protection
VWPP	Virginia Water Protection Program
WUS	Waters of the U.S.

## **I. INTRODUCTION AND BACKGROUND**

The following report describes the natural resources, which may be impacted by the alternatives within the study area for the I-95 Rappahannock River Crossing Project. The purpose of this report is to summarize baseline conditions along the Alternatives' footprints, provide a comparison of the impacts to these resources for the different Alternatives, and summarize potential permits and/or environmental clearances needed prior to the construction of the project.

### **A. Project Description**

The Virginia Department of Transportation (VDOT), in cooperation with the Federal Highway Administration (FHWA), is evaluating potential transportation improvements to address traffic conditions along an approximate three-mile section of the Interstate 95 (I-95) corridor, from the VA 3 Interchange (Exit 130) to just north of the US 17 Interchange (Exit 133) in the City of Fredericksburg, Stafford and Spotsylvania Counties, as shown in **Figure 1**.

This project was requested by the City of Fredericksburg and is included in the Fredericksburg Area Metropolitan Planning Organization (FAMPO) Fiscal Year 2012-2015 Transportation Improvement Program, as well as programmed in the Fiscal Year 2014-2019 VDOT Six-Year Improvement Program (SYIP).

### **B. Purpose and Need**

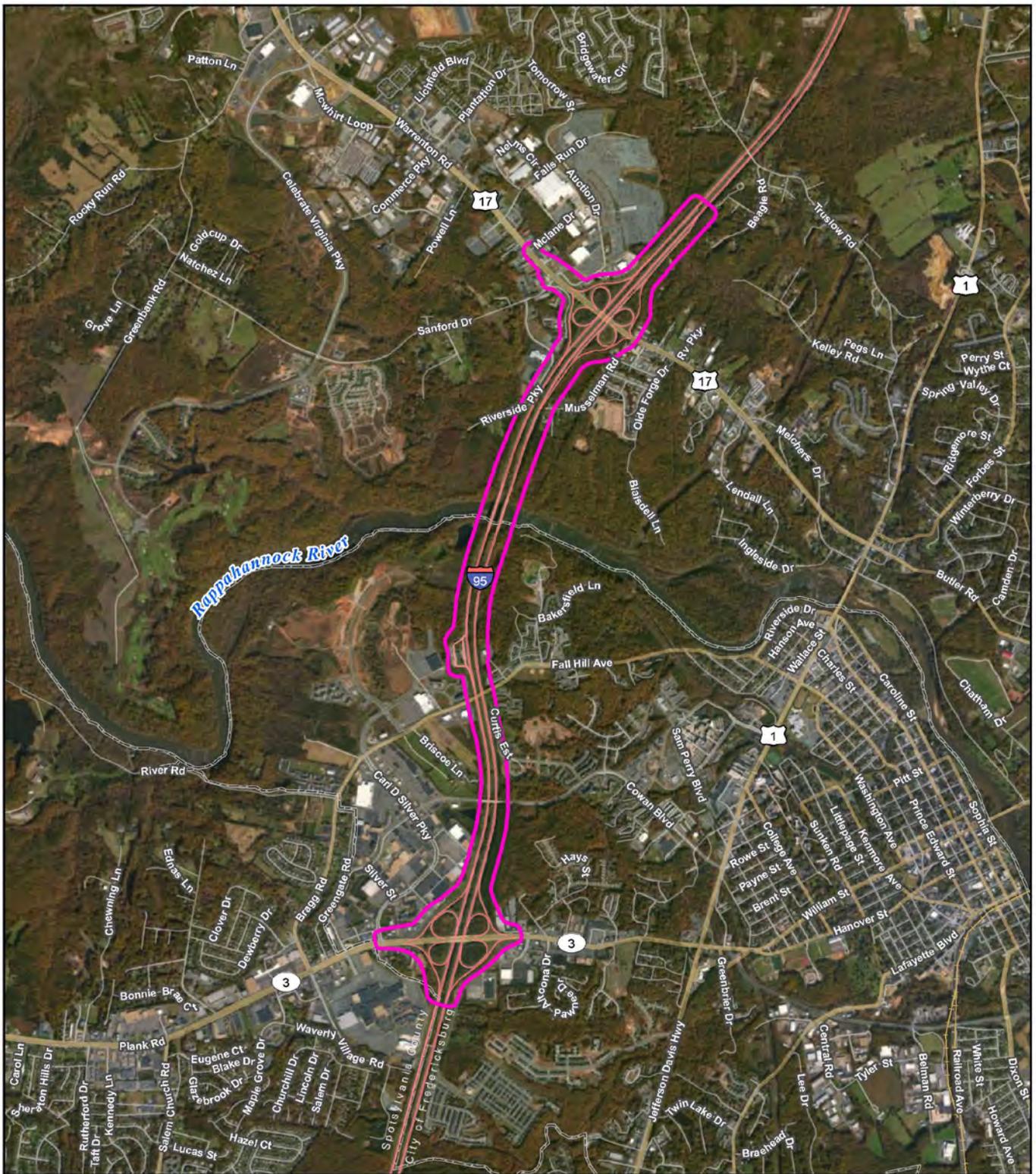
The study area has seen substantial population and job growth throughout several decades. This growth, combined with regional travel patterns, has led to increased traffic volumes, congestion and safety concerns on the roadway network, particularly I-95. This project was initiated with the specific intent of improving local and through traffic conditions on I-95 between and within the VA 3 and US 17 Interchanges and increasing access between I-95 and key residential and commercial areas in the study area, both north and south of the Rappahannock River. Based on the existing and future needs, the purpose of the proposed project is to improve the Level of Service (LOS) on I-95 by providing additional capacity and improving mobility and improving safety by reducing conflict points between local and through traffic.

### **C. Proposed Alternatives**

A number of possible solutions to address the needs described above were evaluated during the preparation of the *I-95 Interchange Modification Report (IMR), Improvements to I-95 between Exit 133 and Exit 130*. As a result of the alternatives investigations, a Build Alternative and a No-Build Alternative are being carried forward for further analysis in the Environmental Assessment. The goals are to develop solutions that meet the project purpose and need 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**

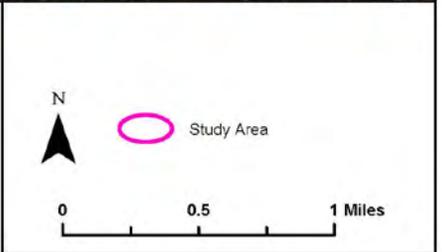
The No-Build Alternative serves as a baseline for the comparison of future conditions and impacts. This alternative represents no modifications to the interstate or arterial roadway system other than the planned and programmed improvements identified in the FAMPO 2040 Constrained Long-Range Plan (CLRP) and VDOT's SYIP. However, it would allow for short-term restoration types of activities (safety and maintenance improvements, etc.) that maintain continuing operation of the existing interstate facility.



**Figure 1**  
**Study Area Map**  
**I-95 Rappahannock River Crossing**

VDOT Projects: 0095-111-259, P101; UPC 101595  
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Stafford and Spotsylvania Counties and the City of Fredericksburg, Virginia  
 (Source: Esri & Digital Globe, 2013)



## 2. Build Alternative

The Build Alternative, which was referred to in the I-95 IMR as Alternative 3A (Modified), would include the construction of parallel collector-distributor (C-D) lanes in each direction between the Route 3 and Route 17 interchanges on I-95 with a pair of braided ramps to separate heavy Route 3 and Route 17 ramp volumes. The northbound C-D Road would start at the eastbound Route 3 to northbound I-95 on-ramp and end at the new I-95 northbound to Route 17 westbound/northbound flyover. The southbound C-D Road would start just south of Route 17 and end at the I-95 southbound off-ramp to westbound Route 3. The project would also include new I-95 bridges in each direction across the Rappahannock River, reconstruction of the Route 17 interchange (Exit 133), improvements to the Route 3 interchange (Exit 130) and improvements to the Virginia Welcome Center, as described further in the I-95 IMR and the Alternatives section of the Environmental Assessment.

**Figure 2** shows the project study area and the Build Alternative. The areas that have the potential to be impacted by the proposed project are also shown in **Figure 2**, in blue. This area is generally the limits of cut and fill for the proposed alignments, as shown in the I-95 IMR design plans, but was also expanded in a few locations to allow for potential easements, utility relocations and staging areas during construction.

## II. EXISTING CONDITIONS AND POTENTIAL IMPACTS

### A. Topography

#### *Methodology and Existing Conditions*

The study area is located within the westernmost limits of the Coastal Plain Physiographic Province of Virginia. The Coastal Plain 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 area is within the United States Geologic Survey (USGS) Salem Church and Fredericksburg 7.5 and 15-minute quadrangle map. A topographic map showing the study area is included as **Figure 3**. Within the vicinity of the project site, elevations range from 48 to 280 feet above mean sea level (MSL). According to the topographic map of the area, the mean elevation of the proposed alternatives area is approximately 195 feet above MSL.

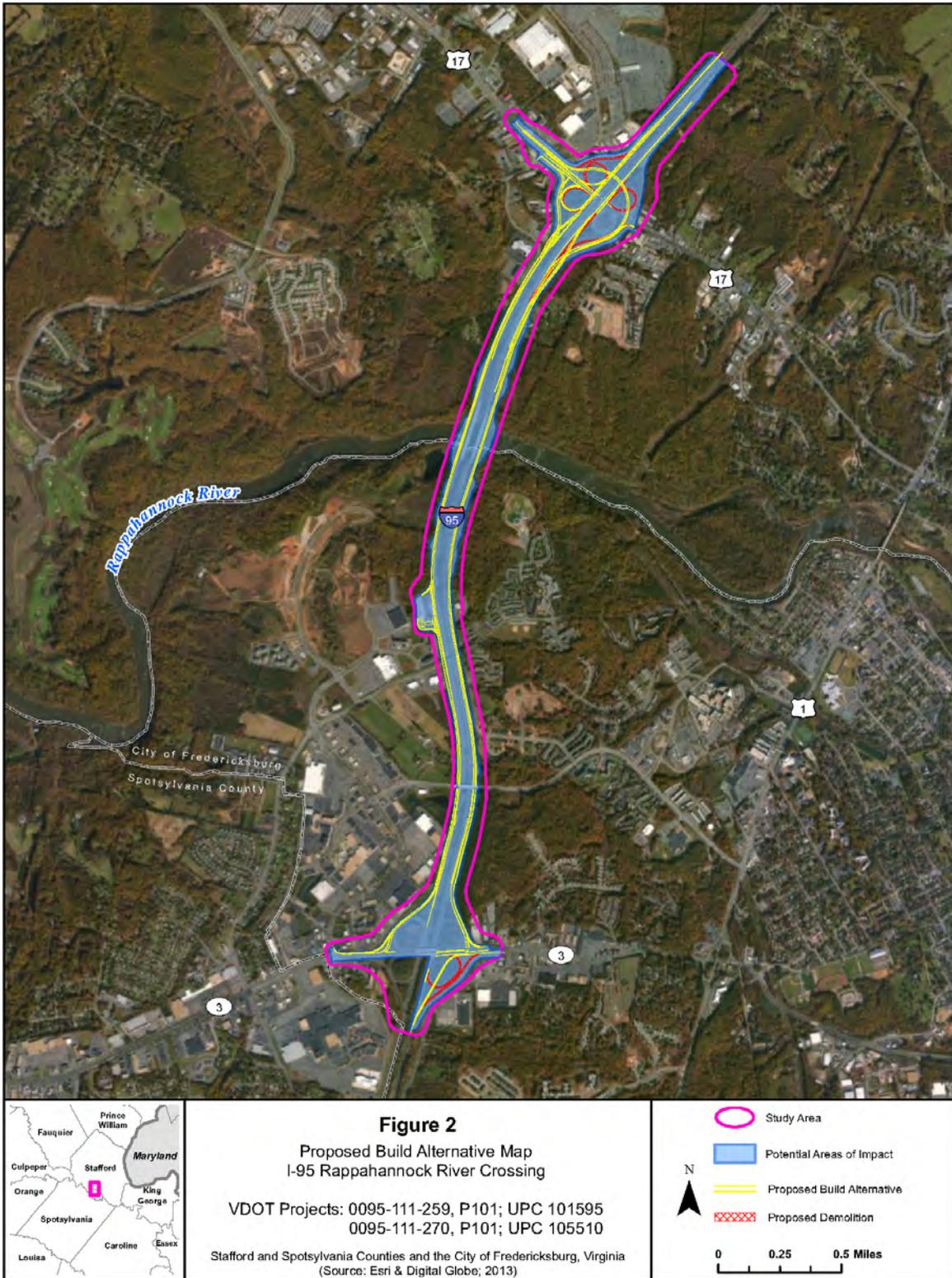
#### *Potential Impacts and Mitigation Measures*

