

## **Appendix L**

**L.1 Natural Resources Technical Memorandum**

**L.2 NOAA Biological Assessment**

**L.3 USFWS Biological Assessment**

**L.4 NOAA & USFWS Consultation**





# **Appendix L.1**

## **Natural Resources Technical Memorandum**

# NATURAL RESOURCES TECHNICAL MEMORANDUM

I-526 Lowcountry Corridor West  
CHARLESTON COUNTY, SOUTH CAROLINA

PREPARED FOR



SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION  
COLUMBIA, SOUTH CAROLINA

PREPARED BY:



DRAFT June 3, 2020

## Table of Contents

1.0	Introduction.....	3
1.1	Project Description .....	3
1.2	Purpose.....	3
1.3	Methodology .....	3
2.0	Physical Resources.....	4
2.1	Land Use .....	4
2.2	Physiography and Topography.....	5
2.2.1	Level III Ecoregion.....	5
2.2.2	Level IV Ecoregion .....	5
2.3	Geology and Soils .....	5
2.4	Water Resources and Water Quality.....	9
2.4.1	SCDHEC Water Classifications .....	9
2.4.2	Shellfish Harvesting .....	10
2.4.3	River Basins.....	10
2.4.4	Watersheds.....	11
2.4.5	303(d) List of Impaired Waters.....	12
2.4.6	Total Maximum Daily Loads .....	13
2.4.7	National Pollutant Discharge Elimination System.....	14
2.4.8	Water Quality Summary .....	16
3.0	Biotic Resources.....	16
3.1	Habitat Types.....	17
3.1.1	Maintained Development .....	17
3.1.2	Mixed Pine/Hardwood Forest .....	18
3.1.3	Scrub/ Shrub Communities.....	18
3.1.4	Bottomland Hardwood Forest.....	18
3.1.5	Tidal Wetlands.....	19
3.1.6	Brackish Marsh .....	19
3.1.7	Freshwater Herbaceous Wetland.....	19
3.1.8	Forested Wetlands .....	19
3.1.9	Cypress-tupelo Wetlands .....	20
3.1.10	Open Freshwater .....	20
4.0	Waters of the U.S.....	20
4.1	Waters of the U.S. Regulations .....	20
4.2	Aquatic Resources.....	22
4.2.1	Wetlands.....	22
4.2.2	Streams.....	26
4.3	Permitting.....	28
4.4	Compensatory Mitigation.....	29
5.0	Floodplains.....	30
6.0	Threatened, Endangered, and Protected Species.....	32

6.1	Migratory Bird Treaty Act.....	33
6.2	Bald and Golden Eagle Protection Act.....	34
6.3	State Protected Species.....	34
6.4	Protected Species Documented within Charleston County.....	34
6.5	Potential Species Impacts (Migratory Birds and Bald Eagle) .....	48
6.6	Construction Overview .....	49
6.7	Biological Conclusions (Threatened and Endangered Species).....	50
6.7.1	Recommended Species Commitments .....	51
7.0.	References.....	52

## Tables

Table 1:	Charleston County Soils within Project Study Area.....	6
Table 2:	Palustrine Emergent Wetlands Identified in the PSA.....	23
Table 3:	Palustrine Forested Wetlands Identified in the PSA .....	23
Table 4:	Estuarine Emergent Wetlands Identified within the PSA .....	25
Table 5:	Freshwater Streams Identified within the PSA .....	26
Table 6:	Tidally Influenced Streams Identified within the PSA .....	27
Table 7:	Open Waters (Ponds) Identified within the PSA .....	28
Table 8:	Mitigation Banks that Could Potentially Offset WOUS Impacts .....	30
Table 9:	Federal and State Protected Species in Charleston County.....	35
Table 10:	Federal At Risk Species in Charleston County .....	37
Table 11:	Summary of Federally Protected Species and Biological Conclusions or Impacts .....	50

## Appendices

APPENDIX A	Figures
APPENDIX B	DHEC Water Quality Tool Results
APPENDIX C	USACE Preliminary Jurisdictional Determination Letter
APPENDIX D	USFWS LOI Response and Charleston County Protected Species List
APPENDIX E	Draft Northern Long-Eared Bat 4(d) Rule Streamlined Consultation Form
APPENDIX F	Representative Site Photographs

## **1.0 INTRODUCTION**

This Natural Resources Technical Memorandum (NRTM) was prepared to assist the (SCDOT) and the Federal Highway Administration (FHWA) with developing an Environmental Impact Statement (EIS), regarding proposed infrastructure improvements and widening of Interstate 526 (I-526). Stantec, in cooperation with Civil Engineering Consulting Services (CECS), and other subconsultants (the Project Team), has been contracted by SCDOT to provide environmental services and design plans for the proposed improvements to I-526. This document serves to outline the natural resources and environment within the Project Study Area (PSA) (see Appendix A, Figure 1). This report provides an overall description of the project vicinity, and specifically describes natural resources within the PSA, including wetlands, water resources, plant communities, and protected species.

### **1.1 Project Description**

The proposed I-526 Lowcountry Corridor West project extends approximately 11.4 miles from near Paul Cantrell Boulevard in West Ashley to Virginia Avenue in North Charleston in Charleston County, SC. SCDOT currently ranks the segment of I-526 between I-26 and Virginia Avenue as the most congested segment of interstate highway in the state. The remainder of the I-526 LCC West project, from I-26 to Paul Cantrell Boulevard, ranks among the top ten of the state's existing most congested corridors. Traffic forecasts show that segments of that corridor will continue to be among the state's most congested in 2040. The interchange of I-526 and I-26 is the major source of the congestion.

An EIS is being completed that outlines potential alternatives to satisfy the purpose and need of the project. These alternatives are being assessed to determine the alternative that meets the project needs while also avoiding and minimizing construction impacts on the human and natural environment where feasible. Through various reasonable build alternatives, SCDOT proposes to add two travel lanes in each direction along I-526 and to upgrade the interchange of I-526 and I-26. Improvements to access I-526 from Paul Cantrell Boulevard, North Rhett Avenue, and Virginia Avenue are also proposed.

### **1.2 Purpose**

The purpose of this project is to increase capacity and improve operations at the I-26/I-526 interchange and along the I-526 mainline from Paul Cantrell Boulevard to Virginia Avenue.

### **1.3 Methodology**

Prior to conducting fieldwork, the following materials were referenced:

- U.S. Geological Survey (USGS) 7.5-minute topographic quadrangles. Johns Island, South Carolina (2017); Ladson, South Carolina (2011); and N. Charleston, South Carolina (2011)
- Natural Resources Conservation Service (NRCS) Soil Data Mart, Soil Series Mapping. Charleston

County, South Carolina (1971)

- U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) Wetlands On-Line Mapper
- NRCS-U.S. Department of Agriculture (USDA) National List of Hydric Soils Database; National List, All States. (Accessed: February 2020)
- South Carolina Department of Natural Resources (SCDNR) LiDAR Digital Elevation Model Dataset. Charleston County, 2007.
- USFWS South Carolina Field Office. Endangered, Candidate, and At-Risk Species. County Listings for Charleston County (Last Updated: December 2018; Accessed: February 2020)
- USFWS Information for Planning and Conservation (IPaC) web tool. Charleston County (Accessed February 2020)
- SCDNR. Rare, Threatened, and Endangered Species and Communities Known to Occur in Charleston County (Last Updated June 2014; Accessed: February 2020)
- SCDNR South Carolina Heritage Trust (SCHT). Geographic Database of Rare, Threatened, and Endangered Species Inventory Species Found in Charleston County (Last Updated January 2006; Accessed: February 2020)
- South Carolina Department of Health and Environmental Control (SCDHEC). Integrated Report for 2016. Part I: *Section 303(d) List of Impaired Waters*
- SCDHEC. Integrated Report for 2018. Part I: *Section 303(d) List of Impaired Waters Draft*
- National Agriculture Imagery Program Aerial Photography. Charleston County (2016)

Following review of available background data, site visits were conducted on several occasions between August to December 2016, January to February 2017, and September 2019 to document the presence of WOUS and to identify and document habitat communities where protected species may occur.

## **2.0 PHYSICAL RESOURCES**

### **2.1 Land Use**

The area surrounding the PSA is a densely populated region to the west of the City of Charleston, South Carolina. Based on the size of this project and the density of development in greater Charleston, the land use with this vicinity varied greatly. The majority of the land within this buffer has been developed for residential, commercial, and industrial uses. Large tracts include the Roper St. Francis Hospital, Limestone College, Charleston International Airport, the Boeing Company manufacturing facility, office parks, and large commercial shopping centers. Several active rail lines are also present in the PSA.

Undeveloped land primarily consists of maintained rights of way, landscaped lawns, wooded forests, and tidal marshes. The Ashley River flows through the PSA and is surrounded by tidal mudflats and vegetated marshes. Filbin Creek and its floodplain parallel and cross through PSA; this area is largely undeveloped forested wetlands.

## **2.2 Physiography and Topography**

### **2.2.1 Level III Ecoregion**

The PSA is located in the Coastal Plain physiographic province of South Carolina, and is specifically situated within the Southern Coastal Plain (75) Level III Ecoregion (Griffith, et al., 2002). The Southern Coastal Plain extends from South Carolina and Georgia through much of central Florida, and along the Gulf coast lowlands of the Florida Panhandle, Alabama, and Mississippi. It appears to be mostly flat plains, but it is a heterogeneous region also containing barrier islands, coastal lagoons, marshes, and swampy lowlands along the Gulf and Atlantic coasts. Once covered by a variety of forest communities that included trees of longleaf pine, slash pine, pond pine, beech, sweetgum, southern magnolia, white oak, and laurel oak, land cover in the ecoregion as a whole is now mostly slash and loblolly pine with oak-gum-cypress forest in some low lying areas, pasture for beef cattle, and urban land uses.

The PSA is further characterized by falling within the Sea Islands / Coastal Marsh (75j) Level IV Ecoregion (Griffith, et al., 2002).

### **2.2.2 Level IV Ecoregion**

The Sea Islands/Coastal Marsh region contains the lowest elevations in South Carolina and is a highly dynamic environment affected by ocean wave, wind, and river action. Mostly organic and clayey soils occur in the freshwater, brackish, and salt marshes. Maritime forests of live oak, red cedar, slash pine, and cabbage palmetto grow on parts of the sea islands, and various species of cordgrass, saltgrass, and rushes are dominant in the marshes.

Based on USGS topographic mapping (see Appendix A, Figure 2), elevations in the PSA range from approximately 5 feet above National Geodetic Vertical Datum (NGVD) to 40 feet NGVD. The PSA drains to numerous waterbodies which include tributaries of the Stono River, Bulls Creek, the Ashley River, Brickyard Creek, Filbin Creek, Turkey Creek, and the Cooper River.

## **2.3 Geology and Soils**

Sediments of the Southern Coastal Plain were deposited during periodic transgressive and regressive cycles caused by sea level fluctuations. Sea level fluctuations were caused, in part, by the expansion and recession of glacial ice caps. Depositions created by fluctuating sea levels formed an uneven land surface that generally decreases in elevation seaward. As a result of these transgressive and regressive cycles, progressively younger sequences of deposits lie nearer the modern coast, and at lower elevations, than older sequences. Pluvial sediments from the Cretaceous and Tertiary periods



overlay pre-Mesozoic basement rocks of the Coastal Plain (Horton and Zullo, 1991).

According to the USDA NRCS Soil Survey of Charleston County (USDA, 1976), nineteen (19) soil map units (SMU) are mapped within the PSA (see Appendix A, Figure 3). The soils mapped within the PSA are depicted in Appendix A. Farmland Classification and Hydric Rating for each SMU is located in Table 1. The Farmland Protection Policy Act (FPPA) of 1981 requires evaluation of farmland conversions to nonagricultural uses. Farmland can be prime farmland, unique farmland, or farmland of statewide importance.

**Table 1: Charleston County Soils within Project Study Area**

CHARLESTON COUNTY, SOUTH CAROLINA					
Map Symbol	Map Unit Name	Farmland Classification	Hydric Rating	Acres within PSA	Percentage within PSA
Cg	Capers silty clay loam	Not prime farmland	Hydric soil	25.4	1.5
Cm	Chipley loamy fine sand	Not prime farmland	Not hydric	9.3	0.6
HoA	Hockley loamy fine sand, 0-2 percent slopes	All areas are prime farmland	Hydric soil	49.3	2.9
HoB	Hockley loamy fine sand, 2-6 percent slopes	All areas are prime farmland	Not hydric	4.4	0.3
LaB	Lakeland sand, 0 to 6 percent slopes	Not prime farmland	Not hydric	3.5	0.2
Mp	Mine pits and dumps	Not prime farmland	Not hydric	1.8	0.1
Qu	Quitman loamy sand	Prime farmland if drained	Not hydric	29.8	1.8
Rg	Rutledge loamy fine sand	Not prime farmland	Hydric soil	17.3	1.0
Sa	St. Johns fine sand	Not prime farmland	Hydric soil	3.2	0.2
Se	Santee loam	Farmland of statewide importance	Hydric soil	2.2	0.1
Sm	Seewee complex	Not prime farmland	Not hydric	0.8	0.1
St	Stono fine sandy loam	Farmland of statewide importance	Hydric soil	0.8	0.1
Ts	Tidal marsh, soft	Not prime farmland	Hydric soil	29.1	1.7
UR	Urban land	Not prime farmland	Not hydric	1,354.6	80.9
W	Water	Not prime farmland	Not hydric	36.1	2.2
Wa	Wadmalaw fine sandy loam	Farmland of statewide importance	Hydric soil	52.2	3.1

CHARLESTON COUNTY, SOUTH CAROLINA					
Map Symbol	Map Unit Name	Farmland Classification	Hydric Rating	Acres within PSA	Percentage within PSA
WgB	Wagram loamy fine sand 0-6 percent slopes	Farmland of statewide importance	Not hydric	19.3	1.2
WoB	Wicksburg loamy fine sand 0-6 percent slopes	Farmland of statewide importance	Not hydric	63	6.6
Yo	Yonges loamy fine sand	Farmland of statewide importance	Hydric soil	34.1	2.0
<b>SUBTOTALS FOR SOIL SURVEY AREA</b>				<b>1673.8</b>	<b>100.0%</b>

The following describes the SMUs found within the PSA.

**Capers silty clay loam (Cg)**-This soil is formed in silty clay to silty clay loam sediments and occurs on tidal flats. All Capers silty clay loam is in marsh grass. It is used for range pasture. It is not suited to crops and wood-land, because of its salt and sulfur content. If this soil is drained it becomes so extremely acid that plants die. This soil constitutes approximately 25 acres within the PSA and is found along Bulls Creek in the southern portion of the PSA.

**Chibley loamy fine sand (Cm)** - This is a deep, nearly level, moderately well drained to somewhat poorly drained soil that is sandy throughout. This soil is easily friable and easy to work. Most areas are wooded. This soil constitutes approximately 9 acres within the PSA and is located near Ashley Commons Road in the southern portion of the PSA.

**Hockley loamy fine sand, 0 to 2 percent slopes (HoA)** - This is a moderately well drained, friable, acid soil that contains a moderately fine textured subsoil. It has a high water table. This soil constitutes approximately 49 acres within the PSA and is located near commercial shopping areas in the extreme southern portion of the PSA.

**Hockley loamy fine sand, 2 to 6 percent slopes (HoB)** - This is a moderately well drained, friable, acid soil. This soil constitutes approximately 4 acres within the PSA and is located along the banks of Bulls Creek in the southern portion of the PSA.

**Lakeland sand, 0 to 6 percent slopes (LaB)** - This is a deep, acid, nearly level to gently sloping, sandy soil. This soil constitutes approximately 4 acres within the PSA and is located near Savage road in the southern portion of the PSA.

**Mine pits and dumps (Mp)** - consists of (1) open pits that remain after phosphate rock, soil material, and sand has been removed from the soil and (2) areas where soil material removed during mining operations has been dumped. This soil constitutes approximately 2 acres within the PSA and is located south of Paul Cantrell Boulevard in the southern portion of the PSA.

**Quitman loamy sand (Qu)** - This is a level, somewhat poorly drained acid soil that has a loamy fragipan in the subsoil. This soil constitutes approximately 30 acres within the PSA and is located south of Paul Cantrell Boulevard in the southern portion of the PSA.

**Rutlege loamy fine sand (Rg)** - This is a poorly drained to very poorly drained deep soil that is sandy throughout. This soil constitutes approximately 17 acres within the PSA and is located along two drainage features that are perpendicular to I-526 in the southern portion of the PSA.

**St. Johns fine sand (Sa)** - This is a deep, poorly drained, acid soil that is sandy throughout. This soil constitutes approximately 3 acres within the PSA and is located behind a commercial development in the southern portion of the PSA.

**Santee loam (Se)** - This is a very poorly drained soil that has a clayey layer in the subsoil. This soil constitutes approximately 2 acres within the PSA and is located near the Citadel Mall in the southern portion of the PSA.