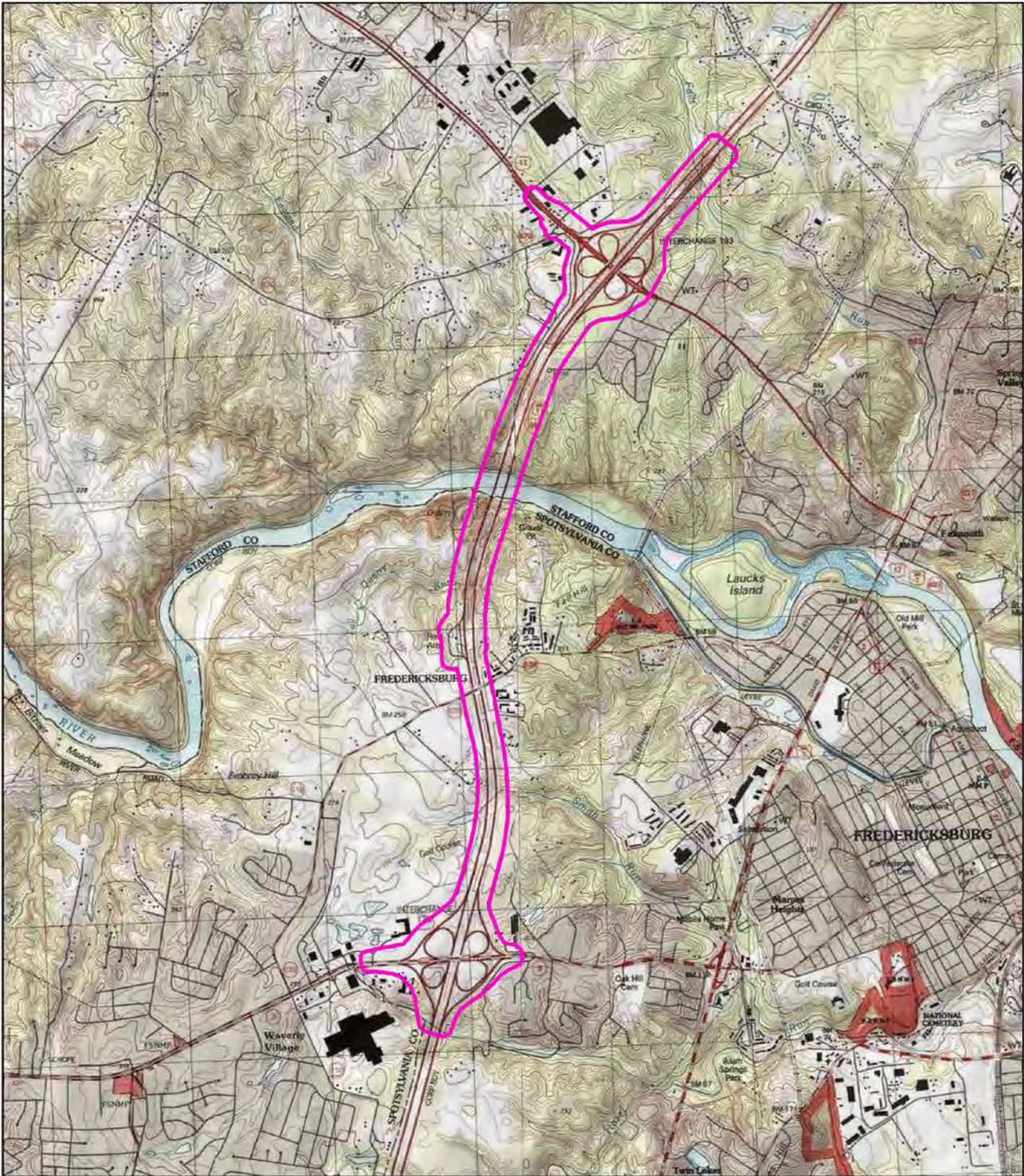
The primary topographic relief along the study area is associated with the area along the Rappahannock River. In terms of topography, the area is already suitable for the proposed activities; therefore, no adverse changes to topography would occur. No measures to mitigate potential topographic changes are anticipated.

### B. Geology

#### *Methodology and Existing Conditions*

The study area is located within the westernmost limits of 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.

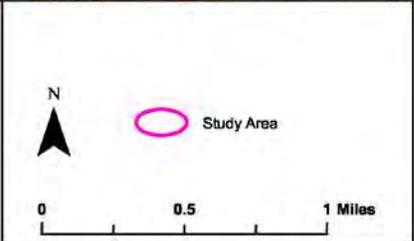




**Figure 3**  
**Topographic Map**  
**I-95 Rappahannock River Crossing**

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Stafford and Spotsylvania Counties and the City of Fredericksburg, Virginia  
 (Source: Esri; USGS National Geographic Society 2013)



The Coastal Plain, in general, is underlain by a thick wedge of sediments that increases in thickness from a feathered edge near the fall zone to more than 13,000 feet 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 a shallow sea, which created the Chesapeake Bay. It was subsequently buried under about 4,000 feet 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.

According to the Virginia Department of Conservation and Recreation (VDCR), the study corridor is not located in a locality containing karst topography.

### ***Potential Impacts and Mitigation Measures***

There are no geological conditions or unique geologic resources in the vicinity of the study area that would be adversely affected by any of the Alternatives. Seismic risks are low and would not likely affect the construction or road system operation. No mitigation action related to geological or seismic conditions is anticipated. 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 westernmost limits of 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, comprising 50% of most soils, with the highest concentrations of up to 80-90%. Feldspars are also common in Coastal Plain 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 (USDA) Natural Resources Conservation Service (NRCS) County Soil Surveys. Classified soils are grouped into general soils 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.

According to the 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.

There are a total of 44 soils map units within the study area, as identified from the NRCS Soil Survey maps (see **Table 1**). The tables included in this document identify soil mapping units, along with general characteristics of those soil units within Spotsylvania County (21 soil map units) and Stafford County (23 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 **Appendix A**.

**Table 1: Soils within the Project Study Area**

Map Unit	Map Unit Name	Percent Slopes	Drainage Class	Hydric Soils
1B	Abell Sandy Loam	2-7	Moderately well drained	Does not meet hydric criteria
4C2	Appling-Wedowee Sandy Loams	7-15	Well drained	Does not meet hydric criteria
4D2	Appling-Wedowee Sandy Loams	15 - 25	Well drained	Does not meet hydric criteria
13D2	Cecil-Pacolet Complex	15-25	Well drained	Does not meet hydric criteria
17C	Dystrochrepts-Udults Complex	Sloping	Somewhat excessively drained	Does not meet hydric criteria
17D	Dystrochrepts-Udults Complex	Moderately steep	Somewhat excessively drained	Does not meet hydric criteria
18B	Emporia Sandy Loam	2-7	Well drained	Does not meet hydric criteria
18C	Emporia Sandy Loam	7-15	Well drained	Does not meet hydric criteria
21B	Faceville-Varina Complex	2-7	Well drained	Does not meet hydric criteria
21C2	Faceville-Varina Complex	7-15	Well drained	Does not meet hydric criteria
23	Fluvaquents-Udifuvents Complex	0-2	Fluvaquents: Poorly Drained Udifuvents: Moderately Well Drained	Fluvaquents: meets hydric criteria Udifuvents: does not meet hydric criteria
24	Goldsboro Sandy Loam	0-4	Moderately well drained	Does not meet hydric criteria
27E	Louisburg Sandy Loam	25-50	Well drained- to excessively well drained	Does not meet hydric criteria
29C2	Masada Loam	7-15	Well drained	Does not meet hydric criteria
30B	Mattaponi Sandy Loam	2-7	Moderately well drained to well drained	Does not meet hydric criteria

**Table 1: Soils within the Project Study Area (continued)**

Map Unit	Map Unit Name	Percent Slopes	Drainage Class	Hydric Soils
31C2	Mattaponi Sandy Clay Loam	7-15	Moderately well drained to well drained	Does not meet hydric criteria
36B	Savannah Sandy Loam	2-7	Moderately well drained	Does not meet hydric criteria
44	Udorthents, gravelly	2-25	Poorly drained to well drained	Does not meet hydric criteria
45B	Udorthents-Udifluents Complex	Gently sloping	Udorthants: Poorly drained to well drained Udifluents: moderately well drained	Does not meet hydric criteria
46	Urban land-Udults Complex	Smoothed	Udults: moderately well drained	Does not meet hydric criteria
W	Water	--	--	--
Ae	Alluvial land, wet	--	--	--
AnC2	Appling gravelly fine sandy loam	6-10	Well drained	Does not meet hydric criteria
AsF	Ashlar fine sandy loam	25-35	Well drained	Does not meet hydric criteria
AvB	Aura gravelly fine sandy loam	2-6	Well drained	Does not meet hydric criteria
AvD2	Aura gravelly fine sandy loam	10-18	Well drained	Does not meet hydric criteria
AwD	Aura-Galestown-Sassafras complex	6-15	Aura: Well drained Galestown: Somewhat excessively drained Sassafras: Well drained	Does not meet hydric criteria
AwE	Aura-Galestown-Sassafras complex	15-30	Aura: Well drained Galestown: Somewhat excessively drained Sassafras: Well drained	Does not meet hydric criteria
BaA	Bertie very fine sandy loam	0-3	Somewhat poorly drained	Does not meet hydric criteria
BmA	Bourne fine sandy loam	0-2	Moderately well drained	Does not meet hydric criteria

**Table 1: Soils within the Project Study Area (continued)**

Map Unit	Map Unit Name	Percent Slopes	Drainage Class	Hydric Soils
BmB	Bourne fine sandy loam	2-6	Moderately well drained	Does not meet hydric criteria
BmC2	Bourne fine sandy loam	6-10	Moderately well drained	Does not meet hydric criteria
BnB	Bourne fine sandy loam, gravelly subsoil variant	2-6	Moderately well drained	Does not meet hydric criteria
BnC2	Bourne fine sandy loam, gravelly subsoil variant	6-10	Moderately well drained	Does not meet hydric criteria
CaB2	Caroline fine sandy loam	2-6	Well drained	Does not meet hydric criteria
CaC2	Caroline fine sandy loam	6-10	Well drained	Does not meet hydric criteria
CcD3	Caroline clay loam	10-18	Well drained	Does not meet hydric criteria
Cn	Congaree loam	0-4	Well drained to Moderately well drained	Does not meet hydric criteria
Cw	Cut and fill land			
Iu	Iuka fine sandy loam, local alluvium	0-4	Moderately well drained	Does not meet hydric criteria
KfB	Kempsville fine sandy loam, gravelly substratum	2-6	Well drained	Does not meet hydric criteria
SfB	Sassafras fine sandy loam	2-6	Well drained	Does not meet hydric criteria
TeB	Tetotum fine sandy loam	2-6	Moderately well drained	Does not meet hydric criteria
Wh	Wehadkee very fine sandy loam	0-2	Poorly drained and Very poorly drained	Meets hydric criteria

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 excessively well drained to very poorly drained throughout the corridor. In addition, hydric soils are located throughout the corridor and generally correspond to areas where wetland systems were identified.

## ***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 Alternative***

The proposed improvements would be built on suitable 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 falls within the Rappahannock River Basin, specifically the Lower Rappahannock River sub-basin. All drainage along the study area flows into the Rappahannock River, which flows to the Chesapeake Bay. The USGS has assigned a hydrologic unit code (HUC) to all major watersheds in the United States. The study area lies entirely within the Lower Rappahannock River watershed (HUC 02080104) and specifically, within the Rappahannock River-Hazel Run watershed (HUC [VAHU6] RA 46 based on the Virginia National Watershed Boundary Dataset). Surface waters in the study corridor consist of the Rappahannock River, other perennial, intermittent, and ephemeral streams, open waters, and wetlands.

### **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 is a Navigable Water identified within the study area, specifically the Rappahannock River. Neither of these sources includes tidal features in their database. The Corps, by definition, considers all tidal systems as navigable. However, there are no tidal systems within the study area.

## ***Potential Impacts and Mitigation Measures***

There is one Navigable Waters of the United States within the study area. As noted above, all flow from the project site is ultimately directed to the Rappahannock River. In order to protect the river,

additional coordination could be conducted with the counties and the City of Fredericksburg throughout the design process. In addition, the project would require federal and state permits, which would include conditions to protect the navigable resource. The contractor would be required to adhere to these permit conditions during the construction of the project.

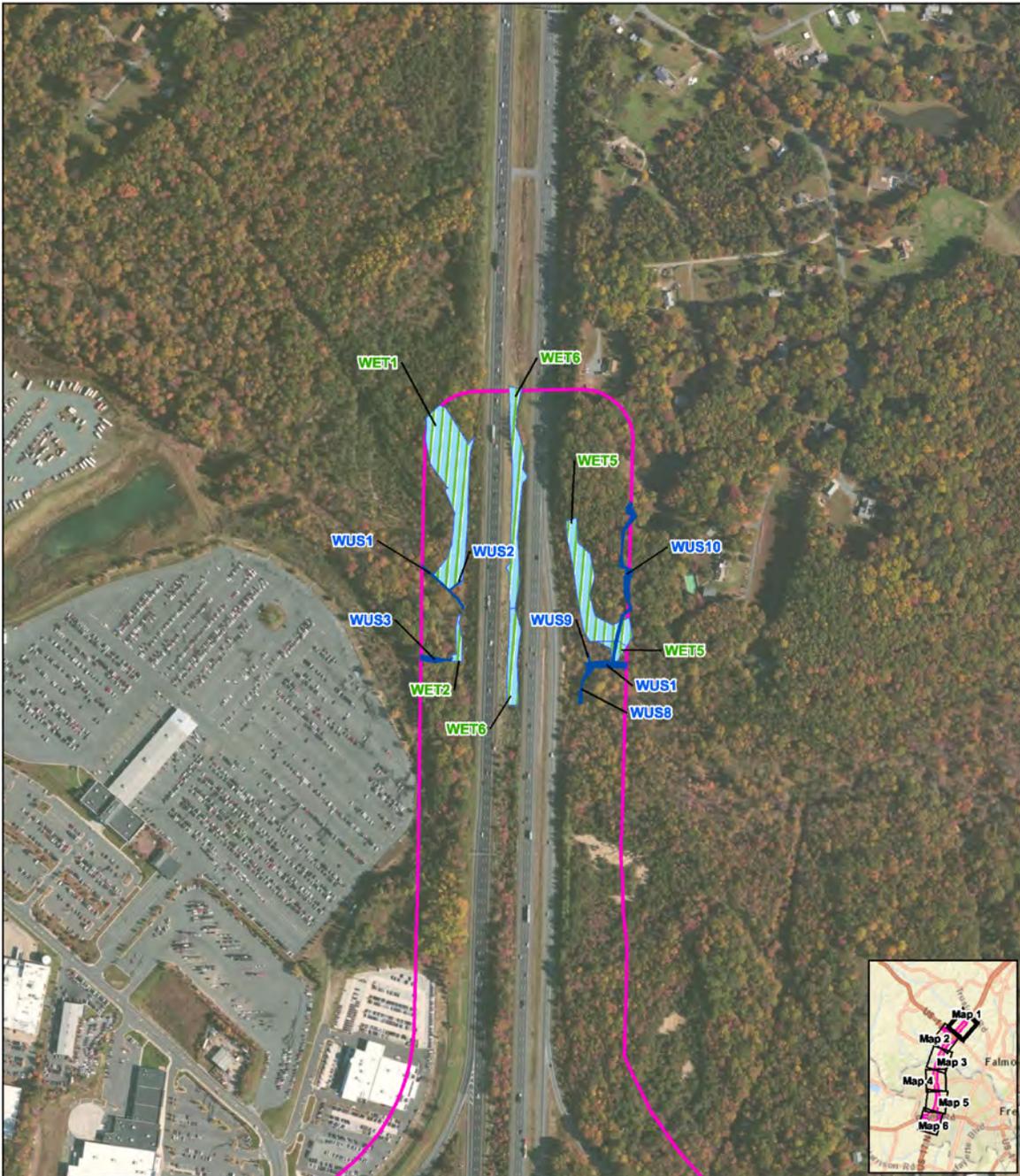
### **3. Waters of the United States (Section 404/Section 401)**

#### ***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. 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, should the project move forward with the government as the permittee, the local wetlands boards would not have jurisdiction over impacts to tidal wetlands and would defer to the VMRC.

The assessment methodology to identify the presence and location of WUS, including wetlands, within the study area 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 by McCormick Taylor from May 13 through 15, 2014. A separate survey was completed by others on a previous project during the months of February, March, April, and May 2012 within other sections of the study area shown in **Figure 4 (Maps 1-6)**. The areas surveyed as part of the two studies are differentiated in the mapping. Surface waters were designated as either a wetland (labeled WET) or other WUS (labeled WUS) by McCormick Taylor. Surface waters were designated and labeled as wetlands (W-WET) or other WUS (Reach) during the previous survey by others and are referenced as 'Previously Identified Wetlands' or 'Previously Identified Streams'.

Wetlands were identified in the field in accordance with the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987), the Atlantic and Gulf Coastal Plain Regional Supplement, and additional 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). The boundaries of the systems were mapped using Global Positioning System (GPS) and identified on project base mapping. Representative wetland data sheets and Unified Stream Methodology (USM) Form 1s were completed for systems within the study area. The wetland data sheets and USM Forms are included in **Appendix B**.



**Figure 4**  
Map 1 of 6

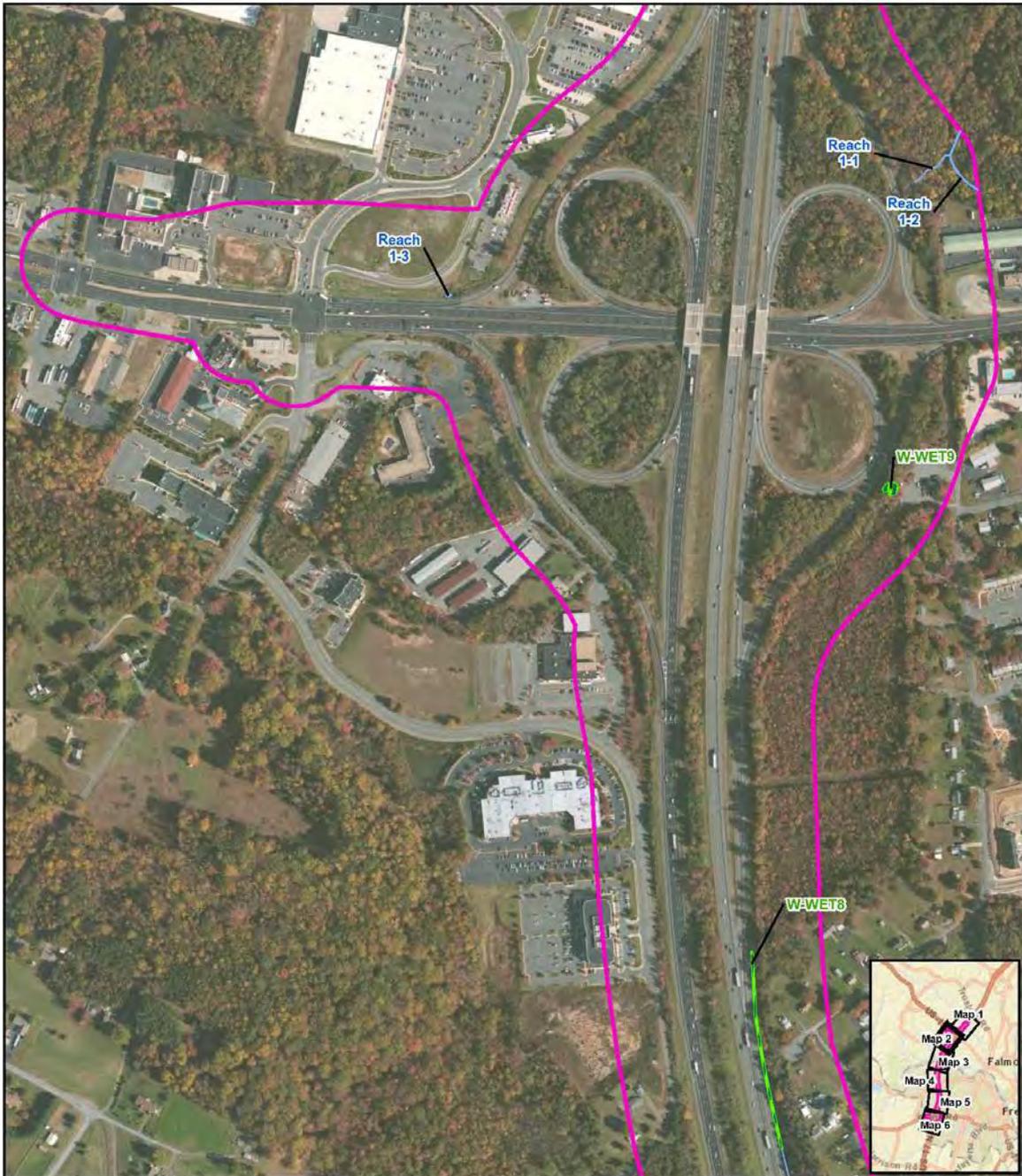
**Identified Streams and Wetlands  
I-95 Rappahannock River Crossing**

VDOT Projects: 0095-111-259, P101; UPC 101595  
0095-111-270, P101; UPC 105510

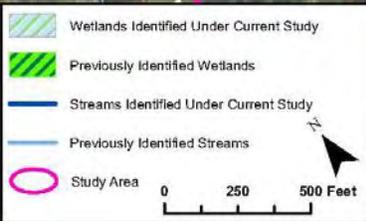
Stafford and Spotsylvania Counties and the City of Fredericksburg, Virginia  
(Source: Esri & DigitalGlobe, 2013)

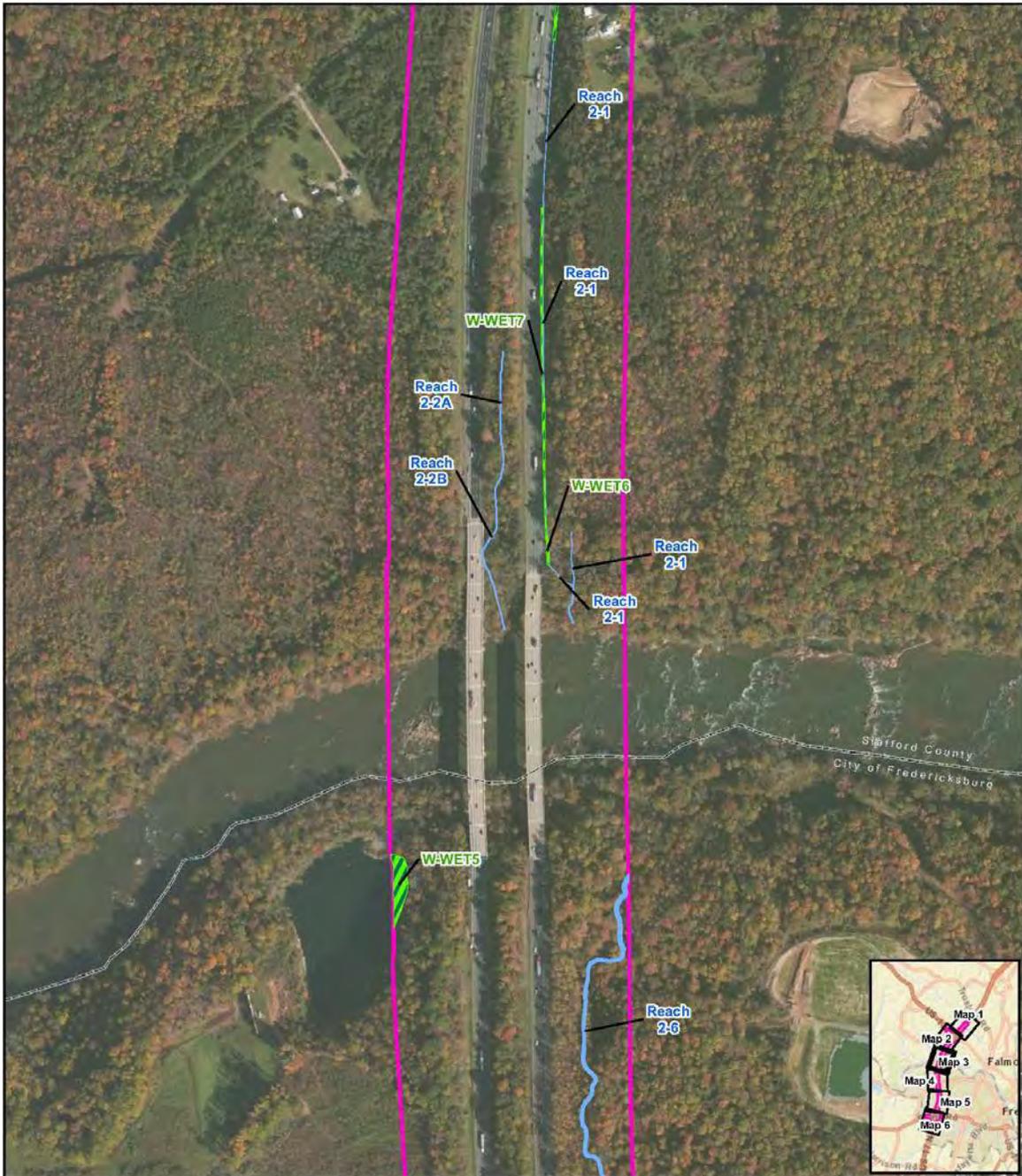
- Wetlands Identified Under Current Study
- Previously Identified Wetlands
- Streams Identified Under Current Study
- Previously Identified Streams
- Study Area

0 250 500 Feet



**Figure 4**  
Map 2 of 6  
**Identified Streams and Wetlands**  
**I-95 Rappahannock River Crossing**  
VDOT Projects: 0095-111-259, P101; UPC 101595  
0095-111-270, P101; UPC 105510  
Stafford and Spotsylvania Counties, and the City of Fredericksburg, Virginia  
(Source: Esri & DigitalGlobe, 2013)





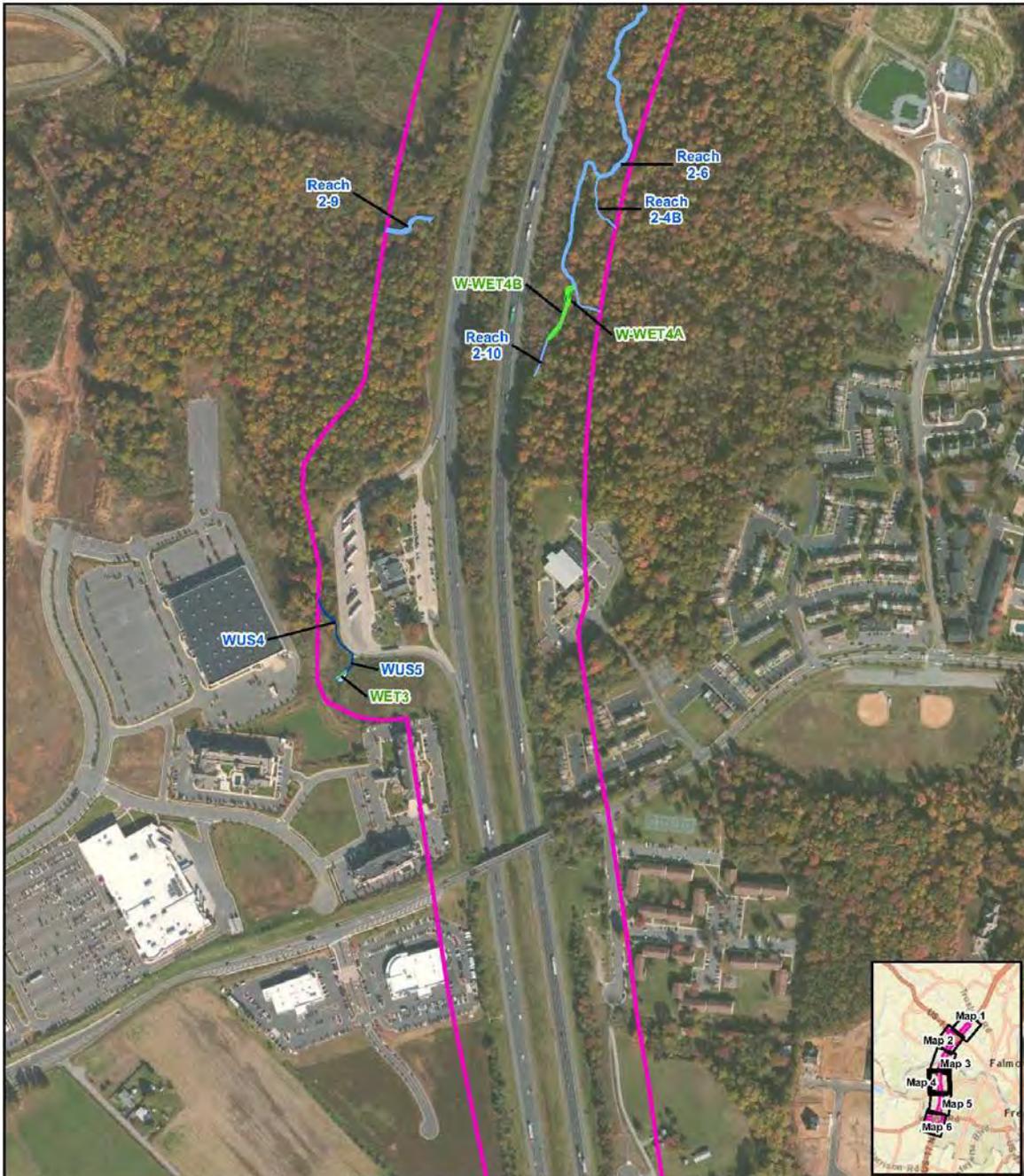
**Figure 4**  
Map 3 of 6

**Identified Streams and Wetlands**  
**I-95 Rappahannock River Crossing**

VDOT Projects: 0095-111-259, P101; UPC 101595  
0095-111-270, P101; UPC 105510

Stafford and Spotsylvania Counties, and the City of Fredericksburg, Virginia  
(Source: Esri & DigitalGlobe, 2013)