**Seewee complex (Sm)** - This is a complex of sandy soils. These soils are level and somewhat poorly drained to moderately well drained. Typically, they have a surface layer of loamy fine sand. This soil constitutes less than 1 acre within the PSA and is located near the Citadel Mall in the southern portion of the PSA.

**Stono fine sandy loam (St)** - This is a level and very poorly drained soil that has a thick black surface layer and a loamy subsoil. This soil constitutes less than 1 acre within the PSA and is located along a drainage in the southern portion of the PSA.

**Tidal marsh, soft (Ts)** - This a miscellaneous land type occurring on the coast and along tidal streams and rivers between the ocean and the uplands. It is in broad, level, tidal flats that are covered by 6 to 24 inches of salt water at high tide. The surface layer is dark colored soft clay, clay loam, muck, or peat and is saturated. It is covered by salt-tolerant plants, such as black rush and smooth cordgrass. This designation constitutes approximately 29 acres within the PSA and is located along the banks of the Ashley River in the southern portion of the PSA and along the bank of the Cooper River in the eastern portion of the PSA.

**Urban Land (UR)** – These soils underlay developed sites and may be a mix of native material and fill material. It is difficult to determine characteristics because of the blending of soils. These soils are often suited for development. This soil constitutes approximately 1,355 acres within the PSA and is by far the dominant soil type within the PSA. It can be found throughout the central, northern, and eastern portions of the PSA.

**Wadmalaw fine sandy loam (0 to 2 percent slopes) (Wa)** - This is a nearly level, poorly drained soil

that is loamy throughout. This soil constitutes approximately 52 acres within the PSA and is located near the Citadel Mall in the southern portion of the PSA.

**Wagram loamy fine sand, 0 to 6 percent slopes (WgB)** - This is a nearly level, well-drained soil that has a thick sandy surface layer and loamy subsoil. This soil constitutes approximately 19 acres within the PSA and is located near Paul Cantrell Boulevard in the southern portion of the PSA.

**Yonges loamy fine sand (Yo)** - This is a level, deep, poorly drained soil that has a loamy to clayey subsoil. Surface runoff is slow, and ponding occurs during rainy periods. This soil constitutes approximately 34 acres within the PSA and is located south of the Ashley River in the southern portion of the PSA.

The project would have both short-term construction-related impacts as well as long-term operational impacts on soils in the PSA; however, these impacts are not considered substantial.

Some areas of the PSA have been previously disturbed due to phosphate mining. In these areas, native soils, and phosphate rock were manually or mechanically stripped away. This mining activity left a landscape with a ridge and swale topography that was devoid of all vegetation. The areas re-vegetated with shrubs and trees that grew well on the ridges left on the land. The swales left over from the mining activities tended to accumulate water due to the hydrologic alteration and restricted or impeded water flow.

This phosphate mining occurred in the late 19th, early 20th century but continues to affect the site today. The low swales in which the phosphate was removed mimic true wetlands in that they may support hydrophytic vegetation and are subject to inundation by surface water or groundwater. Residual exposed phosphate could leach excess phosphorus into exposed waters. These particular wetlands share hydrologic connectivity downstream to Filbin Creek (USGS, 2016).

## **2.4 Water Resources and Water Quality**

### **2.4.1 SCDHEC Water Classifications**

SCDHEC has classified the waterbodies (streams and rivers) of South Carolina based on the desired uses of each waterbody. SCDHEC has established standards for various parameters to protect all uses within each waterbody classification. Waterbody classifications are set out in South Carolina Regulation 61-68 (R.61-68), Water Classifications and Standards. All waters of South Carolina are classified even if they are not specifically named or listed in R.61-69. Waters not listed are assigned the classification of the receiving waterbody to which they flow. Waters classifications in the PSA are shown in Appendix A, Figure 4.

### 2.4.2 Shellfish Harvesting

SCDHEC administers the Shellfish Sanitation Program is to ensure that shellfish (oysters, clams, and mussels) and the areas from which they are harvested meet the health and environmental quality standards provided by federal guidelines and state regulations. South Carolina currently has 25 management areas comprising approximately 578,000 surface acres of estuarine and coastal riverine habitat suitable for the cultivation and harvest of molluscan shellfish. These management areas are assigned water quality classifications for the primary purpose of public health protection. SCDHEC uses combinations of the following harvesting classifications for shellfish area management:

**Approved** areas are those that are normally open for the direct marketing of shellfish for human consumption. Approved areas must not exceed an established water quality standard.

**Conditionally Approved** areas are those that meet criteria for an Approved classification except under predictable conditions. Closure criteria and subsequent re-opening procedures are described in an area-specific management plan. Conditions that normally result in these temporary closures are often rainfall-induced (non-point source runoff or excessive river levels/flows).

**Restricted** areas are those that exceed “approved” area water quality standards and are normally closed for direct harvesting activities but where harvesting may be allowed by special permit. Shellfish from these areas are frequently relocated to “approved” areas where they remain planted for a period of time adequate to allow natural cleansing.

**Prohibited** areas are those that are administratively closed for the harvesting of shellfish for any purposes related to human consumption. These closures are established adjacent to permitted wastewater discharges, marina facilities, or areas containing multiple point sources of pollution. This classification is not based upon violation of a bacteriological standard.

A large portion of the PSA is within Shellfish Growing Area 10B (see Appendix A, Figure 5). This area encompasses the Charleston Harbor, Ashley River, Cooper River, and their tributaries that support shellfish. Waters within this management area in the PSA have been given the classification of “prohibited” and as such, these areas are closed to all human consumption.

The extreme southern portion of the PSA, lies within Shellfish Growing Area 11. This area encompasses the Stono River, Wallace River, Wapoo Creek, Kiawah River, Seabrook Island and Kiawah Island. This management area has been given the classification of “restricted” and as such, waters are closed for direct harvesting without a special permit.

### 2.4.3 River Basins

The US Geological Society (USGS) categorizes drainages areas by specific numbers, or hydrologic unit codes (HUC). Sub river basins within larger river basins are given an eight-digit HUC (i.e. 03050201).

Ten-digit HUCs are also provided for watersheds within 8-digit HUCs (i.e. 03050201-07). In South Carolina, SCDHEC divides South Carolina into eight major river basins. The proposed PSA is located entirely within the Santee River Basin.

The Santee River Basin, located immediately south of the Pee Dee and north of the Edisto River Basin, extends through a central portion of the Atlantic Coastal Plain of eastern South Carolina. The Santee River Basin is subdivided into sub-basins and the PSA is predominantly located within the Cooper River sub-basin (HUC 03050201). The extreme southern portion of the PSA extends into the Stono River sub-basin (HUC 03050202).

The Cooper River sub-basin is located in Berkeley, Charleston and Dorchester Counties and encompasses approximately 1,545 square miles within South Carolina. Of the approximately 1 million acres of the Cooper River Sub-basin, 35.5% is forested land, 25.8% is forested wetland, 13.5% is urban land, 10% is open water, 8.0% is non-forested wetland 6.6% is agricultural land, and 0.6% is barren land. The urban land is comprised chiefly of the greater City of Charleston area.

There are a total of 2,037.2 stream miles in the Cooper River sub-basin, together with 60,829.1 acres of lake waters and 29,134.6 acres of estuarine areas. The diverted Santee River flows into Lake Moultrie, out of the Lake Moultrie Pinopolis Dam, along the Tailrace Canal, and joins with Biggin Creek to form the West Branch Cooper River. The West Branch Cooper River then converges with the East Branch Cooper River at “The Tee” to form the Cooper River. The Cooper River then accepts drainage from the Back River, Goose Creek, the Wando River, and the Ashley River before flowing into Charleston Harbor and the Atlantic Ocean.

#### **2.4.4 Watersheds**

The Cooper River and Stono River Sub-Basins are further divided into watersheds. Of these, the PSA is located within the Stono River Watershed (03050202-02), the Ashley River Watershed (HUC 03050201-06), and the Cooper River Watershed (03050201-07) (see Appendix A, Figure 6).

The Stono River watershed is located in Charleston County, consists primarily of the Stono River and its tributaries. The watershed occupies 97,672 acres of the Lower Coastal Plain and Coastal Zone regions of South Carolina. Land use/land cover in the watershed includes: 29.1% forested land, 23.4% nonforested wetland, 16.4% forested wetland, 12.8% urban land, 9.5% water, 7.7% agricultural land, and 1.1% barren land. Within the PSA, the Stono River Watershed extends from approximately 2,800 feet (0.5 mile) north of US Highway 17 to 1,800 feet (0.3 mile) north of Paul Cantrell Boulevard. While this area does not include USGS named features within the PSA, several streams and wetlands are present in the PSA in the Stono River Watershed, including forested wetlands, emergent wetlands, tidal influenced streams, and freshwater streams.

The Ashley River Watershed is located in Berkeley, Charleston, and Dorchester Counties and consists

primarily of the Ashley River and its tributaries. The watershed occupies 86,887 acres of the Lower Coastal Plain and Coastal Zone regions of South Carolina. Land use/land cover in the watershed includes: 43.3% urban land, 20.0% forested land, 19.5% forested wetland, 9.4% nonforested wetland, 4.9% water, 2.5% agricultural land, and 0.4% barren land. Within the PSA, the Ashley River Watershed approximately extends 1,800 feet (0.3 mile) north of Paul Cantrell Boulevard, north across the Ashley River, to 2,500 feet (0.5 mile) north of International Boulevard. It includes portions of two USGS-named water bodies including the Ashley River and Bulls Creek. Several streams and wetlands are present in the PSA in the Ashley River Watershed, including forested wetlands, emergent wetlands, tidally influenced streams, and freshwater streams.

The Cooper River Watershed is located in Berkeley, Charleston, and Dorchester Counties and consists primarily of the Cooper River and its tributaries draining into the Charleston Harbor. The watershed occupies 206,457 acres of the Lower Coastal Plain and Coastal Zone regions of South Carolina. Land use/land cover in the watershed includes: 26.9% forested land, 25.9% urban land, 20.3% forested wetland (swamp), 10.5% nonforested wetland (marsh), 10.3% water, 4.6% agricultural land, and 1.5% barren land. Within the PSA, this watershed extends from approximately to 2,500 feet (0.5 mile) north of International Boulevard and branches off in diverging directions towards I-26 and east to the Cooper River. The area of the Cooper River Watershed within the PSA terminates to the north at the Eagle Drive overpass and to the east at the Cooper River. It includes portion of two USGS-named features, Turkey Creek and Filbin Creek. Several streams and wetlands are present in the PSA in the Cooper River Watershed, including forested wetlands, emergent wetlands, tidally influenced streams, and freshwater streams.

#### **2.4.5 303(d) List of Impaired Waters**

In accordance with Section 303(d) of the Clean Water Act (CWA), SCDHEC evaluates water bodies identified as impaired from pollutants for appropriate inclusion on the Section 303(d) list. The 303(d) list is a State list of waters that are not meeting water quality standards or have impaired uses. The 303(d) list targets water bodies that do not meet water quality standards set for the state for water quality management, as well as identifying the cause(s) of the impairment and the designated classifications. The current 303(d) List of Impaired Waters was approved in 2016. An updated 303(d) List of Impaired Waters has been proposed as of 2018. As of January 24, 2020, adjustments have been made to the draft 2018 303(d). Since the initial public notice of the proposed updated list in 2018, SCDHEC has determined that some of the 303(d) impaired waters and waters of concern have changed. These changes are the result of an assessment of data using updated calculations for instream metals criteria. An addendum to the draft list is being made available for public comment for a period of thirty-one days, from January 27, 2020 – February 26, 2020. This report includes the currently listed waters from the 2016 approved list and if later available, should be updated following the approval of the modified 2018 list.

According to SCDHEC's 2016 Section 303(d) list and the draft 2018 303(d) list, there are two monitoring stations listed within or just upstream of the PSA (Figure 6). MD-249 is located within the PSA along Filbin Creek. At this station recreational use is not supported in Filbin Creek due to elevated levels of *Enterococcus* bacteria. *Enterococcus* is a large genus of bacteria that can be harmful when found in elevated levels in water (SCDHEC 2016, 2018).

Monitoring station MD-049 is located upstream of the PSA, along the Ashley River. At this station recreational use is not supported in due to elevated levels of *Enterococcus* bacteria. Additionally, aquatic life uses are not supported at MD-049 based on pH and turbidity. The term pH is a measure of the hydrogen ion concentration of water, and is used to indicate degree of acidity. The pH scale ranges from 0 to 14. A pH of 7 is considered neutral, with values less than 7 being acidic, and values greater than 7 being basic. Low pH values are found in natural waters rich in dissolved organic matter, especially in coastal plain swamps and black water rivers. The tannic acid released from the decomposition of vegetation causes the tea coloration of the water and low pH. High pH values in lakes during warmer months are associated with high phytoplankton (algae) densities. Turbidity is an expression of the scattering and absorption of light through water. The presence of clay, silt, fine organic and inorganic matter, plankton, and other microscopic organisms increases turbidity. Increasing turbidity can be an indication of increased runoff from land. It is an important consideration for drinking water there are turbidity limits for water for consumption. Recreation is only partially supported at this same site (MD-049), based on elevated fecal coliform levels. A fish consumption advisory due to elevated mercury levels in certain types of fish is in place for the Ashley River, including the area at the I-526/General William C. Westmoreland Bridge and northwards/upstream of the project to SC 165.

#### **2.4.6 Total Maximum Daily Loads**

Once a site is included on the 303(d) list of impaired waters, a Total Maximum Daily Load (TMDL) must be developed. TMDL is the amount of a single pollutant (e.g., bacteria, nutrients, metals) that can enter a waterbody on a daily basis and still meet water quality standards set forth by SCDHEC. "TMDL" refers to both a calculation of a pollutant entering a waterbody as well as a document that incorporates the calculation along with source assessments, watershed, land use information, pollutant reductions and allocation information, implementation and additional relevant information, maps, figures and pictures. TMDLs are a requirement found in Section 303(d) of the CWA.

TMDLs are calculated by adding all point and nonpoint sources for the pollutant which leads to the impairment. After a TMDL is calculated, the amount of load entering from point and nonpoint sources is compared to the water quality standards for that waterbody. The total loading is reduced to the levels where the water quality standards can be met. This reduced loading is then divided among all the point and nonpoint sources.



The goal of a TMDL is to identify potential pollution sources, calculate and quantify the reduction of those sources, and provide general implementation information needed to meet water quality standards and improve water quality. After the approval of the TMDL, an implementation plan can be developed to realize the goals of the written TMDL document. Implementation of a TMDL has a potential to reduce sources of pollution within a watershed and a potential to restore the full use of the waterbody.

A TMDL has been developed for the Charleston Harbor, Cooper, Ashley, and Wando Rivers and approved by the EPA to identify opportunities to increase dissolved oxygen (DO) in the watershed. Many coastal waters in South Carolina have DO levels below the established DO criteria. Wastewater dischargers and other anthropogenic influences may contribute to low DO in coastal waters. Natural factors such as organic loading and reduced oxygen levels from wetlands and marshes and estuarine dynamics in the mixing zone where freshwater and saltwater come together can create naturally low DO conditions. The waters in and around Charleston Harbor are considered to be both naturally low in DO and further impacted by wastewater dischargers. Potential sources of oxygen demand loading that were considered include National Pollutant Discharge Elimination System (NPDES) wastewater discharges (continuous point sources), NPDES stormwater discharges (noncontinuous point sources), non-point sources, and natural background sources.

#### **2.4.7 National Pollutant Discharge Elimination System**

Point source discharge means a discharge which is released to the waters of the State by a discernible, confined and discrete conveyance, including but not limited to a pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, vessel, or other floating craft from which waste is or may be discharged. The NPDES Permit Program was created by Section 402 of the CWA. In 1975, the Bureau of Water received authority from the EPA to administer the NPDES Permit Program in South Carolina. The SCDHEC Bureau of Water is responsible for the permitting, compliance, monitoring and enforcement activities of the program.

Persons with point source discharges to surface waters are required to have NPDES permits. Typical regulated point source discharges are:

- discharges from wastewater treatment systems owned by municipalities, industries, private utilities, State and Federal government, etc.;
- discharges such as cooling water, boiler blow down, etc.;
- storm water discharges from municipal separate storm sewer systems (MS4s);
- storm water discharges associated with industrial activity; and,

- Storm water dischargers from construction sites.

According to the Water Quality Assessment Report for the Santee River Basin (SCDHEC, 2013) and the SC Watershed Atlas (SCDHEC, 2018), six NPDES major discharge permitted facilities are authorized directly in, or within close proximity to the PSA (Figure 6). One is in the PSA and the remaining five are located north and south of the PSA.

- Kapstone Charleston Craft, LLC (SC0001759) holds a permit to discharge as a paperboard mill. This is located just north of Filbin Creek within the PSA and a second site is located just outside of the PSA.

Five NPDES major discharge permits have been issued for areas near to (within 2.5 miles), but outside of the PSA. These sites are all associated with the industrial area along the west side of the Cooper River to the north and south of the PSA.