	<table border="0" style="width: 100%;"> <tr> <td style="width: 20px;"></td> <td>Wetlands Identified Under Current Study</td> </tr> <tr> <td style="width: 20px;"></td> <td>Previously Identified Wetlands</td> </tr> <tr> <td style="width: 20px;"></td> <td>Streams Identified Under Current Study</td> </tr> <tr> <td style="width: 20px;"></td> <td>Previously Identified Streams</td> </tr> <tr> <td style="width: 20px;"></td> <td>Study Area</td> </tr> </table> <div style="text-align: right; margin-top: 10px;">   </div>		Wetlands Identified Under Current Study		Previously Identified Wetlands		Streams Identified Under Current Study		Previously Identified Streams		Study Area
	Wetlands Identified Under Current Study										
	Previously Identified Wetlands										
	Streams Identified Under Current Study										
	Previously Identified Streams										
	Study Area										



**Figure 4**  
Map 4 of 6

**Identified Streams and Wetlands**  
**I-95 Rappahannock River Crossing**

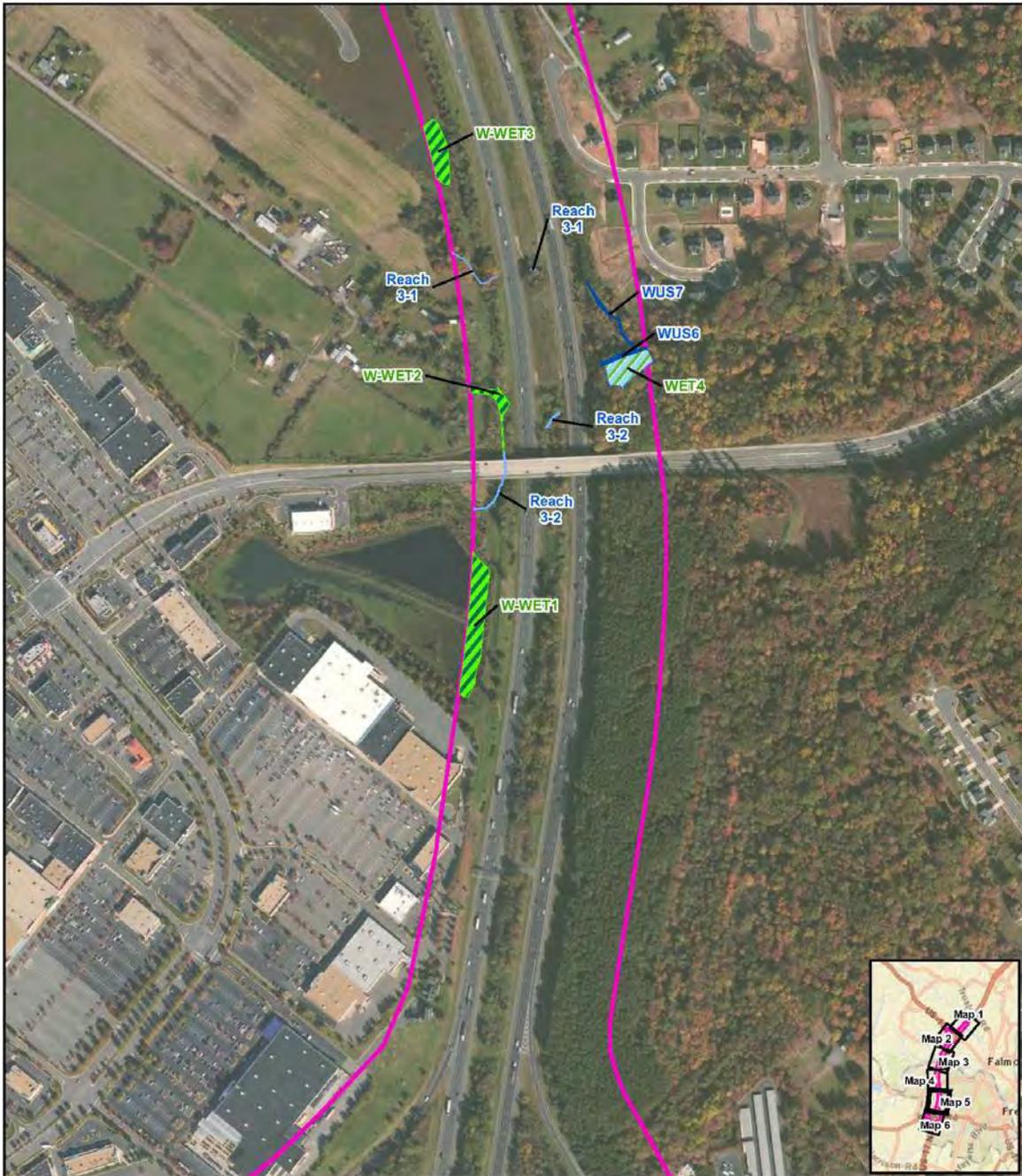
VDOT Projects: 0095-111-259, P101; UPC 101595  
0095-111-270, P101; UPC 105510

Stafford and Spotsylvania Counties, and the City of Fredericksburg, Virginia  
(Source: Esri & DigitalGlobe, 2013)

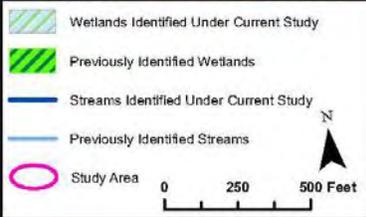
- Wetlands Identified Under Current Study
- Previously Identified Wetlands
- Streams Identified Under Current Study
- Previously Identified Streams
- Study Area

N

0 250 500 Feet

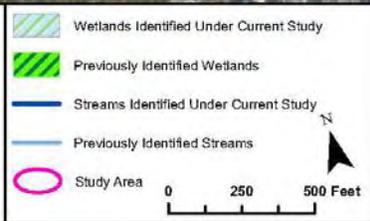


**Figure 4**  
Map 5 of 6  
**Identified Streams and Wetlands**  
**I-95 Rappahannock River Crossing**  
VDOT Projects: 0095-111-259, P101; UPC 101595  
0095-111-270, P101; UPC 105510  
Stafford and Spotsylvania Counties, and the City of Fredericksburg, Virginia  
(Source: Esri & DigitalGlobe, 2013)





**Figure 4**  
Map 6 of 6  
**Identified Streams and Wetlands**  
**I-95 Rappahannock River Crossing**  
VDOT Projects: 0095-111-259, P101; UPC 101595  
0095-111-270, P101; UPC 105510  
Stafford and Spotsylvania Counties, and the City of Fredericksburg, Virginia  
(Source: Esri & DigitalGlobe, 2013)



A formal jurisdictional determination was not completed 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. All identified systems (subject to the Corps jurisdictional determination) within the study area are shown in **Figure 5 (Maps 1-6)**.

The Rappahannock River is the main watercourse through the study area, flowing generally west to east. Additional primary systems include Hazel Run, Falls Run, and Fall Quarry Run. Perennial, intermittent, and ephemeral channels are also located within the area reviewed. The wetland systems (which are predominantly forested and emergent systems) within the study area are located along the stream channels. As noted above, all systems located within the study area are non-tidal systems. There are no tidal waters located in the immediate vicinity of the project.

**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 Alternative*

**Tables 2 and 3** summarize the quantities of wetlands and other WUS identified within the study area footprint and the potential impacts resulting from the Build Alternative. As noted above, no tidal waters were identified within the Build Alternative footprints. The amount of wetland and stream channel impacts that would result from the Build Alternative would be 2.416 acres and 6,408 linear feet, respectively. The wetland acreages and stream linear footages listed in the summary tables represent the values associated with an overlay of the study area and the Build Alternative’s footprints.

**Table 2: Wetland Acreages**

Identification	Classification	Study Area Footprint (acres)	Build Alternative (acres)
W-WET1	POW	0.745	0
W-WET2	PFO	0.143	0.096
W-WET3	POW	0.342	0
W-WET4A	PSS	0.024	0.024
W-WET4B	PSS	0.027	0.027
W-WET5	POW	0.269	0
W-WET6	PEM	0.026	0.026
W-WET7	PEM	0.185	0.185
W-WET8	PEM	0.179	0.179
W-WET9	PFO	0.050	0.050
WET 1	PFO	1.533	0.598
WET 2	PFO	0.087	0.087
WET 3	PEM	0.027	0.026
WET 4	PFO	0.344	0.095
WET 5	PFO	0.860	0
	PEM	0.093	0
WET 6	PEM	0.696	0.684
	PSS	0.340	0.340
<b>Total Acres</b>		<b>5.969</b>	<b>2.416</b>

**Table 3: Other Waters of the United States Linear Footage**

<b>Identification</b>	<b>Stream Name</b>	<b>Classification</b>	<b>Study Area Footprint (linear feet)</b>	<b>Build Alternative (linear feet)</b>
Reach 1-1	Tributary to Falls Run	Perennial (R2)	180	0
Reach 1-2	Tributary to Falls Run	Perennial (R2)	280	0
Reach 1-3	Un-named Culverted Channel	Intermittent (R4)	20	20
Reach 2-1	Roadside Drainage to Rappahannock River	Intermittent (R4)	2,274	2,274
Reach 2-2A	Median Drainage to Rappahannock River	Intermittent (R4)	540	540
Reach 2-2B	Median Drainage to Rappahannock River	Perennial (R2)	575	575
Reach 2-4B	Tributary to Fall Quarry Run	Intermittent (R4)	240	59
Reach 2-6	Fall Quarry Run	Perennial (R2)	2,473	1,560
Reach 2-9	Fall Quarry Run	Perennial (R2)	207	52
Reach 2-10	Tributary to Fall Quarry Run	Perennial (R2)	390	390
Reach 3-1 (joins with WUS-7)	Tributary to Hazel Run	Intermittent (R4)	265	97
Reach 3-2 (joins with WUS-6)	Tributary to Hazel Run	Intermittent (R4)	373	301
Reach 4-1	Tributary to Hazel Run	Perennial (R2)	329	0
Reach 4-2	Tributary to Hazel Run	Intermittent (R4)	310	0
WUS-1	Falls Run	Perennial (R2)	388	69
WUS-2	Tributary to Falls Run	Ephemeral	55	39
WUS-3	Potential Former Channel Draining to WET-2	Ephemeral	120	5
WUS-4	Tributary to Fall Quarry Run	Perennial (R2)	258	180
WUS-5	Tributary to Fall Quarry Run	Perennial (R2)	74	77

**Table 3: Other Waters of the United States Linear Footage (cont.)**

Identification	Stream Name	Classification	Study Area Footprint (linear feet)	Build Alternative (linear feet)
WUS-6 (joins with Reach 3-2)	Tributary to Hazel Run	Intermittent (R4)	188	66
WUS-7 (joins with Reach 3-1)	Tributary to Hazel Run	Perennial (R2)	337	104
WUS-8	Tributary to Falls Run	Perennial (R2)	148	0
WUS-9	Tributary to Falls Run	Perennial (R2)	38	0
WUS-10	Tributary to Falls Run	Perennial (R2)	692	0
<b>Total Linear Feet</b>			<b>10,754</b>	<b>6,408</b>

Tables 4 and 5 summarize the acreages and linear footages per classification of the wetland and stream systems for the study area and the Build Alternative.

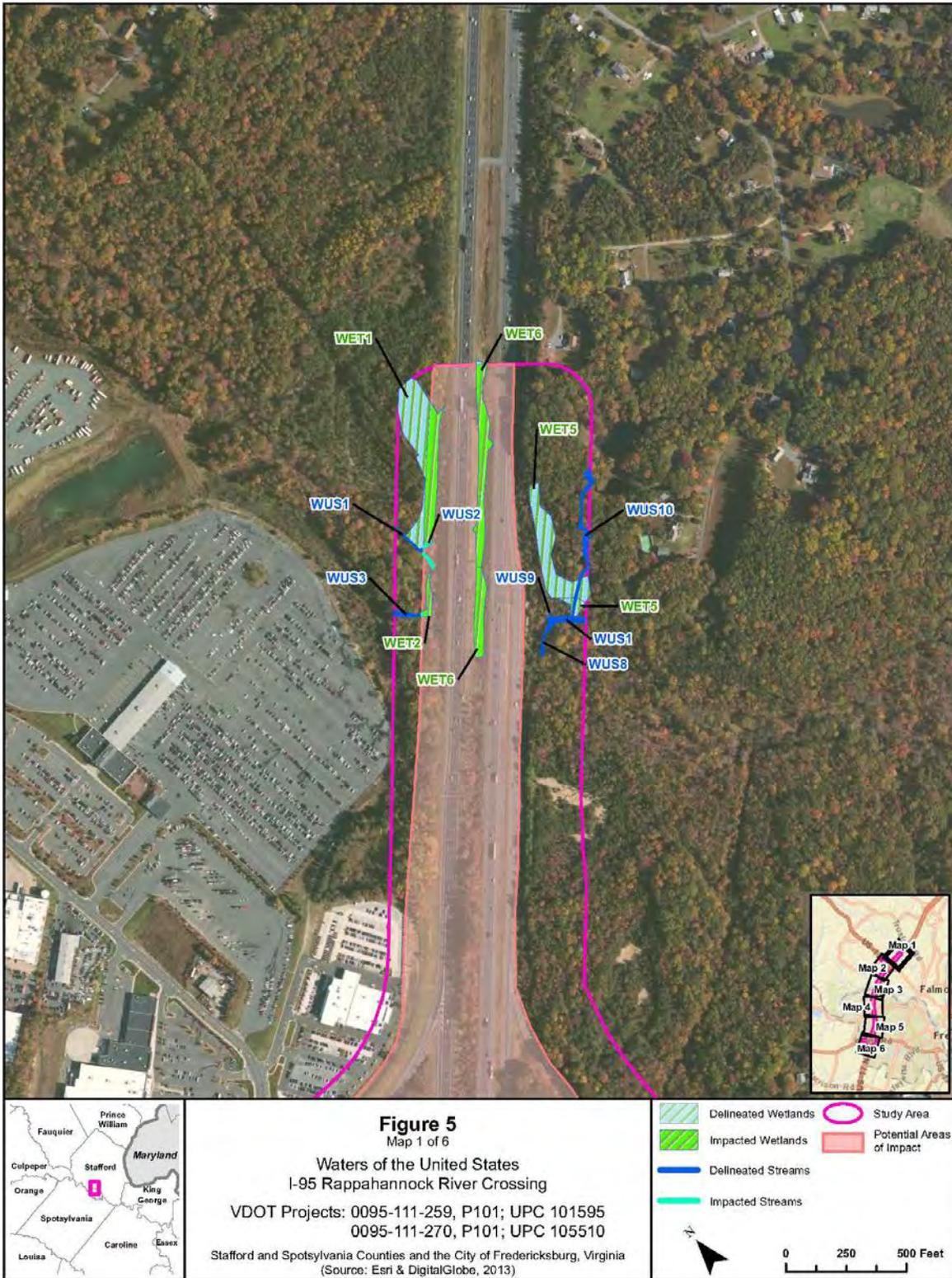
**Table 4: Summary of Wetland Classification Acreages**

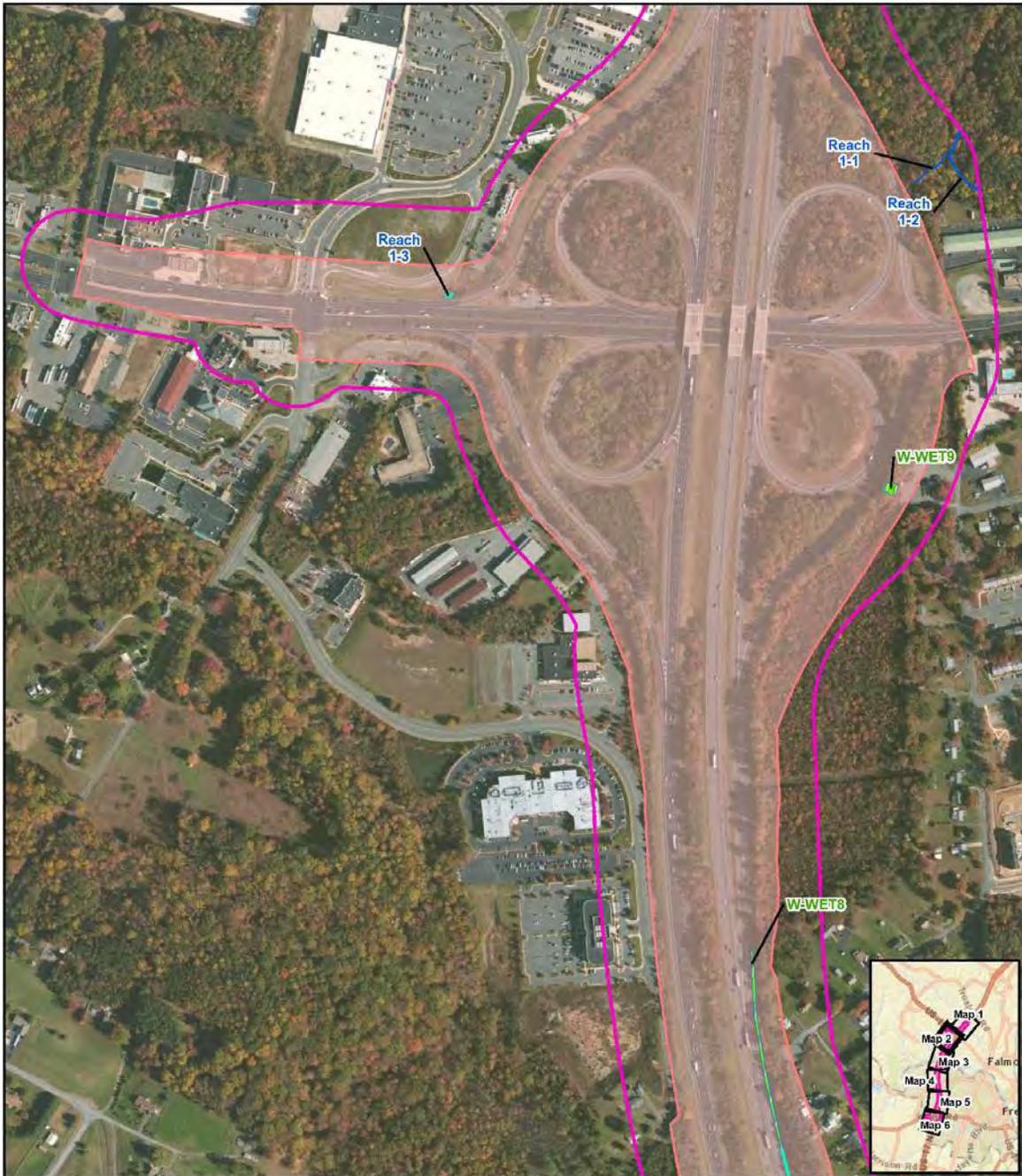
	PFO Wetlands (acres)	PSS Wetlands (acres)	PEM Wetlands (acres)	POW (acres)	Total (acres)
<b>Study Area</b>	3.017	0.391	1.206	1.356	5.969
<b>Build Alternative</b>	0.926	0.391	1.099	0	2.416

**Table 5: Summary of Other Waters of the United States Classification Linear Footages**

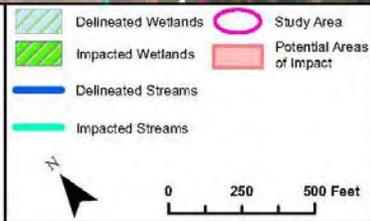
	Ephemeral (Linear Feet)	Intermittent (Linear Feet)	Perennial (Linear Feet)	Total (Linear Feet)
<b>Study Area</b>	175	4,210	6,369	10,754
<b>Build Alternative</b>	44	3,357	3,007	6,408

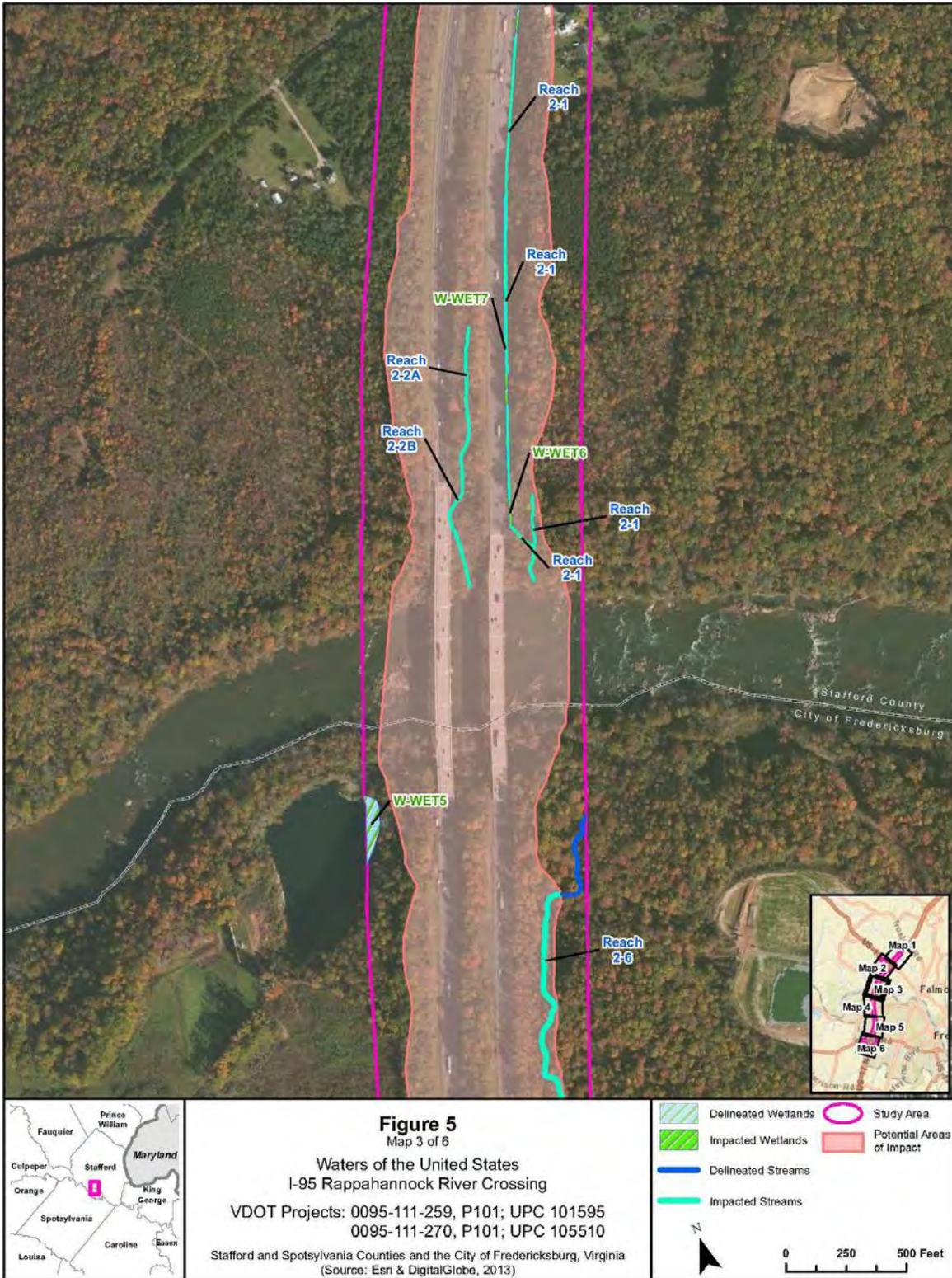
The mitigation measures for stream and wetland impacts would be identified during final design. These measures would include avoidance and minimization efforts to the greatest extent practicable. Some measures which may be considered include: the use and appropriate placement of erosion and sediment 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.