- Kapstone Charleston Craft, LLC (SC0001759) holds an additional permit to discharge as a paperboard mill on the west side of the Cooper River.
- Buckeye Terminal (SC0002852) holds a permit to discharge as a petroleum bulk station and/or terminal along the west side of the Cooper River.
- Delfin Group USA, LLC (SC0003026) holds a permit to discharge as a lubricating oils/greases facility. This location is along the west side of the Cooper River, outside of the PSA.
- Detyens Shipyard (SC0047562) holds a permit as a ship building and repairing site along the west side of the Cooper River, outside of the PSA.
- Seacrest Marine Holdings, LLC (SC0048518) holds a permit as a ship building and repairing site along the west side of the Cooper River, outside of the PSA.

According to the Water Quality Assessment Report for the Santee River Basin (SCDHEC, 2013) and the SC Watershed Atlas (SCDHEC, 2018), six NPDES General Permits have been issued within or near the PSA (Figure 6).

- One NPDES General Permit has been issued to Defense Fuel Support (SCG340022) to discharge as a petroleum bulk station and/or terminal. This discharge location is situated within the PSA near Virginia Avenue.

Five NPDES discharge General Permits have been issued for areas near to (within 2.5 miles), but outside of the PSA.

- Kinder Morgan Bulk Terminal (SCG340015) holds a General Permit to discharge as a petroleum bulk station and/or terminal. This location is along a CSX railroad near the Cooper River.
- Buckeye Terminal (SCG340026) holds a General Permit to discharge as a petroleum bulk station and/or terminal along the west side of the Cooper River.
- Charleston Airforce Base Pipeline Site (SCG830031) holds a General Permit to discharge near Turkey Creek, just west of I-26.
- The Boeing facility (SCG250270) holds a permit to discharge as an aircraft facility. This is a General Permit and represents two discharge locations. Neither discharge location is within the immediate PSA.

#### **2.4.8 Water Quality Summary**

SCDHEC's Watershed and Water Quality Information was reviewed through an online query in February 2020. A TMDL for DO has been established within Charleston Harbor, Cooper, Ashley, and Wando Rivers (Stations MD-115, MD-264, CSTL-102, MD-049, RT-032046, MD-052, RO-09363, CSTL-085, and MD-152, portions of HUC 03050201), as stated in the Basinwide Watershed Water Quality Assessment Report for the Santee River Basin (SCDHEC, 2013). Please see Appendix B for a copy of the SCDHEC Watershed and Water Quality Information Reports.

The proposed project is not anticipated to contribute to these impairments or have long term impacts on water quality within the watershed; however, due to the existing water quality impairments and approved TMDL within watershed 03050201, SCDHEC may require additional water quality protection and stormwater treatment measures during and after construction.

During construction activities, temporary siltation may occur in adjacent waters and erosion may be of a greater degree than presently occurring. Recommendations would be set forth that the contractor minimize this impact through implementation of construction best management practices, reflecting policies contained in 23 CFR 650 B and S.C. Code of Regulations 72-400. SCDOT has also issued an Engineering Directive Memorandum (Number 23), dated March 10, 2009, regarding Department procedures to be followed in order to ensure compliance with S.C. Code of 72-400, Standards for Stormwater Management and Sediment Reduction. Exposed areas may be stabilized by following the Department's Supplemental Technical Specification for Seeding (SCDOT Designation: SC-M-810-4(07/17)).

### **3.0 BIOTIC RESOURCES**

The PSA comprises a long, linear corridor that traverses numerous types of habitats and human

influenced areas.

Specific surveys for commonly occurring wildlife species were not conducted; however, wildlife readily observed and documented during the field reviews, or those likely to occur within the PSA, are summarized below.

Common bird species either observed during field reviews or known to occur within the PSA include Carolina chickadee, northern mockingbird, blue jay, northern cardinal, brown thrasher, common grackle, American crow, American goldfinch, American robin, eastern towhee, Carolina wren, eastern bluebird, chipping sparrow, red-bellied woodpecker, barred owl, red-tailed hawk, red-shouldered hawk, turkey vulture, and osprey. Wading birds and waterfowl include Canada goose, Muscovy duck, mallard, great egret, green heron, and great blue heron.

Some crayfish, common fishes, and other aquatic organisms were readily observed in the PSA in both brackish and freshwater areas. Those species, as well as others that are likely to be present in the PSA include marsh fiddler crab, periwinkle snail, eastern mudsnail, mosquito fish, channel catfish, sailfin molly, bluegill, silver perch, Atlantic menhaden, and bay anchovy.

There are many common reptile and amphibian species that could occur in the PSA including American alligator, green tree frog, various leopard frog species, skink, Carolina anole, eastern glass lizard, eastern garter snake, eastern king snake, black racer, pond sliders, eastern box turtle, snapping turtle, and American toad.

Common mammal species likely to occur in the PSA include white-tailed deer, striped skunk, river otter, raccoon, bats, cotton mouse, opossum, eastern gray squirrel, and eastern cottontail rabbit.

The majority of PSA is comprised of existing roadway. Areas which are not developed were classified based upon vegetation and land form types. Vegetative terrestrial communities within the PSA were distinguished by dominant plant species and community types, location in the landscape, past disturbances, and hydrologic characteristics. Only those habitats which were located directly within the PSA are characterized. The PSA was examined through current and historical Google Earth imagery, USDA ortho imagery, and USGS topographic maps to discern areas with similar signatures, and the data were verified and classified through on-site field review. Essential Fish Habitat (EFH) is also present within the PSA and is addressed in a separate document. A brief summary of the habitat communities found within the PSA is as follows:

### **3.1 Habitat Types**

#### **3.1.1 Maintained Development**

Maintained developments were classified as areas or regions which have altered the native state of the land for consumptive human use. Man-maintained and disturbed communities within the PSA

also include roadside shoulders and utility rights of way. Most of the naturally-occurring plants associated with these maintained or disturbed communities have been eliminated and/or replaced with cultivated grasses or taken over by naturally occurring opportunistic species characteristic of disturbed areas. These areas encompassed land uses such as residential homes, commercial developments, roadway surfaces, and parking lots. Most of the disturbed roadway edges are comprised of herbaceous species and sparse shrubs, including various grasses such as common fescue (*Festuca sp.*), ryegrass (*Lolium perenne*), bahia grass (*Paspalum notatum*), and bluegrass (*Poa sp.*).

### **3.1.2 Mixed Pine/Hardwood Forest**

Mixed pine/hardwood forest is a dominant community type located throughout the majority of the PSA. Dominant vegetation consists of pine species including loblolly pine (*Pinus taeda*), long-leaf pine (*Pinus palustris*) and pond pine (*Pinus serotina*). Hardwood species observed include sweetgum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), water oak (*Quercus nigra*), and tulip poplar (*Liriodendron tulipifera*). Smaller hardwood/ sapling species include eastern red cedar (*Juniperus virginiana*), American holly (*Ilex opaca*), and wax myrtle (*Morella cerifera*). Groundcover and vine strata include saw palmetto (*Serenoa repens*), blueberry (*Vaccinium sp.*), greenbrier (*Smilax sp.*), and partridge berry (*Michella repens*).

### **3.1.3 Scrub/ Shrub**

These areas are characterized as being cleared within the past five years. They do not have the established species found in the mixed hardwood forest but are not frequently mowed like roadsides and lawns. Notable areas include dry drainages, areas beneath overpasses and interchanges, and spaces that have been maintained in the past but have been allowed to lie fallow. These communities often include ruderal species and non-native species. These species tend to be more widespread and occupy numerous habitat types. These areas include an early diverse array of herbaceous species within the initial phases of disturbance and transition towards the climax community, replacing primary colonizers. Species observed include sweetgum, Chinese tallow tree (*Triadica sebifera*), blackberry (*Rubus sp.*), eastern baccharis (*Baccharis halimifolia*), Chinese privet (*Ligustrum sinense*), Autumn olive (*Eleagnus umbellata*), honey suckle (*Lonicera japonica*), and broomsedge (*Andropogon sp.*).

### **3.1.4 Bottomland Hardwood Forest**

Bottomland hardwood forest are present in small locations within the limits of the PSA. These areas are confined to the floodplain zones of creeks and perennial tributaries where out of bank flooding seasonally inundates benches and terraces. These areas are typically mapped within flood zones of waterways. This community type within the PSA is comprised of dominant vegetation of hardwood tree species that includes red maple, tulip poplar, sweetgum, and water oak. Mid canopy species

comprise a low density layer of younger individuals where gaps within the upper canopy allow for sunlight to penetrate. Shrub components within the community may be comprised of Chinese privet and giant cane (*Arundinaria gigantea*). Herbaceous ground cover is sparse to bare, with a dense duff layer holding moisture within the soil column for extended periods.

### **3.1.5 Tidal Wetlands**

The tidal wetland communities are characterized by being periodically inundated in correlation with ocean tides. Within the PSA these areas were noted within SCDHEC OCRM critical areas. Soils consist of soft organics and alluvial deposits and support a variety of herbaceous vegetation. Species observed include smooth cordgrass (*Spartina alterniflora*), black needlerush (*Juncus roemerianus*), and saltmeadow cordgrass (*Spartina patens*), occurring in tidally flooded areas. Along the banks, eastern baccharis and wax myrtle were observed.

### **3.1.6 Brackish Marsh**

Brackish marshes are representative of an estuarine transition zone where a mixture of fresh and saltwater occurs, resulting in brackish water with lower salinity levels, and thereby allowing the presence of both fresh and saltwater plant species. Other species that may be found in the brackish marsh community include big cordgrass (*Spartina cynosuroides*), narrow-leaf cattail (*Typha angustifolia*), saltmeadow cordgrass, bulrush (*Scirpus spp.*), salt grass (*Distichlis spicata*), annual wildrice (*Zizania aquatica*), and Jamaica sawgrass (*Cladium mariscus*).

### **3.1.7 Freshwater Herbaceous Wetlands**

This habitat type does not support woody vegetation but is characterized by a mix of herbaceous species often growing in standing or perennially moist soils. These areas are not tidally influenced and within the project area were commonly noted along margins of larger water bodies or as stormwater retention areas. Cattail, wool grass (*Scirpus*), sedges (*Carex sp.*), rushes (*Juncus sp.*, *Eleocharis sp.*) were common in these areas. Margins of these open areas are often lined with sapling woody species such as alder (*Alnus serrulata*), birch (*Betula nigra*), and willow (*Salix nigra*).

### **3.1.8 Forested Wetlands**

This is the most common wetland type throughout the site. These features have hydric soils and may or may not have evidence of periodic standing surface water. Canopy species are mixed hardwood with a sapling and shrub stratum. Ground cover may or may not be present. Notable species include: sweet gum, red maple and southern magnolia (*Magnolia grandiflora*) as canopy species with water oak, yaupon (*Ilex vomitoria*) and cabbage palmetto (*Sabal palmetto*) composing a sampling stratum. Shrubs include Chinese privet, fetterbush (*Lyonia lucida*), and giant cane. Herbaceous species include rushes, and a mix of sedges. Vines such as greenbrier and honey suckle were often observed in this habitat type.

### **3.1.9 Cypress-tupelo Wetlands**

This is a mature forested habitat type characterized by an overstory of bald cypress (*Taxodium distichum*) and water tupelo (*Nyssa aquatica*). Other species present include swamp tupelo (*Nyssa biflora*), red maple, swamp cottonwood (*Populus eterophylla*), and Carolina ash (*Fraxinus caroliniana*). Shrub and herbaceous layers are less diverse or absent. This habitat type is open and may have standing water for all or part of the year.

### **3.1.10 Open Freshwater**

Open freshwater communities within the PSA include man-made ponds and naturalized borrow pits. These areas typically consist of open, deepwater within the central portion and vegetated, shallow water along the outer portion. Several man-made freshwater ponds exist throughout the study area and are usually hydrologically connected to other wetlands, streams, and ditches. Plant species common to the shallow, vegetated portions of the ponds and borrow pits include black willow, wax myrtle, duckweed (*Lemna* sp.), and various species of cattail.

## **4.0. WATERS OF THE U.S.**

### **4.1 Waters of the U.S. Regulations**

Waters of the U.S. (WOUS) are defined by 33 CFR 328.3(b) and protected by Section 404 of the CWA (33 U.S.C. 1344), which is administered and enforced in South Carolina by the USACE, Charleston District. The term “waters of the U.S.” is defined in 33 CFR Part 328 as:

1. All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
2. All interstate waters including interstate wetlands;
3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:
  - which are or could be used by interstate or foreign travelers for recreational or other purposes; or
  - from which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
  - which are used or could be used for industrial purpose by industries in interstate commerce;
4. All impoundments of waters otherwise defined as waters of the United States under the definition;

5. Tributaries of waters identified in paragraphs 1 – 4 above;
6. The territorial seas; and
7. Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in 1 – 6 above.

Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the CWA (other than cooling ponds as defined in 40 CFR 123.11(m) which also meet the criteria of this definition) are not WOUS. WOUS do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted cropland by any other federal agency, for the purposes of the CWA, the final authority regarding CWA jurisdiction remains with the EPA.

Wetlands are defined as those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands are defined in the field as areas that display positive evidence of three environmental parameters including dominance of hydrophytic vegetation, wetland hydrology, and hydric soils (USACE, 1987).

The USACE Charleston District regulates WOUS, including wetlands in South Carolina. The USACE's authority to regulate impacts to WOUS comes from Section 404 of the CWA. The USACE utilizes specific hydrologic, soil, and vegetation criteria in establishing the boundary of wetlands within their jurisdiction. In addition to wetlands, the USACE defines WOUS within CWA as Traditional Navigable Waters (TNWs) – including territorial seas and surface waters that flow to TNWs. Impoundments of these waters (ponds, lakes, and reservoirs) are also considered to be WOUS.

SCDHEC also has jurisdiction over WOUS in South Carolina. SCDHEC's regulatory authority derives from Section 401 of the CWA. A Section 401 water quality certification from SCDHEC is required whenever a project needs a federal license or permit for an activity that may result in a discharge to a navigable water or other WOUS. In South Carolina, the SCDHEC Ocean and Coastal Resource Management (OCRM) is the regulatory agency responsible for implementing the Coastal Zone Management Act and the South Carolina Coastal Tidelands and Wetland Act of 1977, which was enacted by the state to protect, preserve, restore and enhance the coastal resources of South Carolina. OCRM's objective is to manage wetland alterations, stormwater and land disturbance activities, and alterations to tidally influenced critical areas. Critical area is defined by the SCDHEC OCRM as any of the following: 1) coastal waters; 2) tidelands; 3) beach/dune systems; and 4) beaches. The PSA contains WOUS that are defined as "critical area". Critical Area plats that have been approved by SCDHEC OCRM are included in Appendix A, Figure 7.



## 4.2 Aquatic Resources

Following review of available background data, site visits were conducted on several occasions between August to December 2016, January to February 2017, and September 2019 to document the potential of WOUS, including wetlands. WOUS were determined using the Routine On-Site Determination Method as outlined by the USACE Wetland Delineation Manual (USACE 1987) and the Atlantic and Gulf Coastal Plain Region Regional Supplement, Version 2.0. Limits of stream boundaries were determined through identification of characteristics as outlined through Regulatory Guidance Letter 05-05. Delineated WOUS were identified and the boundaries demarcated with orange flagging tape with alpha and numeric labels for unique identification. The delineated boundaries of potential jurisdictional waters were spatially recorded utilizing a Trimble GeoXH 7 handheld GPS with Hurricane antennae for sub-meter accuracy. The GeoXH 7 settings used included a PDOP of 4.0, an elevation mask of 15-degrees and a minimum SNR of 33.0. GPS coordinates were validated using Trimble Pathfinder Office and analyzed through ESRI ArcGIS 10.6.1 software. Additional investigations may be necessary if the PSA is altered or expanded.

In addition, field surveys identified and documented habitat communities within the PSA where protected species may occur.

Surveyors from Davis and Floyd were tasked with taking survey points at each flag and developing a Critical Area plat and line file of WOUS.

The USACE was provided a preliminary jurisdictional determination (PJD), which identifies the locations and boundaries of wetlands and other aquatic resources on-site that are presumed to be the subject of regulatory jurisdiction (see Appendix A, Figure 8). The USACE approved the PJD on October 31, 2019 (see Appendix C).

### 4.2.1 Wetlands

A total of 86 areas were identified within the PSA during site reviews which met the criteria for classification as wetlands. Wetlands were classified based upon type of hydrophytic species present, percentage of cover within the recorded data point, and proximity to saline environment. Wetland types identified within the PSA include palustrine emergent wetlands, palustrine forested wetlands, and estuarine wetlands.

#### 4.2.1.1 *Palustrine Emergent Wetlands*

Field surveys identified fifteen areas (15) encompassing 120.05 acres exhibiting ecological characters consistent for designation as palustrine emergent wetland communities (Table 2). Palustrine wetlands are those that are not tidally influenced. Typical vegetation within these wetlands typically consisted of facultative wetland species including sedges, rushes, and other grasses.

**Table 2: Palustrine Emergent Wetlands Identified in the PSA**

PALUSTRINE EMERGENT WETLANDS	
Wetland Identification	Acreage
Wetland FA-2	0.49
Wetland FB-1	0.17
Wetland FH-1A	2.32
Wetland FL-2	0.03
Wetland FQ-1A	0.56
Wetland FQ-1B	0.36
Wetland FS-1	0.05
Wetland FS-2A	0.24
Wetland FT-1	0.12
Wetland FT-2	1.49
Wetland FU-2	0.02
Wetland FV-1	113.72
Wetland WWAB	0.09
Wetland WWAA	0.17
Wetland WAB	0.21
<b>Total</b>	<b>120.05ac</b>

**4.2.1.2 Palustrine Forested Wetlands**

Field surveys identified fifty-nine (59) areas encompassing 111.79 acres exhibiting ecological characters consistent for designation as palustrine forested wetland communities (Table 3). Typical vegetation within these communities included oak trees, maple trees, gum trees, and elm trees.

**Table 3: Palustrine Forested Wetlands Identified in the PSA**

PALUSTRINE FORESTED WETLANDS	
Wetland Identification	Acreage
Wetland FA-1	0.06
Wetland FA-3A	0.04
Wetland FA-3B	0.11
Wetland FB-2	0.93
Wetland FB-3	0.95
Wetland FC-1	3.50
Wetland FD-1	0.12
Wetland FE-1	4.47

PALUSTRINE FORESTED WETLANDS	
Wetland Identification	Acreage
Wetland FF-1	0.75
Wetland FF-2	0.25
Wetland FF-3	0.86
Wetland FG-1	0.50
Wetland FG-2	0.08
Wetland FH-1B	0.23
Wetland FH-2	0.42
Wetland FI-1	0.42
Wetland FI-2	0.18
Wetland FI-3	1.04
Wetland FJ-1	0.67
Wetland FK-1	0.47
Wetland FM-1	0.25
Wetland FN-1	3.40
Wetland FN-2	1.28
Wetland FN-3	0.53
Wetland FN-4	0.68
Wetland FO-1	2.33
Wetland FO-5	24.77
Wetland FO-6	0.99
Wetland FO-7	1.52
Wetland FP-1	12.98
Wetland FP-5	0.31
Wetland FP-8	5.58
Wetland FR-1	0.11
Wetland FR-2	0.05
Wetland FS-2B	1.38
Wetland FV-1A	10.60
Wetland FW-1	0.44
Wetland FW-2	0.61
Wetland FW-6	0.18
Wetland FW-8	0.21
Wetland WWA	0.22
Wetland WWD	0.17
Wetland WAD	0.21
Wetland WWC	0.12

PALUSTRINE FORESTED WETLANDS	
Wetland Identification	Acreage
Wetland WWB	1.13
Wetland WRAR	0.26
Wetland WRV	4.81
Wetland WAE	2.54
Wetland WTA	0.95
Wetland WJV	2.08
Wetland WJY	1.35
Wetland WJU	0.28
Wetland WRS	2.52
Wetland WRU	1.53
Wetland WJX	0.91
Wetland WJT	0.09
Wetland WTZ	0.29
Wetland FU-1	7.93
Wetland FZ-1	0.12
<b>Total</b>	<b>111.79</b>

#### 4.2.1.2 Palustrine Scrub Shrub Wetlands

Field surveys identified one (1) area encompassing 3.02 acres exhibiting ecological characters consistent for designation as a scrub shrub wetland (identified as Wetland WAC). Typical vegetation within this community comprised species such as myrtle trees, maple trees, gum trees, and privets.

#### 4.2.1.2 Estuarine Emergent Wetlands

Field surveys identified nine (9) areas encompassing 90.27 acres exhibiting ecological characters consistent for designation as estuarine emergent wetland communities (Table 4). Typical vegetation within these communities included saltmarsh cordgrass, black needlerush, salt grass, and groundsel bush. These are tidally influenced waters and subject to Section 10 permitting by USACE.

**Table 4: Estuarine Emergent Wetlands Identified within the PSA**

ESTUARINE INTERTIDAL EMERGENT WETLANDS	
Wetland Identification	Acreage
Wetland CW-1B	0.35
Wetland CW-1C	5.88
Wetland CW-1E	0.64
Wetland CW-2H	16.43
Wetland CW-1L	3.76

ESTUARINE INTERTIDAL EMERGENT WETLANDS	
Wetland Identification	Acreage
Wetland CW-1J	2.30
Wetland CW-2C	3.00
Wetland CW-1G	1.86
Wetland CW-2G	5.71
Wetland CW-1H	11.88
Wetland CART	38.45
<b>Total</b>	<b>90.27</b>

## 4.2.2 Streams

### 4.2.2.1 *Freshwater streams*

Freshwater streams (identified in the JD as non-wetlands waters) were identified within the PSA were evaluated in the field (Table 5). Ecological and morphological characteristics pertaining to stream type, function, size, and extents were recorded. Field surveys identified twenty-six (26) streams, totaling 37,899.68 combined linear feet. This includes 24 unnamed streams and two named streams (Turkey Creek and Filbin Creek west of Virginia Avenue). Typical vegetation adjacent to these freshwater streams included ash trees, oak trees, pine trees, and privet.

**Table 5: Freshwater Streams Identified within the PSA**

FRESHWATER STREAMS	
Wetland Identification	Linear Footage
Non-wetlands waters FS-H1A (Filbin Creek)	8831.15
Non-wetlands waters FS-H1B	9204.92
Non-wetlands waters FS-B1	198.35
Non-wetlands waters FS-C1	1011.36
Non-wetlands waters FS-D1	95.16
Non-wetlands waters FS-F1	1575.16
Non-wetlands waters FS-G1	207.35
Non-wetlands waters FS-G2	485.54
Non-wetlands waters FS-H2	4568.80
Non-wetlands waters FS-H3	3028.81
Non-wetlands waters FS-H4	1236.77
Non-wetlands waters FS-H5	1278.41
Non-wetlands waters FS-H7	1081.98
Non-wetlands waters FS-H8	115.31
Non-wetlands waters FS-H9	264.60
Non-wetlands waters FS-H10	560.97
Non-wetlands waters FS-H11	590.61
Non-wetlands waters FS-H12	500.05
Non-wetlands waters FS-J1 (Turkey Creek)	144.98
Non-wetlands waters FS-K2	68.72
Non-wetlands waters FS-L1	625.65

FRESHWATER STREAMS	
Wetland Identification	Linear Footage
Non-wetlands waters FS-L2	764.18
Non-wetlands waters FS-L3	851.18
Non-wetlands waters FS-L4	174.53
Non-wetlands waters WWB	304.75
Non-wetlands waters WRAR	130.39
<b>Total</b>	<b>37,899.68</b>

#### 4.2.2.2 *Tidally Influenced Streams*

Tidally influenced streams (identified in the JD as non-wetlands waters) were identified within the PSA and were evaluated in the field (Table 6). Ecological and morphological characteristics pertaining to stream type, function, size, and extents were recorded. Field surveys identified eight (8) tidal streams, totaling 9,559.21 combined linear feet. This includes 6 unnamed streams and two named streams (Bulls Creek and Filbin Creek east of Virginia Avenue). Typical vegetation adjacent to the tidal streams included saltmarsh cordgrass, black needlerush, and salt grass.

**Table 6. Tidally Influenced Streams Identified within the PSA**

TIDALLY INFLUENCED STREAMS	
Wetland Identification	Acreage
Non-wetlands waters TCS-A1	632.43
Non-wetlands waters TCS-A2 (Bulls Creek)	237.85
Non-wetlands waters TCS-B1	1405.30
Non-wetlands waters TCS-C1	1368.48
Non-wetlands waters TCS-D1	966.12
Non-wetlands waters TCS-E1	604.40
Non-wetlands waters TCS-F1	769.21
Non-wetland waters FS-H1C (Filbin Creek)	3575.42
<b>Total</b>	<b>9,559.21</b>

#### 4.2.3 Open Water Ponds

Field surveys identified ten (10) areas, totaling 6.89 acres, exhibiting ecological characters consistent for designation as lacustrine communities, or jurisdictional open water ponds (Table 7). Typical vegetation within these communities included duckweed and cattails. Adjacent vegetation typically included willow trees, oak trees, and privet.

**Table 7: Open Waters (Ponds) Identified within the PSA**

<b>OPEN WATERS (PONDS) IDENTIFIED WITHIN THE PSA</b>	
<b>Wetland Identification</b>	<b>Acreage</b>
Non-wetlands waters OA-1	1.18
Non-wetlands waters OC-1	0.85
Non-wetlands waters OG-1	0.07
Non-wetlands waters OH-1	0.33
Non-wetlands waters OB-1	0.40
Non-wetlands waters OE-1	0.25
Non-wetlands waters OF-1	0.03
Non-wetlands waters OJ-1	0.21
Non-wetlands waters OD-1	3.38
Non-wetlands waters OZ-1	0.19
<b>Total</b>	<b>6.89</b>

### **4.3 Permitting**

The USACE Charleston District regulates impacts to WOUS, including wetlands in South Carolina. Prior to commencement of construction, submittal and review of a CWA Section 404 permit to the USACE would be required for activities that may impact WOUS such as the placement of fill material, rip rap, pipes, culverts, etc. The extents of impacts of the proposed project would determine the level and type of permitting necessary for compliance. Section 404 permitting requirements range from activities considered exempt or preauthorized; to those requiring pre-construction notification under authorization of a Nationwide Permit; General Permit; or, Individual Permit (IP) from the USACE.

A Coastal Zone Management Act (CZMA) Consistency Determination from the SCDHEC would be required because this project is located in the coastal zone. Additionally, the PSA is located in the 'Critical Area', as defined by the SCDHEC-OCRM. Therefore, an application to OCRM for a 'Critical Area' permit would also be required for impacts to these areas. Because the proposed project is in a 'Critical Area', the 'Critical Area' permit would also incorporate the Section 401 Water Quality Certification (WQC) and the CZMA Consistency Determination. SCDHEC must grant, deny, or waive a WQC, in accordance with Section 401 of the CWA. Waters considered by SCDHEC to be sensitive may also require additional consideration during the 401 WQC process. These include, but are not limited to, Outstanding Resource Waters, Shellfish Harvesting Waters, trout waters, areas draining to waters included on the 303(d) list of impaired waters, and areas draining to waters with an approved TMDL. As discussed previously, the PSA drains to waters listed as a water with an EPA approved TMDL. Additionally, there are prohibited and restricted shellfish harvesting waters in or very near the PSA. Depending on the type of impairments, extent of the project, and other factors, SCDHEC may require

additional water quality protection and storm water treatment measures during and after construction.

Based upon preliminary review of the proposed alternatives and the anticipated impacts to wetlands and/or streams, an IP is anticipated. Specific permitting requirements and strategies for the project would be finalized once impacts to WOUS are quantified, following establishment of design and construction limits.

The permit application must include a delineation of affected WOUS, description of impact avoidance and minimization strategies, and measures to meet the requirements of compensatory mitigation.

#### **4.4 Compensatory Mitigation**

Compensatory mitigation is the third step in a sequence of actions that must be followed to offset impacts to aquatic resources. The 1990 Memorandum of Agreement (MOA) between the Environmental Protection Agency (EPA) and the Department of Army establishes a three-part process, known as the mitigation sequence to help guide mitigation decisions and determine the type and level of mitigation required under Clean Water Act Section 404 regulations.

Step 1. Avoid - Adverse impacts to aquatic resources are to be avoided and no discharge shall be permitted if there is a practicable alternative with less adverse impact.

Step 2. Minimize - If impacts cannot be avoided, appropriate and practicable steps to minimize adverse impacts must be taken.

Step 3. Compensate - Appropriate and practicable compensatory mitigation is required for unavoidable adverse impacts which remain. The amount and quality of compensatory mitigation may not substitute for avoiding and minimizing impacts.

Compensatory mitigation is normally required to offset unavoidable losses of WOUS. The Council on Environmental Quality has defined mitigation in 40 CFR Part 1508.20 to include: avoiding impacts, minimizing impacts, rectifying impacts, reducing impacts over time, and compensating for impacts. Compensatory mitigation usually consists of the restoration of existing degraded wetlands or waters, or the creation of wetlands/waters of equal or greater value than those to be impacted. This type of mitigation is only undertaken after avoidance and minimization actions are exhausted. Specific mitigation requirements would be established during the Section 404 permitting process.

Utilizing the online resource Regulatory In-Lieu Fee and Bank Information Tracking System (RIBITS) and the "I-526 West Lowcountry Corridor Permittee Responsible Mitigation Analysis" (February 25, 2020) there are several USACE mitigation banks with service areas that cover, or partially cover, the PSA (Table 8).



**Table 8: Mitigation Banks that Could Potentially Offset WOUS Impacts\***

MITIGATION BANK	SERVICE AREA	FRESHWATER WETLANDS	CREDIT TYPE	
			FRESHWATER STREAMS	CRITICAL AREA
Caton Creek	Primary	Yes	Yes	N/A
Clydesdale Club	Tertiary	N/A	N/A	Yes
Murray Hill (associated with Clydesdale Club)	Tertiary	N/A	N/A	Unknown
Palmetto Umbrella – Big Run	Primary	Yes	Yes	N/A
SCDOT Huspa Creek - East	Primary	N/A	N/A	Yes
Brosnan Forest Coldwater Branch	Tertiary - Pending	Unknown	Unknown	N/A
Caw Caw Swamp	Secondary - Pending	Unknown	Unknown	Unknown
Daniel Island Mitigation Bank	Primary – Pending	N/A	N/A	Unknown
French Quarter Creek	Tertiary – Pending	Unknown	Unknown	N/A
Halidon Hill	Primary – Pending	Unknown	Unknown	Unknown
Robert F Haggerty – Jehossee Farm	Primary - Pending	Unknown	Unknown	Unknown

**\*Note:** Credit availability and bank status frequently changes and updates to RIBITS may be delayed. Additional coordination would be required to determine if use of these banks would be feasible to offset impacts from the proposed project.

These operating and pending banks may not have enough credits to satisfy the estimated impacts of the project. It is unknown at this time if a mitigation bank or banks would be able to provide enough credits to offset the estimated impacts, or if the credits would be available at the time of the permitting and construction schedule. If mitigation bank credits cannot be purchased, compensatory mitigation for unavoidable impacts to aquatic resources could be met by establishing a permittee responsible mitigation (PRM) plan. Under a PRM plan, restoration, establishment, enhancement or preservation of wetlands and streams would be undertaken by the permittee. This requires protection and restoration of a wetland and/or stream system, to be reviewed and approved by the USACE.

## 5.0 FLOODPLAINS

Floodplains are low-lying areas located near the channel of a river, stream, or other type of waterbody. These areas are subject to periodic flooding during heavy rains and/or long periods of wet weather. These areas provide important functions in the natural environment such as providing storage for flood waters, protecting the surrounding environment from erosion, and providing habitat for wildlife. As such, agencies are required to take actions that reduce the risk of impacts to

floodplains and their associated floodway, or main channel of flow. Floodplain areas exist within the PSA, and this section describes the floodplains and potential impacts to those areas.

Floodplain and floodway protections are required under several federal, state, and local laws, including Executive Order 11988 entitled "Floodplain Management," which requires federal agencies to avoid making modifications to and supporting development in floodplains wherever practical. Floodplains subject to inundation by the 1% annual chance flood event are regulated by the Federal Emergency Management Agency (FEMA). FEMA publishes maps which depict areas of regulated floodplains and floodways. The Flood Insurance Rate Map (FIRM) is the most common of these flood maps. The FIRM is an official map of a community on which FEMA has delineated both the special hazard areas and the risk premium zones applicable to the community. FIRMs depict the boundaries of flood hazard areas and differentiates them by zone.

Several flood zones that are designated by FEMA as Special Flood Hazard Area (SFHA) are present within the PSA. The SFHA is the area where the National Flood Insurance Program's (NFIP) floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies. The SFHA zones within the PSA include AE and VE.

In addition to national guidelines for development in a floodplain, local municipalities have specialized requirements for impacts to floodplains:

- The City of Charleston requires Elevation and Engineering Certificates be obtained for new buildings within the SFHA.
- The City of North Charleston requires an Elevation Certificate and compliance with city ordinances.
- Charleston County has developed the Charleston County Flood Damage and Flood Prevention Ordinance that mandates that certain procedures be followed for construction-related work within properties designated as flood zones on FIRMs.

Based upon a review of the floodplain mapping and a GIS analysis of the PSA, the proposed project crosses several areas designated by FEMA as floodplains (see Appendix A, Figure 9).

Zone AE floodplains are areas subject to inundation by the 1-percent-annual-chance flood event and are determined by detailed methods. Base flood elevations (BFEs) are available for Zone AE floodplains and are provided on FIRMs.

Zone VE floodplains are areas subject to inundation by the 1-percent-annual-chance flood event with additional hazards due to storm-induced velocity wave action. VE Zones are also known as the coastal high hazard areas. BFEs derived from detailed hydraulic analyses are shown in the FEMA

mapping of zone VE areas.

Zone X500 is a moderate flood hazard area and is an area between the limits of the base flood and the 0.2-percent-annual-chance (or 500-year) flood. Zone X500 includes areas of 100-year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile.