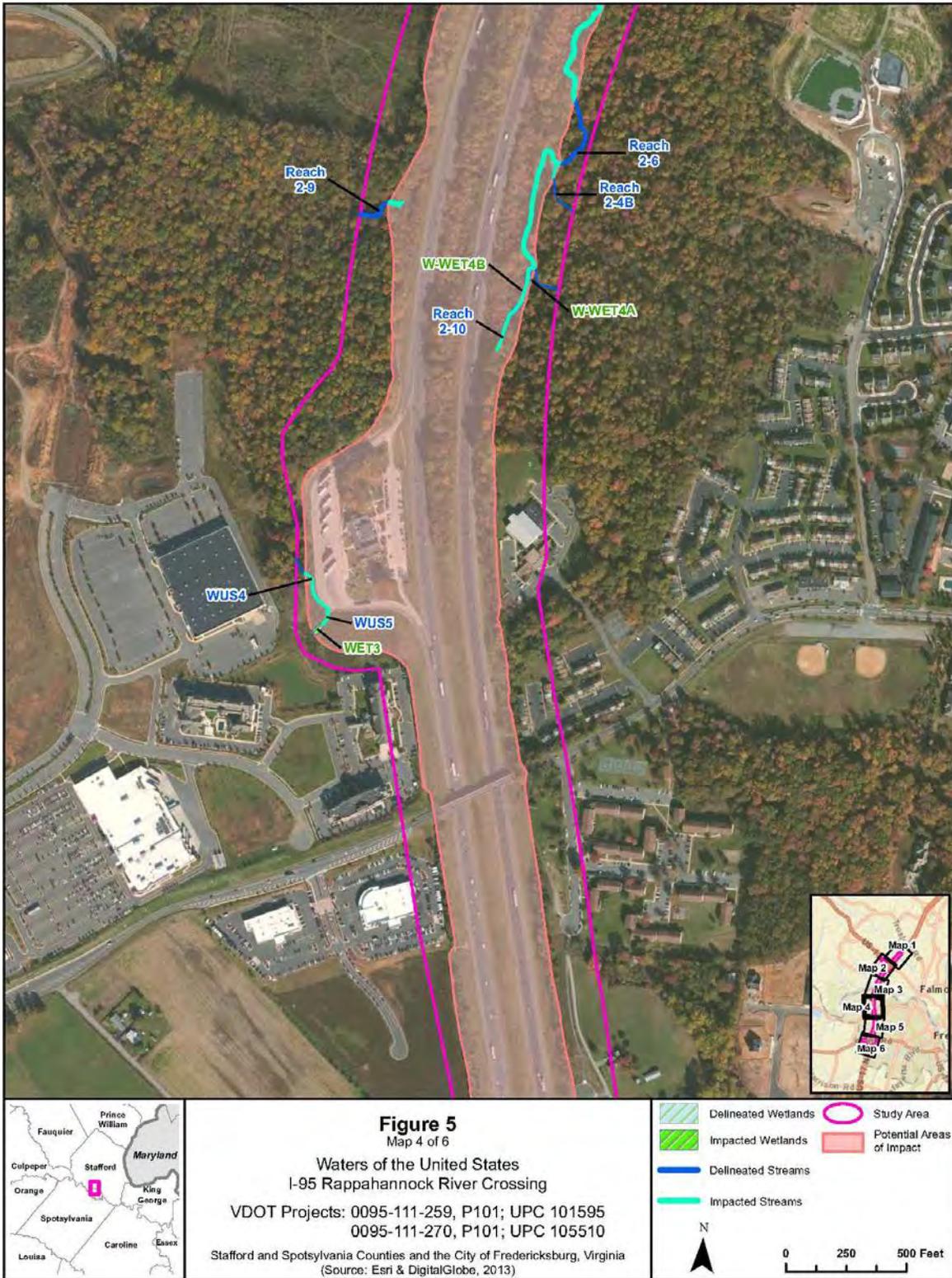


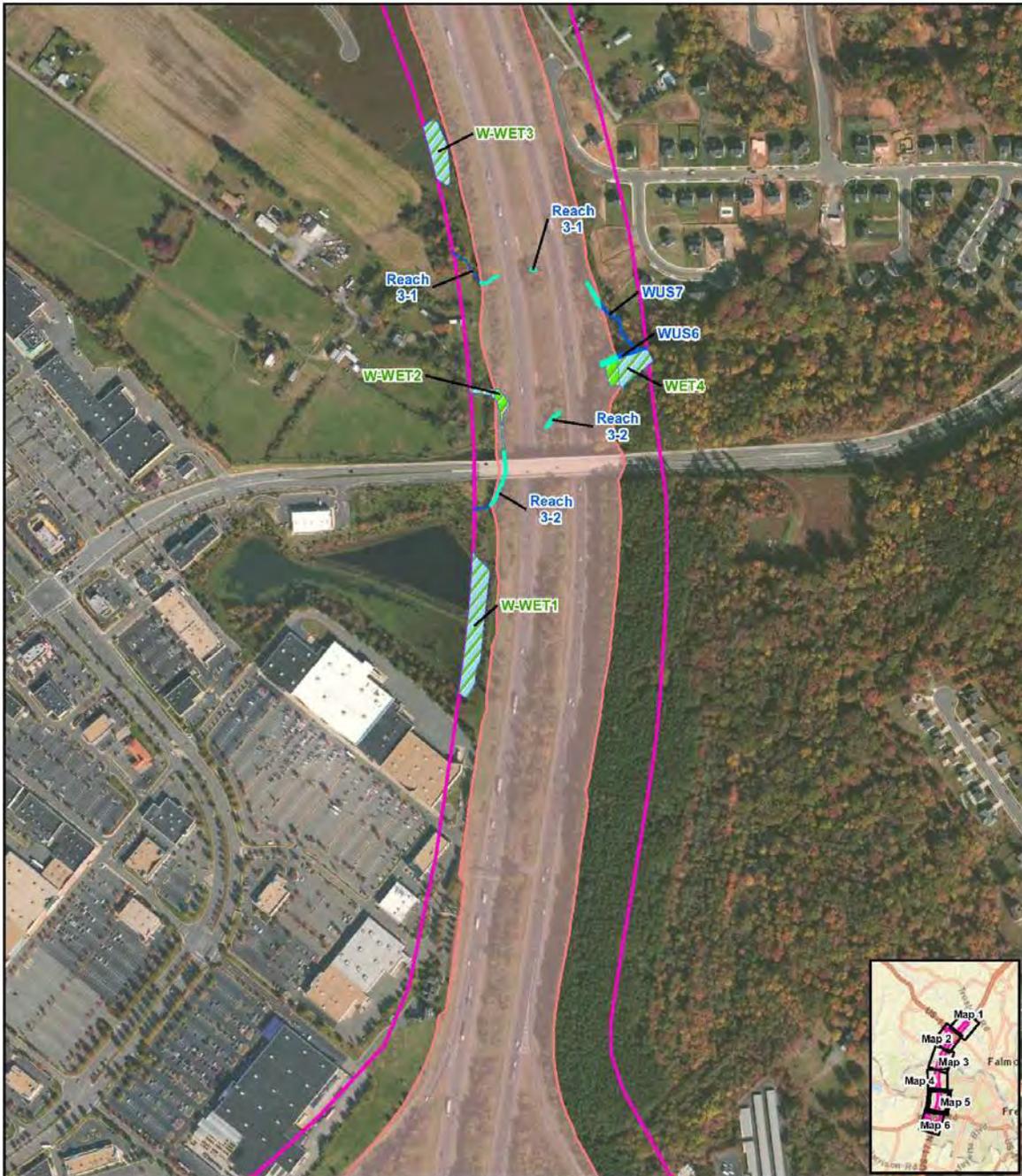


**Figure 5**  
 Map 2 of 6  
 Waters of the United States  
 I-95 Rappahannock River Crossing  
 VDOT Projects: 0095-111-259, P101; UPC 101595  
 0095-111-270, P101; UPC 105510  
 Stafford and Spotsylvania Counties, and the City of Fredericksburg, Virginia  
 (Source: Esri & DigitalGlobe, 2013)

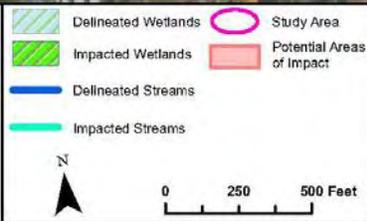


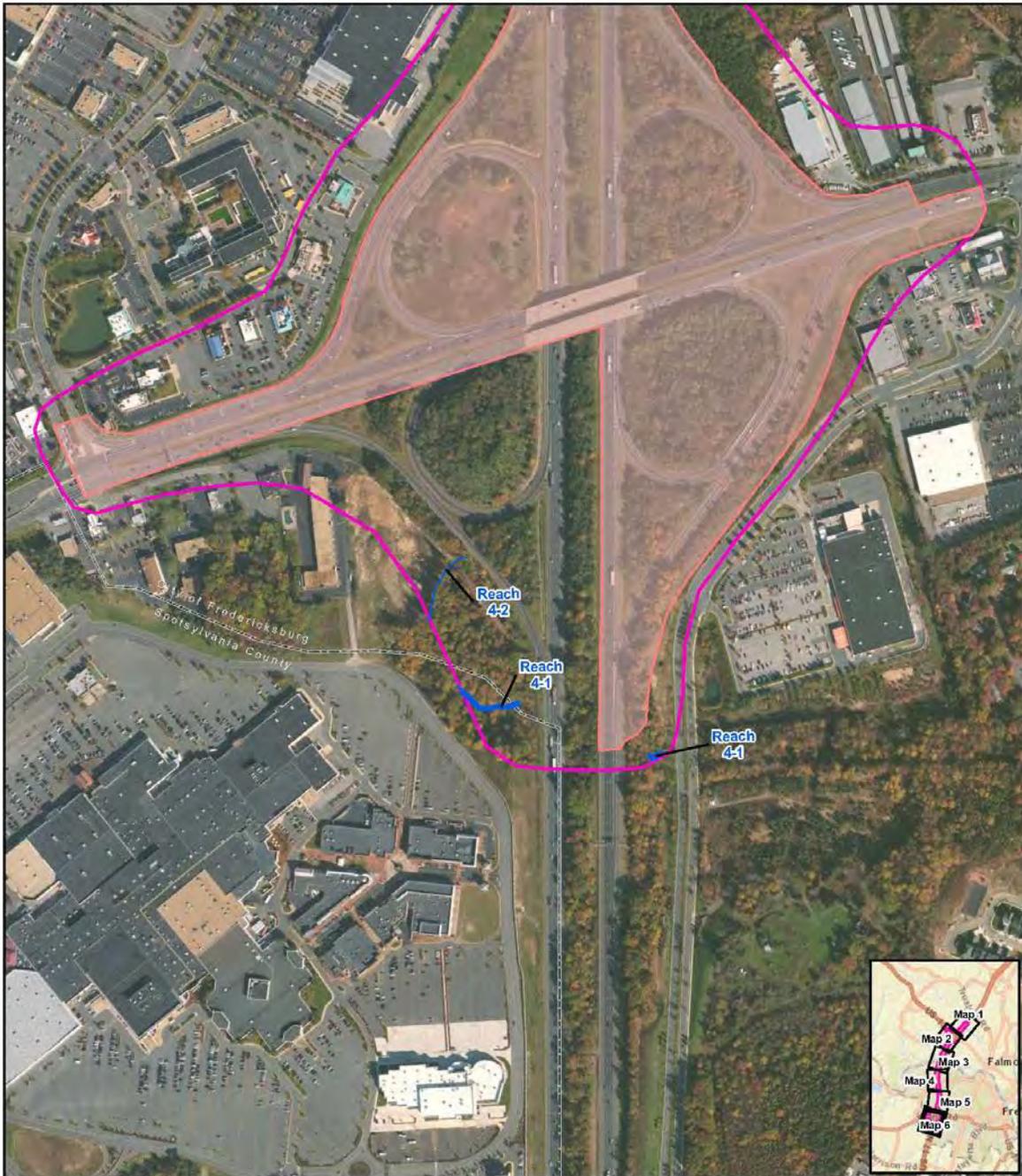




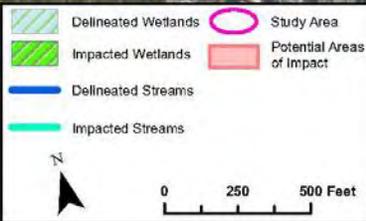


**Figure 5**  
 Map 5 of 6  
 Waters of the United States  
 I-95 Rappahannock River Crossing  
 VDOT Projects: 0095-111-259, P101; UPC 101595  
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**Figure 5**  
 Map 6 of 6  
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 0095-111-270, P101; UPC 105510  
 Stafford and Spotsylvania Counties, and the City of Fredericksburg, Virginia  
 (Source: Esri & DigitalGlobe, 2013)



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 the Build Alternative would require a permitting decision from these agencies. It is anticipated that a Section 404 permit from the Corps, a Virginia Water Protection (VWP) General Permit from the VDEQ, and a Subaqueous Bottomlands Permit from the VMRC would be required. The project may qualify for a Corps State Programmatic General Permit (12-SPGP-01) based on the degree of impacts. For VDOT projects, VMRC issues the Virginia General Permit (VGP-1) permit for subaqueous bottom encroachments where the drainage area of the impact zone(s) exceeds five square miles or for projects crossing state-owned bottomlands. The drainage area of the Rappahannock River is greater than five square miles at the project location. Wetland impacts are exempted by VMRC for any project where the state government is the permittee. The final determination of permit type would be completed through the permitting process once the project proceeds to the design and permitting phase.

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 the United States Environmental Protection Agency (USEPA). The 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 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 a number of compensatory mitigation banks that have available credits for the potential impacts anticipated as a result of this project. 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 approved assessment methodology to determine the required stream compensation would be completed as part of the compensatory mitigation plan. 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 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. At this time, compensatory mitigation is not typically required for impacts to jurisdictional ditches. 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 Commonwealth. 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 Commonwealth, "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.

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*. 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 2012 305(b)/303(d) Water Quality Assessment Integrated Report* (Integrated Report) on January 27, 2014. The 2012 Integrated Report is a summary of the water quality conditions in Virginia from January 1, 2005 through December 31, 2010.

A number of stream systems and other waterbodies, including reservoirs, in the Lower Rappahannock River sub-basin have been listed as impaired in the 2012 Integrated Report. The Rappahannock River, Falls Run, Claiborne Run, and Hazel Run have been listed with a Cause

Category of 5A. The section of the Rappahannock River is located approximately 1.45 miles downstream from the study area, Falls Run is within the study area, Claiborne Run is 1.31 miles downstream from the study area, and Hazel Run is 0.72 miles downstream from the study area. These systems, as well as systems in the vicinity of the study area, are depicted on **Figure 6**. The full summary table for these systems is included in **Appendix C**.

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 the Build Alternative has 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 water quality.

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.

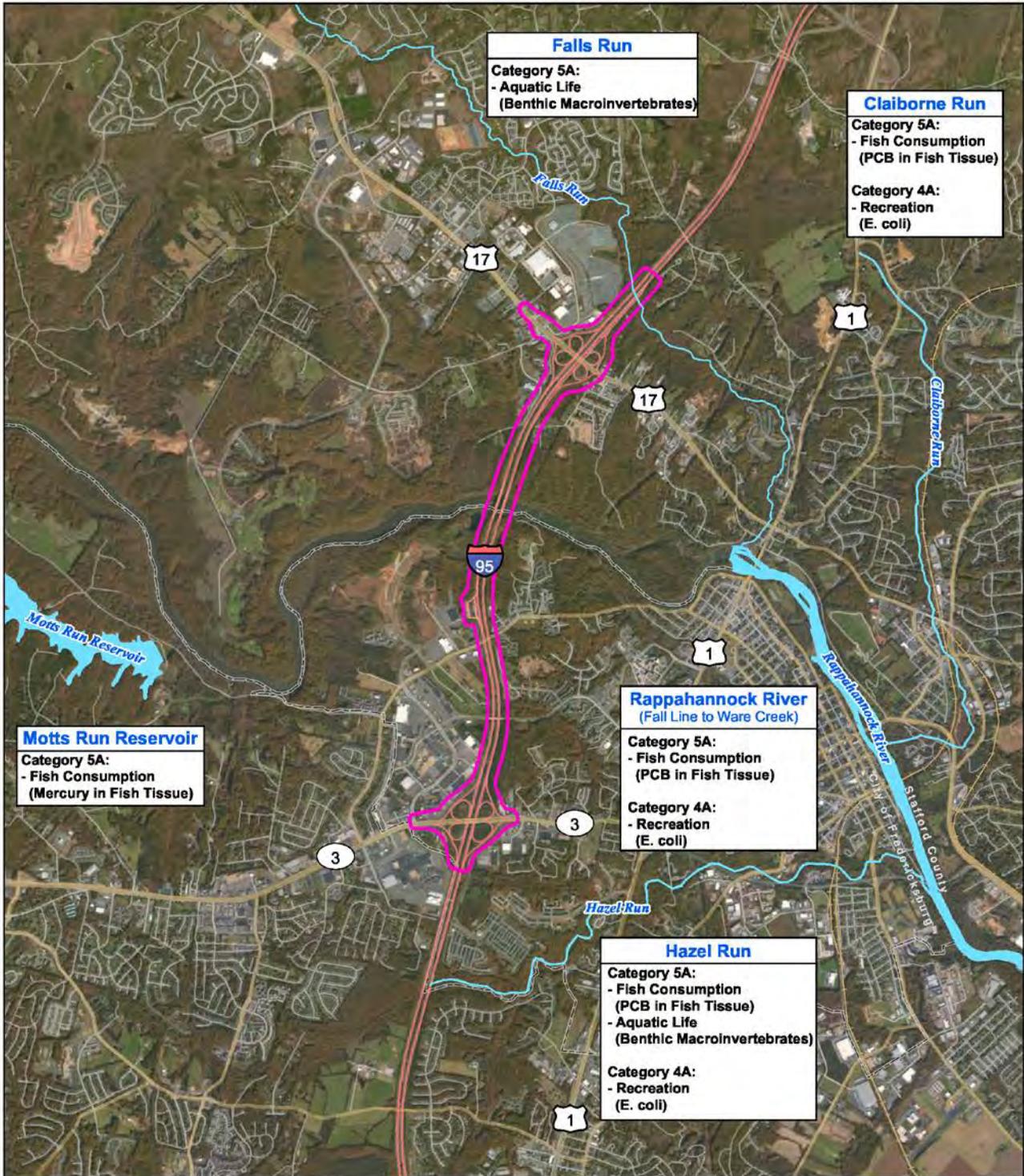
After construction, impacts associated with the use of the roadway would be primarily based on the potential for contamination of surface waters by runoff from new impervious surfaces. These runoff constituents would likely include heavy metals, salt and associated materials, organic molecules, and nutrients. 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 could 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. In addition, clearing practices could 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***

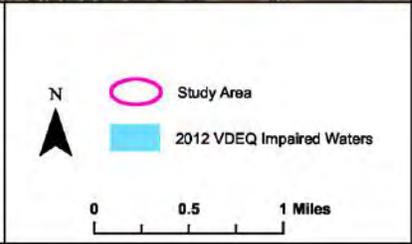
As previously stated, the Coastal Plain region in Virginia is composed mostly of unconsolidated deposits, primarily alternating layers of sand, gravel, shell rock, silt, and clay. These permeable layers hold substantial amounts of groundwater. Therefore, the pollution potential in the uppermost-unconfined aquifer within this area is potentially high due to the high permeability.