As shown in the following figures, the majority of the PSA is within a FEMA-regulated flood zone. The majority of these areas are within zone AE. The Ashley River and a portion of the tidal marshes surrounding the Ashley River are in zone VE.

In accordance with Executive Order 11988, a hydraulic analysis must be conducted for an encroachment of a FEMA-regulated floodplain. The hydraulic analysis is used to determine if the project is likely to increase the risk of flooding within the floodplain. In order to meet the requirements of a “No-Rise” condition, FEMA requires projects which would encroach on Regulated Floodways and Zone AE floodplains to result in a change no greater than 0.1 feet from the established 100-year flood elevations. A preliminary hydraulic analysis will be performed for each encroachment of a FEMA-regulated floodplain and a detailed hydraulic analysis will be performed during final design.

Hydrology studies have not yet been conducted at this stage of project development; however, the project would be designed in an effort to meet “No-Rise” requirements. In the event a “No-Rise” condition cannot be achieved, coordination with FEMA will require the preparation of a CLOMR (Conditional Letter of Map Revision)/ LOMR (Letter of Map Revision) package for the encroachment. This includes a detailed hydraulic analysis, determination of floodplain impacts, and preparation of the CLOMR. Following construction, impacts to the floodplain would be verified prior to the issuance of the LOMR. A LOMR is FEMA's modification to an effective FIRM, or Flood Boundary and Floodway Map (FBFM), or to the Flood Insurance Study.. LOMRs are generally based on the implementation of physical measures that affect the hydrologic or hydraulic characteristics of a flooding source and thus result in the modification of the existing regulatory floodway, the effective BFEs, or the Special Flood Hazard Area (SFHA).

## **6.0 THREATENED, ENDANGERED, AND PROTECTED SPECIES**

The Federal Endangered Species Act (ESA) of 1973 (50 CFR Part 402), as amended, is the federal regulatory tool that serves to administer permits, implement recovery plans, and monitor federally protected (endangered and threatened) species. The ESA is administered and regulated by the USFWS and/or National Oceanic and Atmospheric Administration-National Marine Fisheries Service (NOAA-NMFS). A Biological Assessment (BA) to address the effect of ESA listed species is being produced as part of the Section 7 consultation with these federal agencies. One BA is being prepared for species under the jurisdiction of NOAA-NMFS and a second BA is being prepared for species under

jurisdiction of USFWS. Upon completion, these BA documents will be appended to this report.

Species with the federal classification of endangered or threatened are protected under the ESA. The term “endangered species” is defined as “any species which is in danger of extinction throughout all or a significant portion of its range”, and the term “threatened species” is defined as “any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range” (16 U.S.C. 1532).

When a species is proposed for listing as endangered or threatened under the ESA, USFWS must consider whether there are areas of habitat believed to be essential to the species' conservation. Those areas may be proposed for designation as critical habitat.

“At-Risk Species” (ARS) is an informal term that refers to those species which may be in need of concentrated conservation actions, and have been petitioned for listing as threatened or endangered. The USFWS designations of ARS does not provide federal protection and requires no Section 7 consultation under the ESA. At-Risk Species do not currently receive legal protection from the ESA; therefore, these species have not been included in this analysis. In the event additional species are listed as federally threatened or endangered prior to the construction of the project, SCDOT would consult with USFWS on the results of the surveys performed, if necessary, and would follow any USFWS regulations/requirements resulting from that consultation.

Because of the federal nexus of the proposed project, consultation with the USFWS is required under Section 7 of the ESA, for proposed projects that “may affect” federally endangered and threatened species. This assessment analyzes potential impacts to federally endangered and threatened species associated with the proposed project, and is intended to initiate informal consultation, as needed. In response to the Letter of Intent sent by SCDOT, USFWS provided a list of species in Charleston County that are currently protected by the ESA (see Appendix D). Additionally, the updated list of protected species Charleston County, as published by USFWS, was most recently accessed in January 2020 (Appendix D). Representative site photographs of the PSA that were taken during field surveys are included in Appendix F.

## **6.1 Migratory Bird Treaty Act**

The federal Migratory Bird Treaty Act (MBTA) makes it illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued pursuant to federal regulations (16 USC § 703–712). Executive Order 13186 “Responsibilities of Federal Agencies to Protect Migratory Birds” also directs and guides Federal agencies in implementing the MBTA. The migratory bird species protected by the MBTA are listed in 50 CFR § 10.13. The USFWS has statutory authority and responsibility for enforcing the MBTA. Any activity which results in the “take” of

migratory birds or eagles is prohibited unless authorized by USFWS.

## **6.2 Bald and Golden Eagle Protection Act**

The bald eagle is listed under the Bald and Golden Eagle Protection Act but was removed from the federal list of Threatened and Endangered Species, effective August 8, 2007. The bald eagle is no longer protected under the ESA, but the species is afforded federal protection through the Bald and Golden Eagle Protection Act (BGEPA) of 1940, as well as the MBTA. The BGEPA, 16 U.S.C. 668-668c, prohibits the take of bald eagles including their parts, nests, or eggs by anyone, without a permit issued by the Secretary of the Interior.

## **6.3 State Protected Species**

Animal species that are on the South Carolina state protected species list receive protection under the South Carolina Nongame and Endangered Species Conservation Act (South Carolina Code, Title 50). State endangered species are defined as any species or subspecies of wildlife whose prospects of survival or recruitment within the state are in jeopardy or are likely within the foreseeable future to become so. It is unlawful for any person to take, possess, transport, export, process, sell or offer for sale or ship, and for any common or contract carrier knowingly to transport or receive for shipment any species or subspecies of wildlife appearing on the state list of protected species without appropriate authorization.

## **6.4 Protected Species Documented within Charleston County**

A review of the USFWS species list provided existing information concerning the potential occurrence of threatened or endangered species within Charleston County. A copy of the list provided by the USFWS in 2016 (published October 20, 2015) is included in Appendix D. Since that time, an updated species list has been posted by the USFWS for Charleston County (published September 9, 2019; see Appendix D). This updated list was reviewed and four additional species are included, when compared to the older list. This includes the Eastern black rail, northern long-eared bat, sei whale, and sperm whale. This USFWS online listing identifies twenty-four (24) federally threatened or endangered species known to occur or to have formerly occurred in Charleston County, as listed in Table 9.

The SCDNR Rare, Threatened, and Endangered Species Inventory database was also reviewed for information regarding species with state endangered or threatened status. Nine (9) additional species are currently listed as state threatened or endangered in Charleston.

Per review of the USFWS Information, Planning, and Conservation (IPaC) online database, there is no critical habitat for threatened or endangered species within the PSA.

**Table 9: Federal and State Protected Species in Charleston County.<sup>1</sup>**

Common Name	Scientific name	Federal Status	State Status
<b><u>Amphibian</u></b>			
Dwarf siren	<i>Pseudobranchius striatus</i>	--	Threatened
Flatwoods salamander	<i>Ambystoma cingulatum</i>	Threatened	Endangered
Gopher frog	<i>Lithobates capito</i>	--	Endangered
<b><u>Bird</u></b>			
American swallow-tailed kite	<i>Elanoides forficatus</i>	--	Endangered
American wood stork	<i>Mycteria americana</i>	Threatened	Endangered
Bachman's warbler	<i>Vermivora bachmanii</i>	Endangered	Endangered
Bald eagle	<i>Haliaeetus leucocephalus</i>	*BGEPA	Threatened
Eastern black rail	<i>Laterallus jamaicensis</i>	**Proposed Threatened	--
Least tern	<i>Sterna antillarum</i>	--	Threatened
Piping plover	<i>Charadrius melodus</i>	Threatened	Endangered
Red-cockaded woodpecker	<i>Picoides borealis</i>	Endangered	Endangered
Red knot	<i>Calidris canutus rufa</i>	Threatened	--
Wilson's plover	<i>Charadrius wilsonia</i>	--	Threatened
<b><u>Crustacean</u></b>			
	None found		
<b><u>Fish</u></b>			
Atlantic sturgeon	<i>Acispenser oxyrinchus</i>	Endangered	--
Shortnose sturgeon	<i>Acipenser brevirostrum</i>	Endangered	Endangered
<b><u>Insect</u></b>			
	None found		
<b><u>Mammal</u></b>			
Finback whale	<i>Balaenoptera physalus</i>	Endangered	Endangered
Humpback whale	<i>Megaptera novaengliae</i>	Endangered	Endangered
Northern long-eared bat	<i>Myotis septentrionalis</i>	Threatened	--
Rafinesque's big-eared bat	<i>Corynorhinus rafinesquii</i>	--	Endangered
Right whale	<i>Balaena glacialis</i>	Endangered	--
Sei whale	<i>Balaenoptera borealis</i>	Endangered	--

<sup>1</sup> Source: USFWS <https://www.fws.gov/southeast/pdf/fact-sheet/south-carolina-species-list-by-county.pdf>; updated September 9, 2019 and SCDNR Rare, Threatened, and Endangered Species Inventory <http://www.dnr.sc.gov/species/charleston.html>; accessed January 30, 2020.

Common Name	Scientific name	Federal Status	State Status
Sperm whale	<i>Physeter macrocephalus</i>	Endangered	--
West Indian manatee	<i>Trichechus manatus</i>	Threatened	Endangered
<b><u>Mollusk</u></b>			
Atlantic pigtoe	<i>Fusconaia masoni</i>	--	Endangered
<b><u>Plant</u></b>			
American chaff seed	<i>Schwalbea americana</i>	Endangered	--
Canby's dropwort	<i>Oxypolis canbyi</i>	Endangered	--
Pondberry	<i>Lindera melissifolia</i>	Endangered	--
Seabeach amaranth	<i>Amaranthus pumilus</i>	Threatened	--
<b><u>Reptile</u></b>			
Green sea turtle	<i>Chelonia mydas</i>	Threatened	Threatened
Kemp's ridley sea turtle	<i>Lepidochelys kempii</i>	Endangered	Endangered
Leatherback sea turtle	<i>Dermochelys coriacea</i>	Endangered	--
Loggerhead sea turtle	<i>Carretta carretta</i>	Threatened	Threatened
Southern hognose snake	<i>Heterodon simus</i>	--	Threatened
Spotted turtle	<i>Clemmys guttata</i>	--	Threatened

\*Bald and Golden Eagle Protection Act, \*\* Proposed for listing in the Federal Register

ARS species are included in Table 10 for informational purposes. These species do not receive legal protection from the ESA; therefore, specific surveys for the species were not conducted. During field surveys, none of the ARS species shown in Table 10 were identified within the PSA.

**Table 10: Federal At-Risk Species (ARS) Found in Charleston County<sup>2</sup>.**

Common Name	Scientific name	Federal Status
<b><u>Amphibian</u></b>		
Gopher frog	<i>Lithobates capito</i>	ARS
<b><u>Bird</u></b>		
Black-capped petrel	<i>Pterodroma hasitata</i>	ARS
Saltmarsh sparrow	<i>Ammodramus caudacuta</i>	ARS
<b><u>Crustacean</u></b>	None found	

<sup>2</sup> Source: USFWS <https://www.fws.gov/southeast/pdf/fact-sheet/south-carolina-species-list-by-county.pdf>; updated September 9, 2019 and SCDNR Rare, Threatened, and Endangered Species Inventory

<b><u>Fish</u></b>	None found	
<b><u>Insect</u></b>	None found	
Frosted elfin	<i>Callophrys irus</i>	ARS
Monarch butterfly	<i>Danaus plexippus</i>	ARS
<b><u>Mammal</u></b>		
Tri-colored bat	<i>Perimyotis subflavus</i>	ARS
<b><u>Mollusk</u></b>		
<b><u>Plant</u></b>		
Boykin's lobelia	<i>Lobelia boykinii</i>	ARS
Ciliate-leaf tickseed	<i>Coreopsis integrifolia</i>	ARS
<b><u>Reptile</u></b>		
Eastern diamondback rattlesnake	<i>Crotalus adamanteus</i>	ARS
Southern hognose snake	<i>Heterodon simus</i>	ARS
Spotted turtle	<i>Clemmys guttata</i>	ARS

The state and federal lists of protected species for Charleston County were reviewed, and literature and field reviews were performed to determine the presence of potential habitat for the protected species within the PSA. Specifically, field reviews of the PSA were conducted between July to December 2016, January to February 2017, and April 2019. Areas that matched the descriptions of preferred habitat for protected species were classified as protected species habitat and surveyed accordingly for the presence of individuals. Descriptions of the federal and/or state-listed endangered and threatened species, determinations of potential suitable habitat, and survey methodology are included below.

### **Amphibian**

#### **Dwarf siren (*Pseudobranchius striatus*) – State Threatened**

This siren is the smallest of its family and is a slender, eel and salamander-like amphibian that lives in dense, submerged vegetation along the bottom of freshwater ponds, swamps and ditches. During periods of drought, the dwarf siren is able to burrow into mud and survive for up to two months. Potential habitat for state threatened dwarf siren exists along the bottom of freshwater ponds, swamps and ditches within the PSA. No dwarf sirens were noted during site visits or field surveys.



### **Flatwoods salamander (*Ambystoma cingulatum*) – Federal Threatened; State Endangered**

The flatwoods salamander is a small salamander containing variable coloration, ranging from dark brown to black bodies with grayish specks or lines that resemble a frosted or lichen-like reticulated pattern. Habitat consists of wet pine flatwoods and pine savannas in the southern U.S. Traditionally, habitat consisted of sandy, seasonally wet longleaf pine communities but many of these areas have been replaced with slash pine or destroyed altogether. Adult flatwood salamanders are subterranean, living mainly underground in root channels or crayfish burrows. These salamanders are typically found under logs near small cypress ponds. There is no suitable habitat for this species within the PSA.

### **Gopher frog (*Lithobates capito*) - State Endangered**

The gopher frog is a stout-bodied, highly secretive upland frog, often found in association with gopher tortoises, using the tortoise burrows for shelter. The frog can also be found in moist meadows, prairie woodlands, and pine scrub habitats. The frog is brown or black in color with irregular dark spots on the back and sides, and its skin is smooth. There is no suitable habitat for this species within the PSA.

### **Bird**

#### **American swallow-tailed kite (*Elanoides forficatus*) – State Endangered**

Adult American swallow-tailed kite have a long, deeply forked tail and distinctive black and white plumage. The head and underparts are white, except for the black back, tail, and primary flight feathers. Habitat includes wooded swamps, marshes, river bottoms, and glades in open forest. Nesting sites include the very tops of tall, slender trees, up to 200 feet high. The American swallow-tailed kite can be found in South Carolina during its breeding season, from March to June. Suitable habitat for the state endangered American swallow-tailed kite exists within the Ashley River and surrounding marsh and forested wetlands located within the PSA. No active nests or instances of the bird were found during surveys.

#### **American wood stork (*Mycteria americana*) – Federal Threatened; State Endangered**

American wood storks are the largest wading bird and only stork species that breeds in the United States. These birds are large, long legged with a head to tail length of up to 45 inches and a wingspan of up to 65 inches. Adult wood storks are white except for the primary and



*American wood stork foraging in the I-526 PSA.*

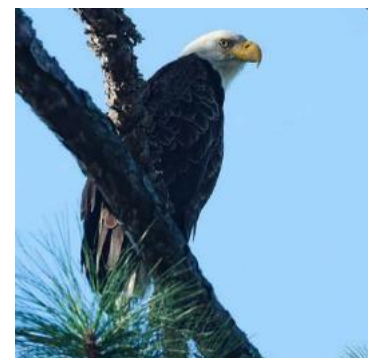
secondary wing feathers and the tail feathers, which are black with a greenish sheen. Adults also have an unfeathered head and neck with a long, thick black bill. The breeding range of the wood stork extends down the southeastern coast of the United States, including South Carolina. American wood storks are colonial nesters with colonies ranging from less than 12 to more than 500 in size. Nesting occurs in small to large trees typically on small islands surrounded by standing water, or in extensive forested and flooded wetlands. The species generally forages in water six to 10 inches deep. They feed in freshwater marshes, narrow tidal creeks, or flooded tidal pools. Suitable habitat and foraging habitat for the American wood stork exists near open waters located within the PSA including wetlands, ponds, the Ashley River, Filbin Creek, and other smaller streams. During surveys, American wood storks were documented foraging in freshwater wetlands near Faber Place Drive and I-526. No active nesting rookeries were found during surveys. The closest known nesting population is over 3 miles north of the PSA.

**Bachman's warbler (*Vermivora bachmanii*) – Federal Endangered; State Endangered**

This species of warbler is presumed to be extinct, historically occurring in the southeastern U.S. during its breeding season. Historically, the bird inhabited seasonally flooded swamp forests, especially with cane thickets and containing variable amounts of water, but usually with some permanent water. The Bachman's warbler is a small bird with olive-green upperparts, yellow forehead, throat, and underparts, and a faint white eye-ring and black crown and bib. The bird was last observed in the U.S. in 1962 near Charleston, South Carolina. Suitable habitat for Bachman's warbler exists within the PSA. Small areas of cane thickets and seasonally flooded swamp forests with variable amounts of water were observed. Evidence of Bachman's warbler was not noted within the PSA.

**Bald eagle (*Haliaeetus leucocephalus*) – Bald and Golden Eagle Protection Act (Federal)**

Adult bald eagles have a blackish-brown back and breast with a white head, neck, and tail and a yellow bill. This bird nests in mature live pines or cypress trees in the transition zone between mature forests and large bodies of water. Nests are very large, up to six feet in width, and are usually less than two miles from open water. Winter roosts are usually in mature trees, similar to nesting trees, but may be somewhat farther from water. Suitable habitat for the bald eagle exists within close proximity to the Ashley and Cooper Rivers and adjacent mature forested woodlands located within the PSA. There is a known active bald eagle nest (N366-Y2019) located approximately 1,400 feet from the western boundary of the PSA near Paul Cantrell Boulevard.



Bald eagle. Photo credit: Glen Cox, 2019

### **Eastern black rail (*Laterallus jamaicensis*) – Federal Threatened (Proposed)**

The Eastern black rail is a small rail species that is usually grey or black-grey in color. It breeds in a wide diversity of habitats such as fresh and saline marshes, wet meadows, and savannas. Eastern black rail habitat can be tidally or non-tidally influenced, and range in salinity from salt to brackish to fresh. Its natural history is the best known in its genus due to work in temperate North America where it primarily feeds on small aquatic and terrestrial invertebrates. Minimally suitable habitat for Eastern black rail exists in the marshes associated with the Ashley River. No



*Eastern Black Rail. Photo credit: Danika Tsao, US Geological Society, 2010*

black rails were identified during field surveys and there are no known populations within the PSA.

### **Least tern (*Sterna antillarum*) – State Threatened**

The least tern is a migratory bird, wintering in Central America, the Caribbean, and northern South America and breeding in North America, including the South Carolina coast beginning in late April. This bird is a small tern, up to nine inches in length with a pale grey upper body and white belly. The preferred habitat for the least tern is sandy, pebbly beaches along marine and estuarine shores and large rivers containing sand bar islands. In South Carolina, least tern has been documented using building rooftops as nesting sites. The least tern is most likely to occur in large open areas, free of vegetation and human disturbance, with sand as the dominant substrate. Other than open rooftops, there is no suitable habitat for this species within the PSA.

### **Piping plover (*Charadrius melodus*) – Federal Threatened; State Endangered**

The piping plover is a small and stocky sparrow sized bird that is pale or sandy white with a black breast band and yellow bill and legs. Breeding birds have a prominent black collar and black band that runs across the forehead. The piping plover inhabits sandy beaches, mudflats and sandbars along rivers and lakes. In South Carolina, the piping plover occurs from August to April and generally overwinters in the southern United States from North Carolina to the Gulf of Mexico. Suitable foraging habitat for piping plover may exist on mudflats and sandbars associated with the Ashley or Cooper Rivers. No piping plovers were identified during field surveys and there are no known populations within the PSA.



*Piping Plover. Photo credit: Wikimedia User Mdf, 2008*

**Red-cockaded woodpecker (*Picooides borealis*) – Federal Endangered; State Endangered**

Adult red-cockaded woodpeckers are a small woodpecker with a black cap, throat, and stripe on the side of the neck and white cheeks and underparts. Adult males have a small red spot on each side of the black cap. The bird is native to southern pine forest and typically nests within open pine stands containing trees 80 years or older. Habitat preference typically consists of longleaf pine stands with open grassland understory. Roosting cavities are excavated within live pines, which are often infected with a fungus. Foraging may occur in pine and/or mixed pine/hardwood stands 30 years or older with trees 10 inches or larger in diameter at breast height. Pine forests within the PSA are young and there is no suitable habitat for this species.

**Red knot (*Calidris canutus rufa*) – Federal Threatened**

The red knot is a fairly large sandpiper with a medium sized bill and rufous colored plumage in the breeding season. Red knots breed in the tundra of the high Arctic and a portion of the species spends the winter on the southeastern coast of the U.S. including South Carolina, Georgia, and Florida. South Carolina provides habitat for both migrating and wintering birds. Red knot flocks roost on inlets of barrier beaches and islands in South Carolina. There is no suitable habitat for this species within the PSA.

**Wilson's plover (*Charadrius wilsonia*) – State Threatened**

Wilson's plover is a small, banded plover with dull legs and a distinctive long, heavy, black bill. Habitat is strictly coastal including open sand or shell beaches and tidal mud flats where it forages for fiddler crabs and other crustaceans. Nesting habitat includes areas near the beach containing sand or bare soil and salt or brackish water nearby. Suitable foraging habitat for the state endangered Wilson's plover may exist on tidal mudflats associated with the Ashley or Cooper Rivers. No Wilson's plovers were identified during field surveys and there are no known populations within the PSA.

**Crustacean**

None present

**Fish**

**Atlantic sturgeon (*Acispenser oxyrinchus oxyrinchus*) – Federal Endangered**

The Atlantic sturgeon is an anadromous fish species, similar in habitat requirements and appearance to the shortnose sturgeon. The Atlantic sturgeon can be distinguished by their large size, snout shape, and bony plates called scutes. They can grow up to 14 feet in length and weigh up to 800 pounds. The Atlantic



*Atlantic Sturgeon. Photo credit: Wikimedia User Cephas, 2012*

sturgeon is bluish-black or olive brown dorsally with paler sides and a white belly. The sides of its body also contain five rows of scutes. Adults are commonly found in brackish and estuarine waters along the coastline. The adult Atlantic sturgeon will migrate upstream to fresh water to spawn in the spring, and can go as far inland as the fall line in South Carolina to spawn, as long the stream is unobstructed. In South Carolina, Atlantic sturgeon have been captured in the Great Pee Dee, Waccamaw, Santee, Cooper, Edisto, Combahee, and Savannah Rivers. Suitable spawning habitat for this species is not present within the PSA however, suitable foraging habitat for the Atlantic sturgeon exists within the Ashley River within the PSA. The Atlantic sturgeon may use Filbin Creek up to Virginia Avenue for foraging by way of the Cooper River but would not likely not use it for spawning.

**Shortnose sturgeon (*Acipenser brevirostrum*) – Federal Endangered; State Endangered**

The shortnose sturgeon is an anadromous fish species which spends most of the year in brackish or salt water and moves into fresh water only to spawn. Spawning season for the shortnose sturgeon occurs from late winter to early spring. The shortnose sturgeon is dark-colored on its dorsal side and light on the ventral side. This species of sturgeon has a wide mouth pointed downward beneath a short snout and can grow up to three feet long. The shortnose sturgeon inhabits the lower portions of large rivers and coastal rivers along the Atlantic Coast. In South Carolina shortnose sturgeon have been found in the Great Pee Dee, Waccamaw, Edisto, Cooper, Santee, and Savannah Rivers. They may also be found in the Black, Sampit, and Ashley Rivers. Suitable spawning habitat for this species is not present within the PSA however, suitable foraging habitat for the shortnose sturgeon exists within the Ashley River within the PSA. The shortnose sturgeon may use Filbin Creek up to Virginia Avenue for foraging by way of the Cooper River but would not likely not use it for spawning.



*Shortnose Sturgeon. Photo credit: NOAA-NMFS, Nancey Haley, 2006*

**Insect**

None present

**Mammal**

**West Indian manatee (*Trichechus manatus*) – Federal Threatened; State Endangered**

The West Indian manatee is a large gray to brown aquatic mammal, averaging about ten feet in length and 1,000 pounds in weight. This mammal has no hind limbs, and the forelimbs are modified flippers. West Indian manatees have flattened horizontal and rounded tails used for locomotion. Manatees inhabit



*West Indian Manatee. Photo credit: NASA, 2004.*

both fresh and salt water, including canals, rivers, estuarine habitats and saltwater bays, throughout their range. West Indian manatees concentrate in areas of warm water, primarily the Florida Gulf Coast waters, from October to April. In the summer months, the West Indian manatee will migrate as far north as coastal Virginia on the east coast and coastal Louisiana on the Gulf of Mexico. Suitable habitat for the West Indian manatee exists in the PSA within the Ashley River. West Indian manatees migrate into estuarine water off the coast of South Carolina during the warmer, summer months and early fall from May to September when water temperatures exceed 70 degrees Fahrenheit. Particular care and consideration should be taken during construction in summer months or early fall as this is when the waterways provide potential habitat. There are known occurrences of manatees within the Cooper River near the WestRock paper facility located just outside the PSA, as well as within the Ashley River. A trained spotter would likely be needed from May to October for in-water work in the Ashley River. Other conditions, such as operating vessels at slow speeds and halting in-water work if a manatee is spotted may also be required.

### **Northern long-eared bat (*Myotis septentrionalis*) – Federal Threatened**

The northern long-eared bat is a medium-sized bat that is medium to dark brown on the back and tawny to pale-brown on the underside. The species is distinguished by its long ears. During the winter months, the northern long-eared bat can be found hibernating in caves and mines. They use areas in various sized caves or mines with constant temperatures, high humidity, and no air currents. During the summer, northern long-eared bats roost underneath bark and in cavities or in crevices of both live trees and dead trees. Individuals of the species have also been found rarely roosting in structures, like barns and sheds. Habitat conducive to seasonal occupation for northern long-eared bat is located within the PSA. The PSA contains potentially suitable summer roosting and foraging habitat for this species within forested areas. The preferred winter hibernation habitat for this species does not exist within the PSA or its immediate vicinity. While the forested areas onsite could be considered suitable habitat, the narrow nature of these areas is a limiting factor for the suitability of this habitat. No northern long-eared bats were identified during pedestrian field surveys and there are no known populations or hibernacula within the PSA.



*Northern Long-eared Bat. Photo credit: USFWS, Al Hicks, 2007*

### **Rafinesque's big-eared bat (*Corynorhinus rafinesquii*) – State Endangered**

Rafinesque's big-eared bat is a medium-sized bat that is brown in color with white-tipped fur on its belly. The species gets its name from its large ears, approximately 1.25 inches long. The species can be found in nearly all forest types within its range but tend to concentrate more heavily in forested swamps. Roosting sites consist of artificial and natural habitats, including unoccupied buildings or

hollowed-out tree cavities, especially black gum trees, near water. Occurrences of roosts under bridges have also been documented. Hibernating bats can be found in caves, wells, and other similar habitats. Potential habitat for the state endangered Rafinesque's big-eared bat is present within the PSA. Specifically, roosting habitat for Rafinesque's big-eared bat may exist in tree cavities near waterbodies within the PSA. Additionally, bridges and large culverts within the PSA also provide day-roosting habitat for the species. No bats were identified during pedestrian field surveys and there are no known populations within the PSA. Charleston County is included in the white-nose syndrome zone<sup>3</sup>.

### **Right whale (*Balaena glacialis*) – Federal Endangered**

Right whales average 46 feet and can weigh up to 70 tons. They are black in color with white patches. The right whale prefers coastal waters more than other baleen whales. Pregnant females migrate to an area off the coast of Georgia and Florida to give birth between December and March and then migrate north to their feeding grounds. This species has been protected since the 1930s but their number have failed to increase and the number of individuals is thought to remain steady at 350 - 400. There is no suitable habitat for this species within the PSA.

### **Sei whale (*Balaenoptera borealis*) – Federal Endangered**

Sei whales average 40 to 60 feet and can weigh up to 50 tons. Sei whales have a long, sleek body that is dark bluish-gray to black in color and white or cream-colored on the underside. Sei whales have a wide distribution and prefer temperate waters in the mid-latitudes, and can be found in the Atlantic, Indian, and Pacific Oceans. This species has been protected since the 1980s, and while their numbers are unknown it is believed there are approximately 8,600 in the north pacific. There is no suitable habitat for this species within the PSA.

### **Sperm whale (*Physeter macrocephalus*) – Federal Endangered**

Sperm whales average 40 feet (females) to 52 feet (males) in length and 15 tons (females) to 45 tons (males) in weight. Sperm whales are mostly dark grey, though some whales have white patches on the belly. Sperm whales are the largest of the toothed whales and have one of the widest global distributions of any marine mammal species. This species has been protected since 1986 and the best estimate of worldwide sperm whale population is between 300,000 and 450,000 individuals. There is no suitable habitat for this species within the PSA.

### **Finback whale (*Balaenoptera physalus*) – Federal Endangered; State Endangered**

The finback whale or fin whale is the second largest living creature, after the blue whale. They average 60 feet in length and weigh about 50 tons. They are found in all oceans of the world. It is thought that the fin whale migrates to cooler waters in winter to feed on krill and other plankton and

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<sup>3</sup> <https://www.fws.gov/midwest/endangered/mammals/nleb/pdf/WNSZone.pdf>

to warmer waters in the summer to reproduce. Fin whales are pelagic and coastal species, sometimes occurring in shallow waters. There is no suitable habitat for this species within the PSA.

### **Humpback whale (*Megaptera novaengliae*) – Federal Endangered; State Endangered**

This large marine mammal weighs between 25 and 40 tons at adulthood and can reach lengths of up to 60 feet. Humpback whales are dark grey with areas of white and can be seen breaching or jumping out of the water. In the winter they migrate to feeding grounds at high latitudes in the winter they travel to calving grounds close to the equator. Humpback whales are found near the surface of the ocean and prefer shallow waters around reef systems, islands or continental shores. There is no suitable habitat for this species within the PSA.

### **Mollusk**

#### **Atlantic pigtoe (*Fusconaia masoni*) – State Endangered**

The shell of the Atlantic pigtoe freshwater mussel is yellow to dark brown and is shaped like that of a pig's hoof or toe. The Atlantic pigtoe is a southern Atlantic slope species that is found from the Ogeechee River Basin in Georgia north to the James River Basin in Virginia. The Atlantic pigtoe inhabits mostly medium to large streams. It prefers very clean, swift waters with stable gravel, or sand and gravel substrate. Swift waters are typically needed to maintain a clear water column with little silt. There is no suitable habitat for this species within the PSA.

### **Plant**

#### **American chaff seed (*Schwalbea americana*) – Federal Endangered**

American chaff seed is a perennial herbaceous plant with erect, densely hairy, unbranched stems up to 24 inches tall. The flowers are yellowish or purplish and grouped in a long terminal cluster. American chaffseed typically grows in open, moist pine flatwoods, fire-maintained pine savannas, ecotone areas between peaty wetlands and xeric sandy soils, and other open grass and sedge dominant areas. This plant is dependent on factors such as mowing, fire, and fluctuating water tables for survival. There is no suitable habitat for this species within the PSA.

#### **Canby's dropwort (*Oxypolis canbyi*) – Federal Endangered**

Canby's dropwort is a perennial herbaceous plant with tuberous roots and pale, fleshy rhizomes and erect stems up to 39 inches tall. The flowers are small and white with five petals and grow in umbels or flat-topped clusters. Canby's dropwort grows in moist areas in the coastal plain and sandhills, including wet meadows, wet pineland savannas, ditches, sloughs, and around the edges of Cypress-pine ponds. The plant seems to be more prolific when the habitat has been burned. Suitable habitat for Canby's dropwort exists within ditches and other open wet areas (i.e., grass and sedge fields) located within the PSA. Surveys were conducted during the



*Canby's Dropwort. Photo credit: USFWS, 2011*



flowering period and this species was not observed.

**Pondberry (*Lindera melissifolia*) – Federal Endangered**

Pondberry is a deciduous shrub that grows up to six feet tall and spreads by underground stolons. The leaves are ovately to elliptically shaped, thin, membranaceous and drooping and have a strong sassafras-like odor when brushed. The flowers are pale yellow and bloom in the spring before the appearance of leaves. Fruits are bright red and oval-shaped and mature in the fall. Pondberry generally occupies wetland habitats that are normally flooded or saturated during the dormant season, but infrequently flooded during the growing season for extended periods. The plant is typically associated with bottomland hardwoods in the inner coastal plain, and margins of sinks, ponds, and other depressions in the outer coastal plain. Suitable habitat for pondberry exists within freshwater depression wetlands and along the margins of ponds located within the PSA. Surveys were conducted during the flowering period and this species was not observed.

**Seabeach amaranth (*Amaranthus pumilus*) – Federal Threatened**

Seabeach amaranth is an annual herbaceous plant found on Atlantic barrier island beaches, where its primary habitat consists of overwash flats and the lower foredunes of beaches. The plant is intolerant of competition and does not occur in densely vegetated areas. The stems of seabeach amaranth are fleshy and reddish in color, while the leaves are small and round and approximately one inch in diameter. Flowering occurs in early summer, and fruits are produced in late summer. There is no suitable habitat for this species within the PSA.

**Reptile**

**Green sea turtle (*Chelonia mydas*) – Federal Threatened; State Threatened**

Green sea turtles, the second largest sea turtle, has a grayish colored shell and forages on submerged grasses. Juveniles are found along the South Carolina coast in shallow creeks, bays, and salt marshes, where they feed on epiphytic green algae such as sea lettuce. There is no suitable habitat for this species within the PSA.

**Kemp's ridley sea turtle (*Lepidochelys kempii*) – Federal Endangered; State Endangered**

Kemp's ridley sea turtle, the smallest sea turtle, has a round grayish-black to olive colored shell which lightens as the turtle matures. The Kemp's ridley only nests on the Gulf Coast of Mexico and Texas. Juveniles can be found along the South Carolina coast during the summer where they feed on fast-swimming crabs, such as the blue crab. There is no suitable habitat for this species within the PSA.