**Figure 6**  
 VDEQ Impaired Waters - Categories 4 and 5 (2012)  
 I-95 Rappahannock River Crossing

VDOT Projects: 0095-111-259, P101; UPC 101595  
 0095-111-270, P101; UPC 105510

Stafford and Spotsylvania Counties and the City of Fredericksburg, Virginia  
 (Source: Esri & DigitalGlobe, 2013; Virginia DEQ, 2012)



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.

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.

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 GWMA's in the State, including the Eastern Virginia GWMA which comprises the area east of I-95 and south of the Mattaponi and York Rivers. The study area 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.

Two reservoirs are located in the vicinity of the study area. Reservoir information was obtained from various sources, including locality Geographic Information System (GIS) data, communication with localities, locality government websites and Google Maps. The Motts Run Reservoir is a water supply reservoir for the City of Fredericksburg, located in Spotsylvania County (HUC 02080104). The reservoir is located 2.1 miles upstream from the study area. The lake is 160 acres and the public recreation/open space area surrounding it is approximately 700 acres. It is open 6 am to 7 pm April through October on certain days and closed during the winter. Amenities include boat rentals, fishing, and orienteering course, trails, nature center, and picnicking. No aspects of Motts Run Reservoir and park are located within the study area. The Abel Lake Reservoir is located in Stafford County and is located within the Potomac River watershed (HUC 02070011), not within the Rappahannock River Watershed. The reservoir is located 2.5 miles north of the study area. No aspects of Abel Lake Reservoir are located within the study area.

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 - Office of Drinking Water provided a response dated March 31, 2014. The comment stated that there were no public groundwater wells within a one mile radius of the study area, and three public surface water intakes within five miles. There would be no apparent impacts to public drinking water sources due to the project, according to VDH. For this study, the comments from March 31, 2014, are detailed as follows:

"No public groundwater wells are within a one mile radius of the project site. The following public surface water intakes are located within a five mile radius of the project site: The Spotsylvania County Utilities Rappahannock River Intake is located approximately 1.6 miles from the project site, the Spotsylvania County Utilities Motts Run Reservoir (Alternate Intake) is located approximately 1.8 miles from the project site, and the Stafford County Utilities Abel Lake Intake is located approximately 3.8 miles from the project site. The

project is not within Zone 1 (up to five miles into the watershed) or Zone 2 (greater than five miles into the watershed) of any public water sources. There are no apparent impacts to public drinking water sources due to this project.”

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 the assessment 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 within the study area.

### ***Potential Impacts and Mitigation Measures***

#### *No-Build Alternative*

The No-Build Alternative would not involve any project-related construction or change 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.

#### *Proposed Build Alternative*

##### Surface Waters

The Build Alternative has the potential to increase levels of contaminants within the affected surface waters draining to the Rappahannock River. 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. 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 the Build Alternative has 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 little to no change to the water quality of the surface waters surrounding the study area.

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 could 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 surface waters 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.

Coordination with regulatory agencies will continue throughout the project to ensure regulations are met. Prior to construction, as appropriate, water quality permits for potential impacts would be obtained from state and federal regulatory agencies. The requirements and special conditions of any required permits for work in and around surface waters would be incorporated into construction contract documents. The contractor would be required to comply with those conditions.

### Groundwater

The Build Alternative would be constructed on the surface, with no anticipated deep excavations, and are anticipated to have little to no effects to groundwater in the aquifers in the vicinity of the study area. Only small changes in the movements of the shallow groundwater table are likely to occur during grading and construction. In addition, the limited depth of construction and the developed nature and previously disturbed nature of the area make it unlikely that runoff from the post-construction road system 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.

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 identified public 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.

## **G. Chesapeake Bay Resource Protection Areas**

### ***Methodology and Existing Conditions***

The study area is located within the Chesapeake Bay Watershed. As part of their commitment to protecting the Bay, localities adopted the Chesapeake Bay Preservation Act (The Bay Act) into local ordinances 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 a locality 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 locality's comprehensive plan.

According to information provided by Stafford County, the Rappahannock River is designated as a Critical RPA under the County's Chesapeake Bay Preservation Area Overlay District ordinance.

According to the County GIS information, several of the systems in the study area have listed RPAs. Those include the Rappahannock River, Falls Run (WUS 1), a tributary to Hazel Run (REACH 4-1) and a tributary to Fall Quarry Run (Reach 2-8).

### ***Potential Impacts and Mitigation Measures***

According to the VDCR - 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. 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***

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.

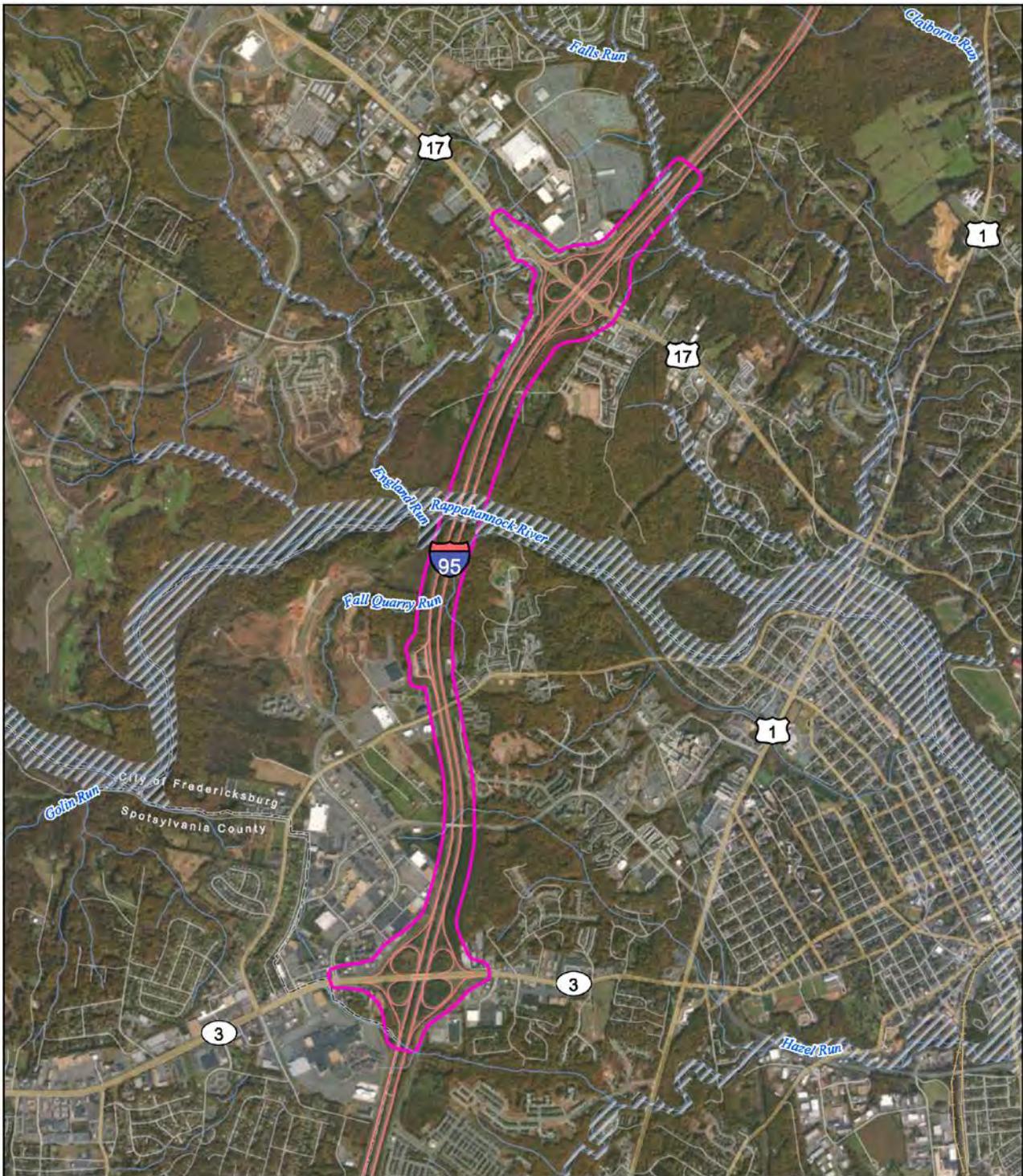
The approximate locations of 100-year floodplain limits in the study area are based on data from FEMA. The 100-year floodplain refers to the areas along or adjacent to a stream or body of water that are capable of storing or conveying floodwaters during a 100-year storm.

According to the FEMA Flood Insurance Rate Maps, the study area crosses approximately 15.98 acres of 100-year floodplain associated with the Rappahannock River and approximately 2.93 acres of the 100-year floodplain associated with Falls Run. The Build Alternative crosses approximately 12.404 acres of the Rappahannock River 100-year floodplain and 0.996 acres of the Falls Run 100-year floodplain. The approximate locations of the 100-year floodplains are shown on **Figure 7**.

### ***Potential Impacts and Mitigation Measures***

#### ***No-Build Alternative***

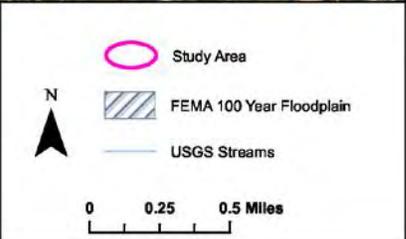
The No-Build Alternative would not involve any project-related construction or changes to the natural environment. As a result, project-related environmental effects from the No-Build Alternative are not anticipated.



**Figure 7**  
**FEMA 100 Year Floodplains**  
**I-95 Rappahannock River Crossing**

VDOT Projects: 0095-111-259, P101; UPC 101595  
 0095-111-270, P101; UPC 105510

Stafford and Spotsylvania Counties and the City of Fredericksburg, Virginia  
 (Source: Esri & DigitalGlobe, 2013; USGS; FEMA)



### *Build Alternative*

Crossings will be designed to minimize floodplain encroachments and avoid substantial flood level increases. Restoration and preservation of the natural and beneficial value of floodplains in the study area will be considered and incorporated wherever feasible. Any construction occurring within the 100-year floodplain will follow proper permitting procedures and guidelines in accordance with Executive Order 11988, Floodplain Management.

Sections 107 and 303 of VDOT's specifications require the use of stormwater management practices to address concerns such as post-development storm flows and downstream channel capacity. These standards require that stormwater management be designed to reduce stormwater flows to preconstruction conditions for up to a 10-year storm event. As a part of these regulations the capture and treatment of the first half inch of run-off in as storm event is required, and all stormwater management facilities must be maintained in perpetuity. During final design, a detailed hydraulic survey and study would evaluate specific effects on stormwater discharges. This evaluation would adhere to the aforementioned specification ensuring that no substantial increases to flooding would occur.

## **I. Threatened, and Endangered Species**

### ***Methodology and Existing Conditions***

The USFWS and the National Oceanic and Atmospheric Administration (NOAA) 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 D**. The USFWS database was referenced and results are detailed herein. The NMFS stated that they have no comments to this project. However, as detailed below, various database searches and reviews have been conducted for both threatened and endangered species.

The study reviewed federal and state threatened and/or endangered species or their habitat located within a two mile radius of the study area. **Figure 8** shows the location of these resources within this project study area. This summary only includes species which have been documented or confirmed through the review process within the two mile radius of the study area. However, Bald Eagle (*Haliaeetus leucocephalus*) information is also discussed, as detailed below. The following sections provide details regarding the resource reviews, agency coordination, and identified species. Stantec also completed reviews for Dwarf Wedgemussel and Small Whorled Pogonia habitat for various projects located within the study area as described below.

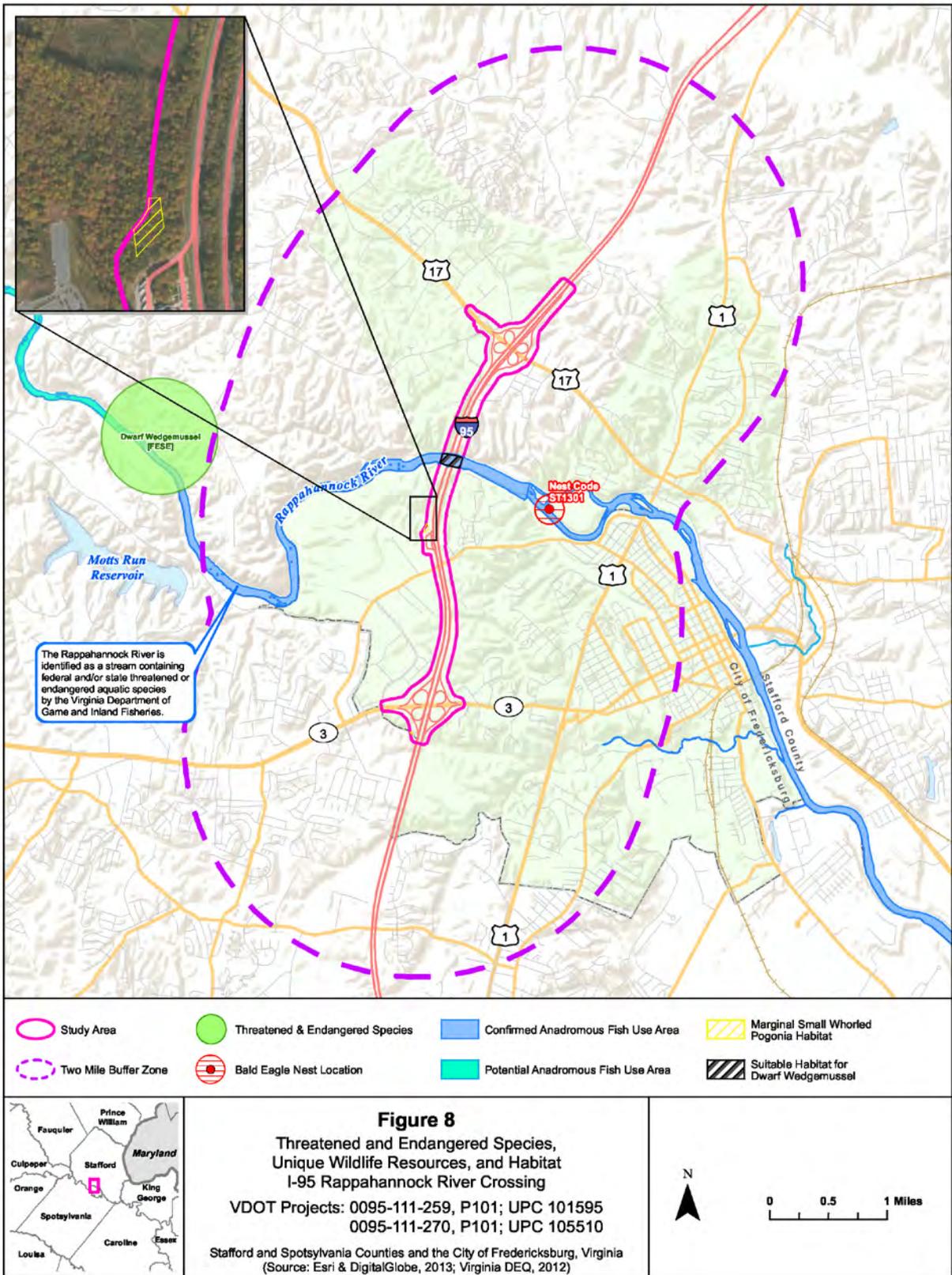
### 1. VDCR Comments

The VDCR-Division of Natural Heritage (DNH) provided comments based on their review of the Biotics Data System for occurrences of natural heritage resources for the study area. 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.