**Leatherback sea turtle (*Dermochelys coriacea*) – Federal Endangered**

Leatherback sea turtles are the largest reptiles in the world, commonly exceeding 1,000 pounds with an average shell length of five feet. These turtles have a rubber-like, black shell with white spots and a pinkish-white spot on the head. Leatherbacks have the most extensive geographic distribution of

any reptile, typically occurring at low densities in the open ocean. Leatherbacks are common visitors throughout South Carolina's coastal waters during the spring while they feed on abundant numbers of cannonball jellyfish. Leatherbacks are also seen in the fall, although in lesser numbers. There is no suitable habitat for this species within the PSA.

#### **Loggerhead sea turtle (*Carretta carretta*) – Federal Threatened; State Threatened**

The loggerhead sea turtle, South Carolina's state reptile, has a dark reddish shell. The major nesting area for the loggerhead in the western Atlantic is open beaches of the southeastern United States, including South Carolina. In South Carolina, the primary nesting beaches are between North Inlet and Prides' Inlet, but other beaches along the southern part of the state are also used in moderate densities. The nesting season runs from mid-May to mid-August. In the winter, loggerheads leave the cold coastal waters and are often seen along the western edge of the Gulf Stream. There is no suitable habitat for this species within the PSA.

#### **Spotted turtle (*Clemmys guttata*) – State Threatened**

The spotted turtle is small, only reaching lengths of up to 5 inches. The shell or carapace is black and sprinkled with numerous orange-yellow dots. The head and neck also have orange-yellow blotches. The spotted turtle is a semi-aquatic species that inhabits a variety of wetland types including small shallow ponds, small streams, swamps, and flooded forests. Potential habitat for the state threatened spotted turtle exists within shallow ponds, small freshwater streams, and flooded freshwater forested wetlands located within the PSA.

#### **Southern hognose snake (*Heterodon simus*) – State Threatened**

The Southern hognose snake is a heavy-bodied snake that may reach up to 24 inches in length. The key defining feature of the species and genera is the upturned snout. Hognose snakes may reside under the surface for long periods of time. Habitat and distribution of the species is primarily within the coastal plain of the eastern United States where soils are comprised of deep sand and dune habitats. Commonly associated with the longleaf pine ecosystem, southern hognose snakes occupy very dry upland habitat with well-drained, sandy soils. They favor habitat where the canopy is open with a grassy understory. The species has declined in population as habitat conversion and the introduction of fire ants have had adverse effects. There is no suitable habitat for this species within the PSA.

### **Species Presence and Suitable Habitat Summary**

Within the PSA, there is no potential suitable habitat for the federally protected flatwoods salamander, red-cockaded woodpecker, red knot, finback whale, humpback whale, right whale, sei whale, sperm whale, American chaffseed, seabeach amaranth, green sea turtle, Kemp's ridley sea turtle, leatherback sea turtle, or loggerhead sea. With respect to state protected species, there is no

potential habitat within the PSA for gopher frog, least tern, Atlantic pigtoe, or Southern hognose snake.

Based on literature and field surveys, suitable habitat in the PSA exists for the federally protected American wood stork, Bachman's warbler, Eastern black rail (proposed), piping plover, Atlantic sturgeon, shortnose sturgeon, Northern long-eared bat, West Indian manatee, Canby's dropwort, and pondberry. American wood storks were found foraging within the PSA. An active bald eagle nest is located approximately 1,400 feet outside of the PSA and habitat for bald eagle exists within the PSA.

With respect to state protected species, there is potential habitat within the PSA for dwarf siren, American swallow-tailed kite, Wilson's plover, Rafinesque's big-eared bat, and spotted turtle.

### **Migratory Birds**

There are hundreds of species of migratory birds protected by the MBTA that may nest in, forage in, or fly through, the PSA. Birds that are considered non-native species such as the house sparrow and the European starling are examples of species that are not protected under the MBTA. In addition, many groups of hunted or game birds, such as ducks, geese, doves, and some shorebirds are subject to limited protection and can be hunted in specific seasons. Migratory birds that may be foraging or moving through the PSA are less likely to be affected by project impacts as they can generally move more readily from construction-related disturbances. Ground nests, arboreal nests, and nests built on man-made structures could occur within the project area. Active nests were not noted on any structures, however nests in shrubs and trees are present throughout the PSA.



*Great blue heron foraging in the I-526 PSA.*

### **6.5 Potential Species Impacts (Migratory Birds and Bald Eagle)**

Project impacts to protected species, including federally designated endangered or threatened species and migratory birds, were determined by the literature and field reviews of the PSA conducted by the project team. A project affect determination on bald eagle is not necessary as the species is no longer protected by the ESA and does not require Section 7 consultation. As proposed, there would be no impacts to bald eagle as a result of the Reasonable Alternatives.

Migratory birds have been documented to use bridges and other artificial roadway drainage structures, such as large culverts, as nesting sites. The PSA contains many bridges and large drainage structures; and a mud nest likely constructed by a barn swallow or eastern phoebe was observed during field reviews underneath the I-526 overpass near Attaway Street. Based on the field reviews, it has been determined that the proposed project would not impact any migratory bird species.

Migratory birds that may be utilizing habitats within the PSA are also less likely to be affected by project impacts as they can generally move more readily from construction-related disturbances.

## **6.6 Construction Overview**

This project is expected to be delivered either via the design build or bid build process and final construction and design plans would be determined by the contractor and/or SCDOT. To maintain competitiveness during the bid process, means and methods of construction may not be final, giving contractors the ability to propose specific methods and equipment. The following is an outline of the likely construction activities and project designs.

- Widening of the roadway approaches to the Westmoreland Bridges.
- Construction of temporary access areas in and near the Ashley River to include matting, barges, and work trestles.
- Construction of a new structure to the south, or downstream side, of the existing Westmoreland Bridges on a mix of concrete prestressed piles and drilled shafts with poured concrete support.
- Construction of a new structure within the center of the existing Westmoreland Bridges on a mix of concrete prestressed piles and drilled shafts.
- Extension of the existing fender system to the south of the existing Westmoreland Bridge.
- Painting existing and new bridge structures.
- Lighting to be installed for navigation and to meet SCDOT urban interstate lighting requirements (“Roadway Lighting on Interstate Routes in South Carolina”).

## **6.7 Biological Conclusions (Threatened and Endangered Species)**

Concurrence with USFWS and NOAA-NMFS regarding determinations of potential habitat and project-related impacts would be conducted during the Section 7 consultation phase of the proposed project for those species that are federally protected. Based on the literature and field reviews it is expected that the proposed project would have ‘no effect’ on federally protected flatwoods salamander, red-cockaded woodpecker, red knot, finback whale, humpback whale, right whale, sei whale, sperm whale, American chaffseed, seabeach amaranth, green sea turtle, Kemp's ridley sea turtle, leatherback sea turtle, or loggerhead sea, as there is no suitable habitat for these species within the PSA.

It is expected that the proposed project ‘may affect, not likely to adversely affect’ American wood

stork, Bachman’s warbler, Eastern black rail, piping plover, Atlantic sturgeon, shortnose sturgeon, West Indian manatee, Canby’s dropwort, and pondberry.

Federal agencies often utilize the “Northern Long-Eared Bat 4(d) Rule Streamlined Consultation Form” regarding potential impacts to this species. This framework allows federal agencies to rely upon the USFWS January 5, 2016, intra-Service Programmatic Biological Opinion (BO) on the final 4(d) rule for the NLEB for section 7(a)(2) compliance. According to the 4(d) rule, the proposed project may affect the NLEB, but any resulting incidental take of the NLEB is not prohibited by the final 4(d) rule. A draft version of this form is included in Appendix E.

In complying with Section 7 of the ESA, the project team will coordinate with the USFWS and NOAA-NMFS regarding the proposed effect determinations to listed species. Consultation will be coordinated, to include Biological Assessments to address potential species effects. Table 11 summarizes the determinations of potential habitat and biological conclusions.

**Table 11: Summary of Federally Protected Species and Biological Conclusions or Impacts**

Species	Protection Status	Biological Conclusion or Impacts
Flatwoods salamander ( <i>Ambystoma cingulatum</i> )	Threatened	No effect
American wood stork ( <i>Mycteria americana</i> )	Threatened	May affect, not likely to adversely affect
Bachman's warbler ( <i>Vermivora bachmanii</i> )	Endangered	May affect, not likely to adversely affect
Bald eagle ( <i>Haliaeetus leucocephalus</i> )	BGEPA	No impact
Black rail ( <i>Laterallus jamaicensis</i> )	Threatened (proposed)	May affect, not likely to adversely affect
Piping plover ( <i>Charadrius melodus</i> )	Threatened	May affect, not likely to adversely affect
Red-cockaded woodpecker ( <i>Picoides borealis</i> )	Endangered	No effect
Red knot ( <i>Calidris canutus rufa</i> )	Threatened	No effect
Atlantic sturgeon ( <i>Acipenser oxyrinchus oxyrinchus</i> )	Endangered	May affect, not likely to adversely affect
Shortnose sturgeon ( <i>Acipenser brevirostrum</i> )	Endangered	May affect, not likely to adversely affect
Finback whale ( <i>Balaenoptera physalus</i> )	Endangered	No effect
Humpback whale ( <i>Megaptera novaengliae</i> )	Endangered	No effect
Northern long-eared bat ( <i>Myotis septentrionalis</i> )	Threatened	May affect, but any resulting incidental take is not prohibited by the final 4(d) rule
Right whale ( <i>Balaena glacialis</i> )	Endangered	No effect
Sei whale ( <i>Balaenoptera borealis</i> )	Endangered	No effect

Species	Protection Status	Biological Conclusion or Impacts
Sperm whale ( <i>Physeter macrocephalus</i> )	Endangered	No effect
West Indian manatee ( <i>Trichechus manatus</i> )	Threatened	May affect, not likely to adversely affect
American chaff seed ( <i>Schwalbea americana</i> )	Endangered	No effect
Canby's dropwort ( <i>Oxypolis canbyi</i> )	Endangered	May affect, not likely to adversely affect
Pondberry ( <i>Lindera melissifolia</i> )	Endangered	May affect, not likely to adversely affect
Seabeach amaranth ( <i>Amaranthus pumilus</i> )	Threatened	No effect
Green sea turtle ( <i>Chelonia mydas</i> )	Threatened	No effect
Kemp's ridley sea turtle ( <i>Lepidochelys kempii</i> )	Endangered	No effect
Leatherback sea turtle ( <i>Dermochelys coriacea</i> )	Endangered	No effect
Loggerhead sea turtle ( <i>Carretta carretta</i> )	Threatened	No effect

## 6.7.1 Recommended Species Commitments

### 6.7.1.1 Threatened and Endangered Species

Special conditions are expected to avoid impacts some protected species. Following submittal of the Biological Assessments to the USFWS and NOAA-NMFS, and coordination regarding the biological conclusions, any required special commitments would be included in the project NEPA documentation.

### 6.7.1.2 Migratory Birds

SCDOT would comply with the MBTA to avoid taking individual migratory birds or destroying their active nests. The contractor shall notify the Resident Construction Engineer (RCE) at least four (4) weeks prior to construction/demolition/maintenance of bridges and box culverts. The RCE would coordinate with SCDOT Environmental Services Office (ESO), Compliance Division, to determine if there are any active birds using the structure. After this coordination, it would be determined when construction/demolition/maintenance can begin. If a nest is observed that was not discovered after construction/demolition/maintenance has begun, the contractor would cease work and immediately notify the RCE, who will notify the ESO Compliance Division. The use of any deterrents by the contractor designed to prevent birds from nesting, shall be approved by the RCE with coordination from the ESO Compliance Division.

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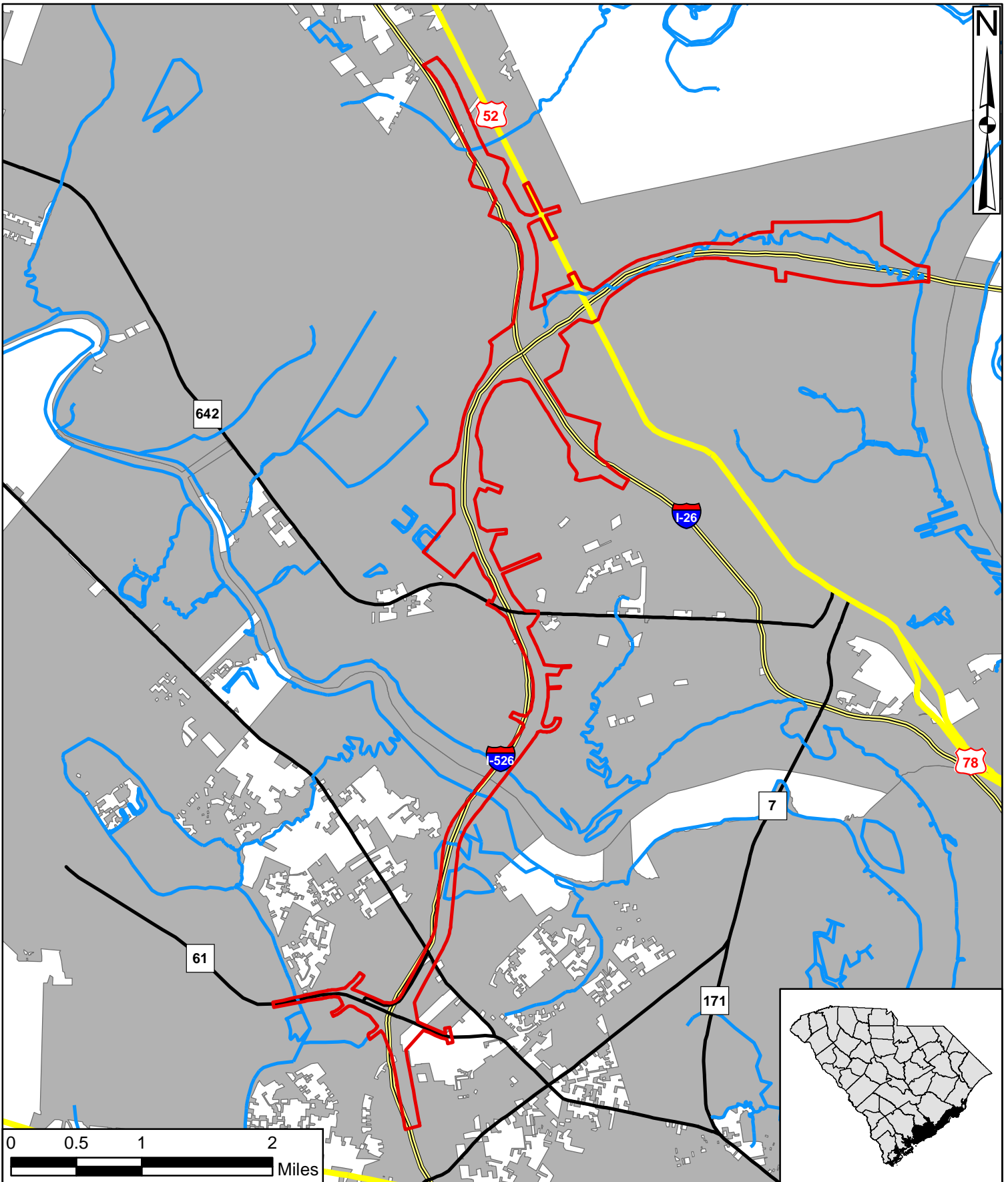
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**APPENDIX A**  
**FIGURES**