As part of this study, in addition to direct coordination with the agency, a query of the VDCR on-line database was conducted using the localities (City of Fredericksburg, Spotsylvania County, and Stafford County) as the areas for review. **Table 6** summarizes the results of the on-line locality based database search for the study area. This table lists the common and scientific names, the federal and state listing status, and the Global and state ranks of each species.

**Table 6: VDCR On-Line Database Listed Threatened and Endangered Species Based on Locality (City of Fredericksburg, Spotsylvania County, Stafford County)**

Common Name	Locality	Scientific Name	Global Rank	State Rank	Legal Status
Dwarf Wedgemussel	Spotsylvania County, Stafford County	<i>Alasmidonta heterodon</i>	G1G2	S1	FE/SE
Green Floater	Spotsylvania County	<i>Lasmigona subviridis</i>	G3	S2	ST
Virginia Piedmont Water Boatman	Spotsylvania County	<i>Sigara depressa</i>	G1G2	S1S2	SE
Small Whorled Pogonia	Spotsylvania County, Stafford County	<i>Isotria medeoloides</i>	G2	S2	FT/SE
Sensitive Joint-Vetch	Stafford County	<i>Aeschynomene virginica</i>	G2	S2	FT/ST
Harperella	Stafford County	<i>Harperella vivipara</i>	G2	S2	FT/SE



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 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 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

VDCR has listed “Hazel Run Rt. 1 to Rt. 2 Stream Conservation unit” as being located within the project site. This site has been given a biodiversity ranking of B3, which represents a site of high significance. The natural heritage resources associated with this site are Aquatic Natural Community (G2/S2) and Aquatic Natural Community (G3G4/S3S4). Also listed within the project site is the “Embrey Hill Conservation site”. Embrey Hill has been given a biodiversity significance ranking of B5. The natural heritage resource of concern is the Water-Willow Rocky Bar and Shore (G4G5/S4). Finally, the Yellow Lance (G2G3/S2S3) has been historically documented downstream of the project site in the Rappahannock River.

## **2. VDACS Comments**

In response to the project scoping request, VDACS deferred to VDCR to provide comments on state endangered and threatened plant and insect species. No specific comments regarding threatened and endangered species were provided by this agency.

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

While no official comments were received from the USFWS to date, a search of the USFWS Information, Planning, and Conservation (IPaC) on-line system was conducted for the study area. Through the use of the USFWS IPaC on-line system, the Dwarf Wedgemussel (FE/SE), Harperella (FE/SE), Small Whorled Pogonia (FT/SE), and the Northern long-eared Bat (FT) are listed species identified for the vicinity of the project. No critical habitats were identified in the database search. The IPaC species list and information is included in **Appendix D**.

### **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, a Bald Eagle nest locator search using the CCB on-line system was conducted. Bald Eagles are currently de-listed under the federal and state ESA; however, they are still 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) and both the federal and state agencies still review projects for potential impacts to individual species or their habitats.

The CCB's nest locator was used to determine the approximate location of eagle nests within the vicinity of the study area. Using this database, one nest (identified as Nest Code ST1301) was found to be within a two mile radius of the study area. The status of this nest, which is located approximately one mile east of the study area, is "Active/Occupied" by the CCB. Nests located within a 660 foot radius (which is considered the nest protection zone) would elevate the review and protective measures required by the agencies. As this nest is not located within the nest protection zone, this elevated review and protective measures would not apply. In addition, Bald Eagle concentration areas are not located within the vicinity of the study area. A map depicting the CCB's results are included in **Appendix D**.

### **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 study area generated from the VFWIS is included on **Figure 8** and summarized in **Table 7**. This summary only includes species which have been documented or confirmed within the two mile radius of the center line of the study area and identified as either ST or SE.

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.

**Table 7: VFWIS Database Documented Threatened and Endangered Species within a Two Mile Radius of the Study Area**

Common Name	Scientific Name	Legal Status	TIER	Distance from the Build Alternative
Dwarf Wedgemussel	<i>Alasmidonta heterodon</i>	FESE	II	1.96 miles
Green Floater	<i>Lasmigona subviridis</i>	ST	II	In Rappahannock
Northern long-eared Bat	<i>Myotis septentrionalis</i>	FT		To be determined

The VFWIS database also identified three Bald Eagle nests listed as “Historic” within a two mile radius of the study area. Although not identified by the CCB, the VFWIS identified Nest Codes ST0003, ST0101, and ST9401, which are located outside of the study area. All nests are also located outside of the nest protection zone.

The Northern Long-eared Bat was officially listed as Federally Threatened on May 4, 2015, and was identified by the VFWIS within two miles of the study area. A habitat survey for the Northern Long-eared bat has not been completed. Measures to ensure avoidance and minimization of impacts to this species are being developed, however, in the interim, VDOT has developed guidance that includes a time-of-year restriction for tree removal (greater than 3-inches diameter breast height), which must be performed outside the species roosting season (April 15th through September 15th). Additionally, any tree removal should be limited to trees located within 100 feet of the existing road surface. Additional agency coordination and re-evaluation concerning the Northern Long-eared bat will be conducted during the proposed project permitting process.

## 6. Stantec Surveys

As noted above, Stantec completed a Dwarf Wedgemussel survey and Small Whorled Pogonia habitat survey within the study corridor. A Dwarf Wedgemussel habitat survey was conducted on three onsite perennial waterbodies within the study corridor which noted that suitable habitat was present in the Rappahannock River to potentially support populations of the species. A mussel survey shall be completed prior to construction to determine if the species is present and to relocate dwarf Wedgemussel individuals should they be found to be contained within the limits of the project. Neither of the other two perennial waterbodies (Fall Quarry Run and an unnamed perennial tributary of Hazel Run) was determined to have suitable habitat, and no live freshwater mussels were identified during the review. A Small Whorled Pogonia habitat survey was also conducted using general ground reconnaissance of the property boundary and potential habitat areas were confirmed as identified on **Figure 8**, but no plants were found during the previously conducted detailed searches. The identified potential habitat areas for the Small Whorled Pogonia were outside of the determined impact area for the project.

Stantec specifically stated the following in their draft species reports submitted to VDOT:

“One perennial waterbody was identified during the land-based review to have potential habitat sufficient to support freshwater mussel populations: the Rappahannock River. The Rappahannock River has known occurrences of the species and characteristics were suitable within the vicinity of the project area. The perennial extent of Fall Quarry Run within the project area was found to be unsuitable in part due to a series of headcuts and grade controls that would preclude the migration of host fish upstream. An unnamed

perennial tributary of Hazel Run at the southern portion of the project was also found to be unsuitable. Culverts present an obstacle to host fish migration, the stream is generally embedded and pools are full of silt. No live individual freshwater mussels were identified during this land-based review... As a result of the habitat survey conducted by Stantec, two areas of marginal small whorled pogonia habitat were identified within the project area. The boundaries of the habitat areas were located using a sub-decimeter accurate Trimble ProXH Global Positioning System (GPS) unit and are depicted on the attached Threatened and Endangered Species Habitat Map.”

### ***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 Alternative***

The Build Alternative has little potential to affect threatened or endangered species or habitats along the study area.

The presence of federal and state threatened or endangered species 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 could be made to incorporate the preliminary recommendations into the design as much as possible. However, certain recommendations may not be practicable. Specific agency coordination could be 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. 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 cannot 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.

## **J. 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. While development has occurred within the

study area, there are a number of undisturbed and/or highly naturalized areas in the vicinity of the study area.

Specific terrestrial and aquatic habitat and wildlife conditions and concerns are noted throughout this report, and some features are expanded upon below. 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 potential or confirmed 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 Confirmed Anadromous Fish Use Area designations within a two mile radius of the study area (summarized in **Table 8**). 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 Confirmed Anadromous Fish Use Areas are included on **Figure 8**.

**Table 8: VFWIS Documented Anadromous Fish Use Areas within a Two Mile Radius of the Study Area**

Stream Name (VDGIF ID)	Locality	Status	Confirmed Species
Hazel Run	City of Fredericksburg	Confirmed	Alewife, Blueback Herring
Rappahannock River 1 (Embry Dam to Chesapeake Bay)	Spotsylvania County Stafford County City of Fredericksburg	Confirmed	Alewife, Blueback Herring, American Shad, Striped Bass, Yellow Perch, Hickory Shad
Rappahannock River 2 (Rocky Pen Run to Embry Dam)	Spotsylvania County Stafford County City of Fredericksburg	Confirmed	Blueback Herring, American Shad, Striped Bass, Hickory Shad

The VFWIS identified Embrey Dam as an “impediment to fish passage” within the study area. However, in 2005, the dam was removed from the river except for historical features such as the 1855 crib dam abutments and the 1910 Embrey Dam abutments. In addition, the VFWIS identified a raised culvert along Hazel Run. However, this culvert is located near the headwaters of Hazel Run and would not affect this study area.

## **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.

A review of the VDGIF database also stated that there were no Colonial Water Bird designations within a two mile radius of the study area.

## **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 actions or proposed 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 online mapping systems were used to identify potential regulated resources within the vicinity of the study area corridor. According to NOAA’s EFH Mapper v3.0 and EFH data inventory, no NOAA Habitat Areas of Particular Concern (HAPC) were designated within the study area corridor. 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 Online Mapping System. 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: the King Mackerel (*Scomberomorus cavalla*), the Spanish Mackerel (*Scomberomorus maculatus*), the Cobia (*Rachycentron canadum*), and the Red Drum (*Sciaenops ocellatus*). The database identified EFH habitat for all species listed above throughout the Rappahannock River.

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 the 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 v3.0 and EFH data inventory, there are no EFH APF designated areas for any waterway within the study area.

## **4. 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 or shellfish areas in the vicinity of the study area. However, the Rappahannock River is listed as a Threatened and Endangered Water for the Dwarf Wedgemussel and the Green Floater.

## **5. Forested Area**

An area is classified as forestland by the United States Department of Forestry if it is at least one acre in size and contains at least ten percent tree cover. Based on information from the Virginia Department of Forestry (VDOP), Division of Resource Information, there are several land use types identified within the footprints of the Build Alternative and the study area. Based on VDOP information, there are approximately 116.77 acres of forested area located within the study area. The Build Alternative would impact approximate 37.898 acres of forested area.

During the scoping process, the VDOP commented that they are particularly interested in the project's impact on the block of contiguous forestland spanning both sides of the Rappahannock River. They are also interested in retaining as much of the contiguous block of upland forests beyond the riparian buffer as possible.

### ***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 Alternative***

The Build Alternative has the potential to impact terrestrial and aquatic habitat or species within the study area. Extensive coordination with the different agencies could 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 could 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.

The Build Alternative has the potential to impact habitat and wildlife resources, as specifically discussed in the following sections, the impacts would be negligible following the measures outlined below.

#### **Terrestrial Wildlife and Habitat**

The potential impacts to terrestrial habitat would be limited to the displacement of small sections of remaining, often disjunct, non-contiguous tracts of forests, with the exception of the one area denoted by VDOP. The existing corridor poses a barrier to wildlife movements that would not be substantially altered by the Build Alternative. 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.

As part of the construction practices, the removal of existing vegetation could 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, could be followed as part of the final design. Cut and fill could 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 could 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 could 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 could be provided and maintained beneath proposed bridges and elevated structures to help minimize effects of wildlife corridor bisection. Fencing could also be considered to minimize motorized collisions with wildlife and to help direct wildlife towards any maintained passageways.

#### Aquatic Wildlife and Habitat

The Build Alternative may reduce aquatic habitat within the construction footprint to a small degree. The construction of the road 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 potential for 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.

For the confirmed anadromous fish species usage, through the permitting process, the VDGIF may recommend the following:

- Time-of-year construction restrictions, meaning no in-stream work is permitted during these dates during a given year, of February 15<sup>th</sup> to June 30<sup>th</sup> for anadromous fish use areas (or their tributaries which cross the study area)
- The use of 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
- Implementing strict erosion and sediment control measures
- Use of clear-span bridges for stream crossings. If clear-span bridges are not feasible, 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.

## **K. Navigation**

### ***Methodology and Existing Conditions***

The United States Coast Guard (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 study area includes bridges over the Rappahannock River. In addition, through the scoping process, the USCG identified these twin bridges in their response letter dated March 6, 2014. No other navigable waters were identified by the USCG.

### ***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 Alternative***

The permitting of the Rappahannock River bridges is within the jurisdiction of the USCG. As stated in the USCG scoping response, the bridges may qualify for an Advanced Approval exemption from a USCG Bridge Permit. Advance approval waterways are those that are navigable by law, but not actually navigated by other than canoes and small boats.

Further coordination with the USGC through the permitting process will be required as the design advances.

## **L. Coastal Zone Management Act**

The Coastal Zone Management Act of 1972 enabled the Commonwealth of Virginia to develop the Virginia Coastal Zone Management Program (CZMP) 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. Virginia's coastal zone is made up of 29 counties, 17 cities and 42 incorporated towns in "Tidewater Virginia", as defined in the Code of Virginia 28.2-100; and it includes the entire study

area for this project. Federal actions occurring within or with the likelihood of affecting any land or water use or natural resource of a state's coastal zone, including indirect and cumulative effects, must be consistent with a state's federally approved CZMP and National Oceanic and Atmospheric Administration (NOAA) regulations (15 CFR part 930).

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, VDOF, Virginia Department of Historic Resources, Virginia Department of Mines, Minerals, and Energy, VDOT, Virginia Economic Development Partnership, and the Virginia Institute of Marine Science.

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 CZMP 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.

#### **M. 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). 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.

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.

As noted in **Section G**, although the study area 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.

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