Source:  
Composite County  
Roadway Data







Drawn By: RHH  
QA/QC: KLM

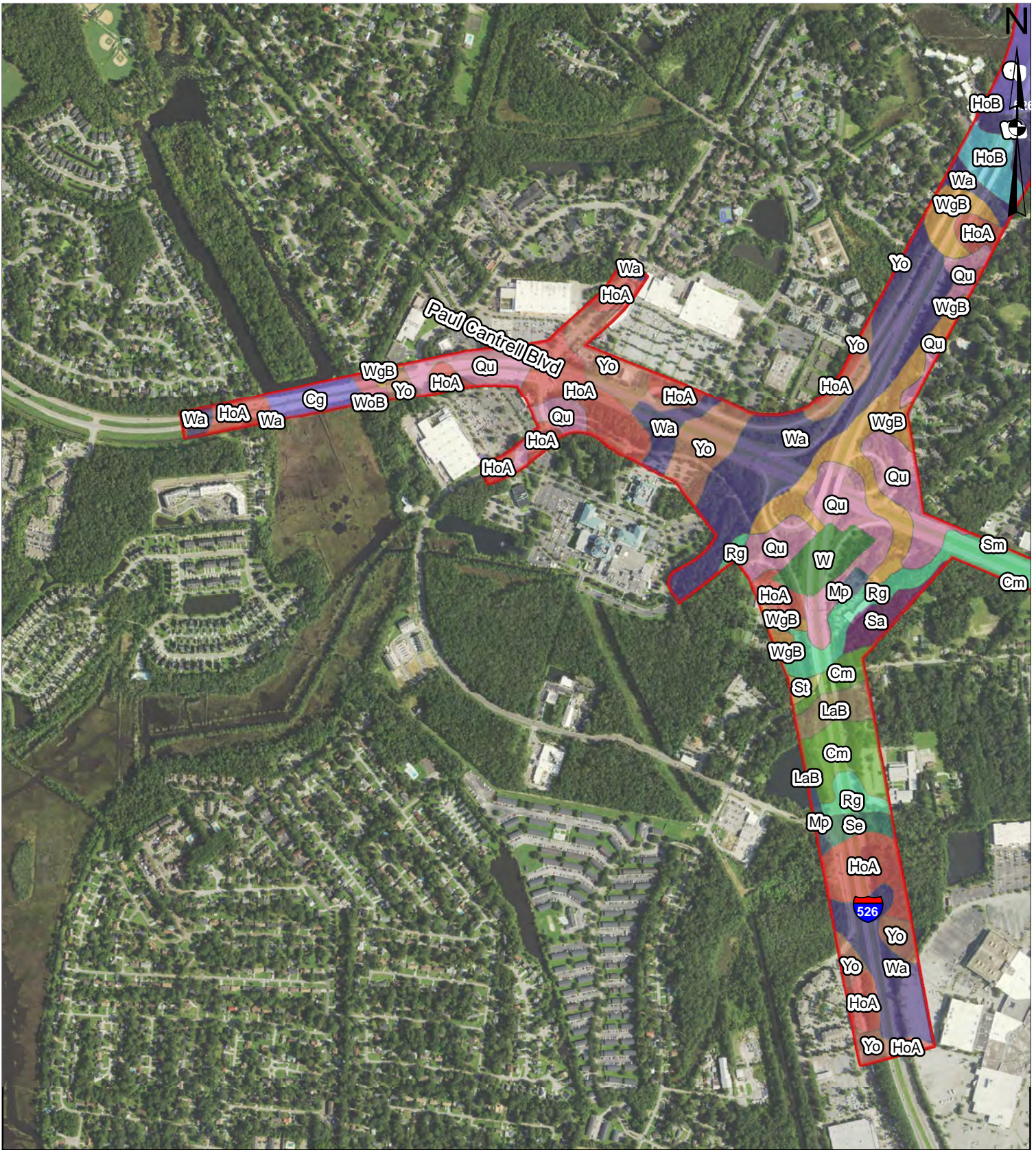
**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

Project Location

Figure 1

**Legend**

-  Project Study Area
-  Streams
-  SC Route
-  US Route
-  Interstate
-  Incorporated City Limits



Legend							
Cg (Caspers silty clay loam)	HoB (Hockley loamy fine sand, 2-6% slopes)	Qu (Quitman loamy sand)	Se (Santee loam)	W (Water)	Wa (Wadmalaw fine sandy loam)	WgB (Wagram loamy fine sand, 0-6% slopes)	WdB (Wicksburg loamy fine sand, 0-6% slopes)
Cm (Chipley loamy fine sand)	LaB (Lakeland sand, 0-6% slopes)	Rg (Rutlege loamy fine sand)	Sm (Seewee complex)	Wa (Wadmalaw fine sandy loam)	Yo (Yonges loamy fine sand)		
HoA (Hockley loamy fine sand, 0-2% slopes)	Mp (Mine pits and dumps)	Sa (St. Johns fine sand)	St (Stono fine sandy loam)	WgB (Wagram loamy fine sand, 0-6% slopes)			



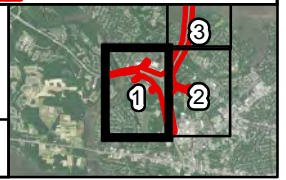

Source:  
NRCS Charleston  
County Soils

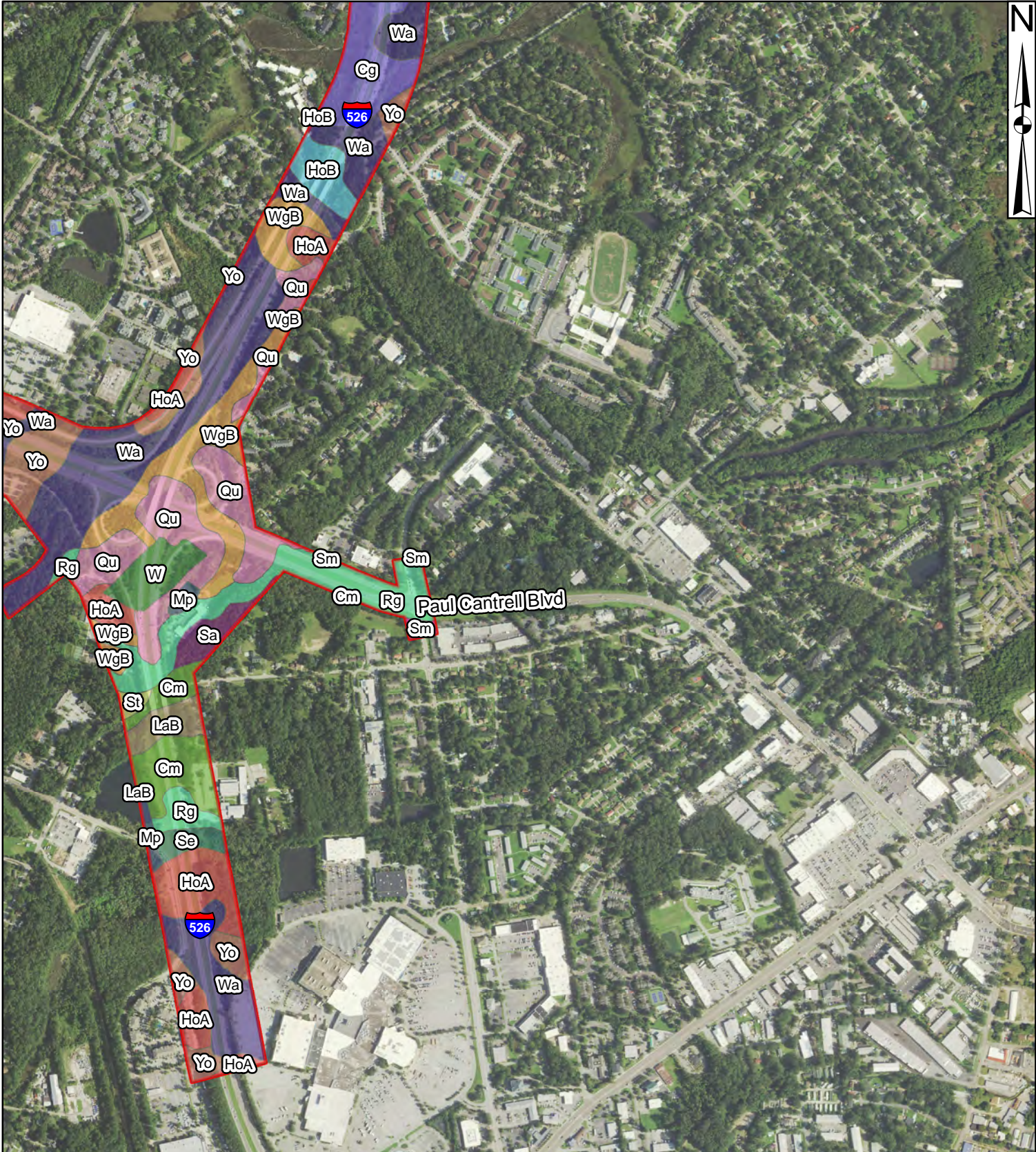
Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
February 2020

NRCS Soils Data

Figure 3  
Sheet 1 of 11





Legend						
Cg (Caspers silty clay loam)	HoB (Hockley loamy fine sand, 2-6% slopes)	Qu (Quitman loamy sand)	Se (Santee loam)	W (Water)	Wa (Wadmalaw fine sandy loam)	Yo (Yonges loamy fine sand)
Cm (Chipley loamy fine sand)	LaB (Lakeland sand, 0-6% slopes)	Rg (Rutlege loamy fine sand)	Sm (Seevee complex)	WgB (Wagram loamy fine sand, 0-6% slopes)		Project Study Area
HoA (Hockley loamy fine sand, 0-2% slopes)	Mp (Mine pits and dumps)	Sa (St. Johns fine sand)	St (Stono fine sandy loam)			

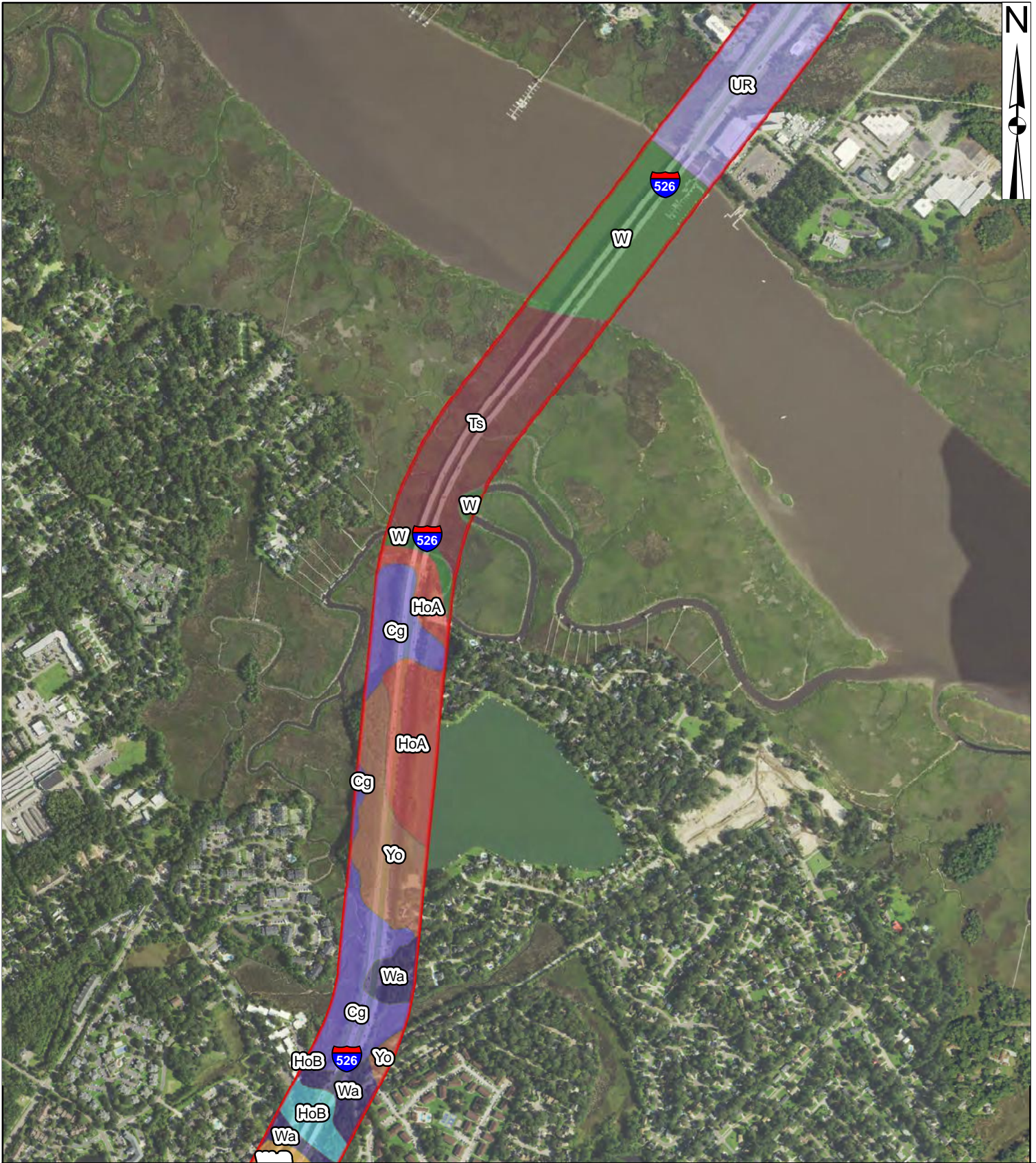
Source:  
NRCS Charleston  
County Soils

Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
February 2020

NRCS Soils Data

Figure 3  
Sheet 2 of 11



Cg (Caspers silty clay loam)	HoB (Hockley loamy fine sand, 2-6% slopes)	Ts (Tidal marsh, soft)	W (Water)	WgB (Wagram loamy fine sand, 0-6% slopes)	Project Study Area
HoA (Hockley loamy fine sand, 0-2% slopes)	Qu (Quitman loamy sand)	UR (Urban land-Yauhannah-Yemassee-Ogeechee association)	Wa (Wadmalaw fine sandy loam)	Yo (Yonges loamy fine sand)	

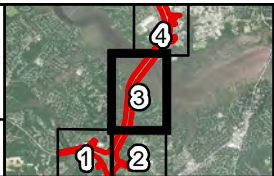
Source:  
NRCS Charleston  
County Soils

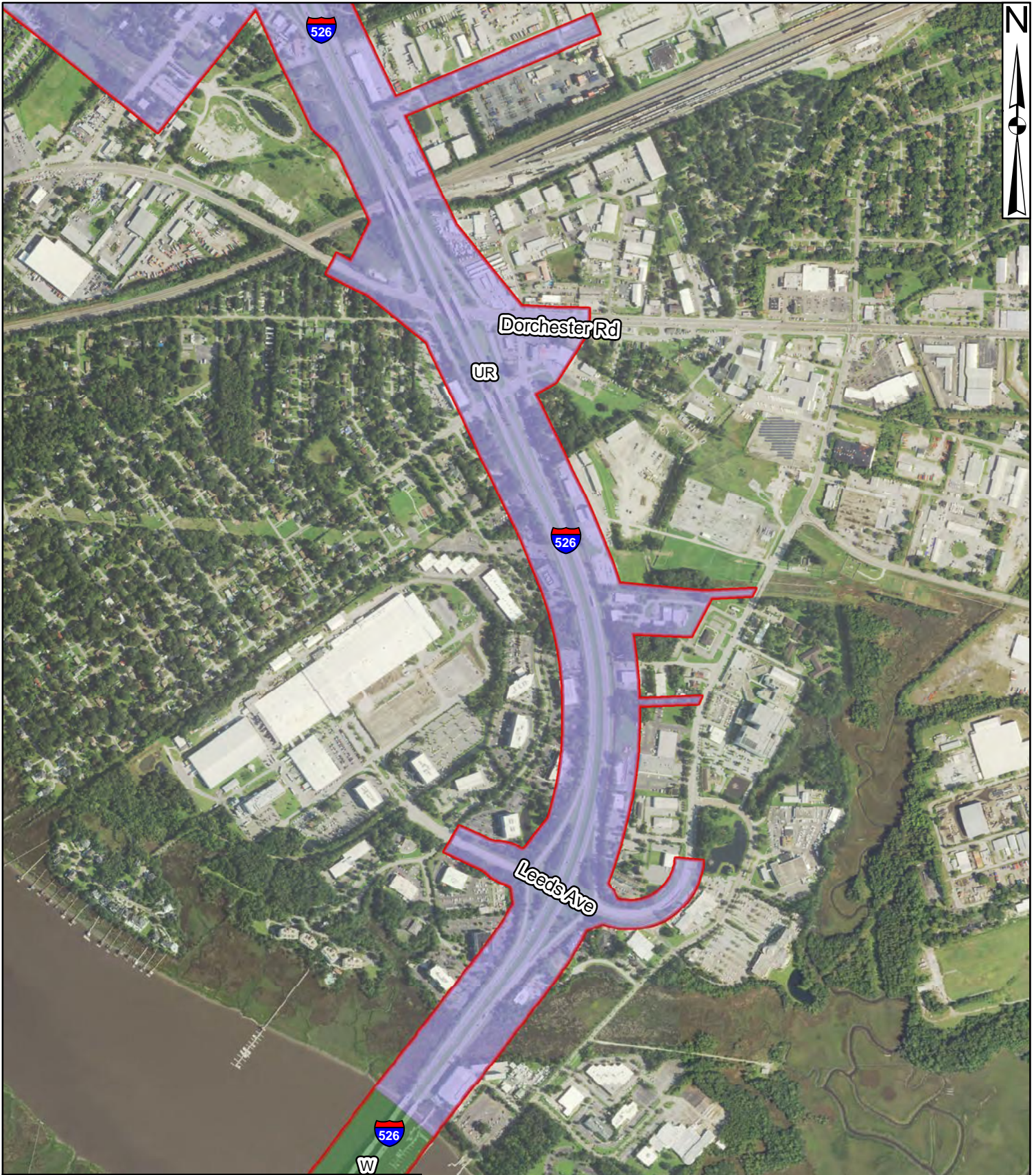
Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
February 2020

NRCS Soils Data

Figure 3  
Sheet 3 of 11





**Legend**  
 UR (Urban land-Yauhannah-Yemassee-Ogeechee association)    W (Water)    Project Study Area




Source:  
 NRCS Charleston  
 County Soils

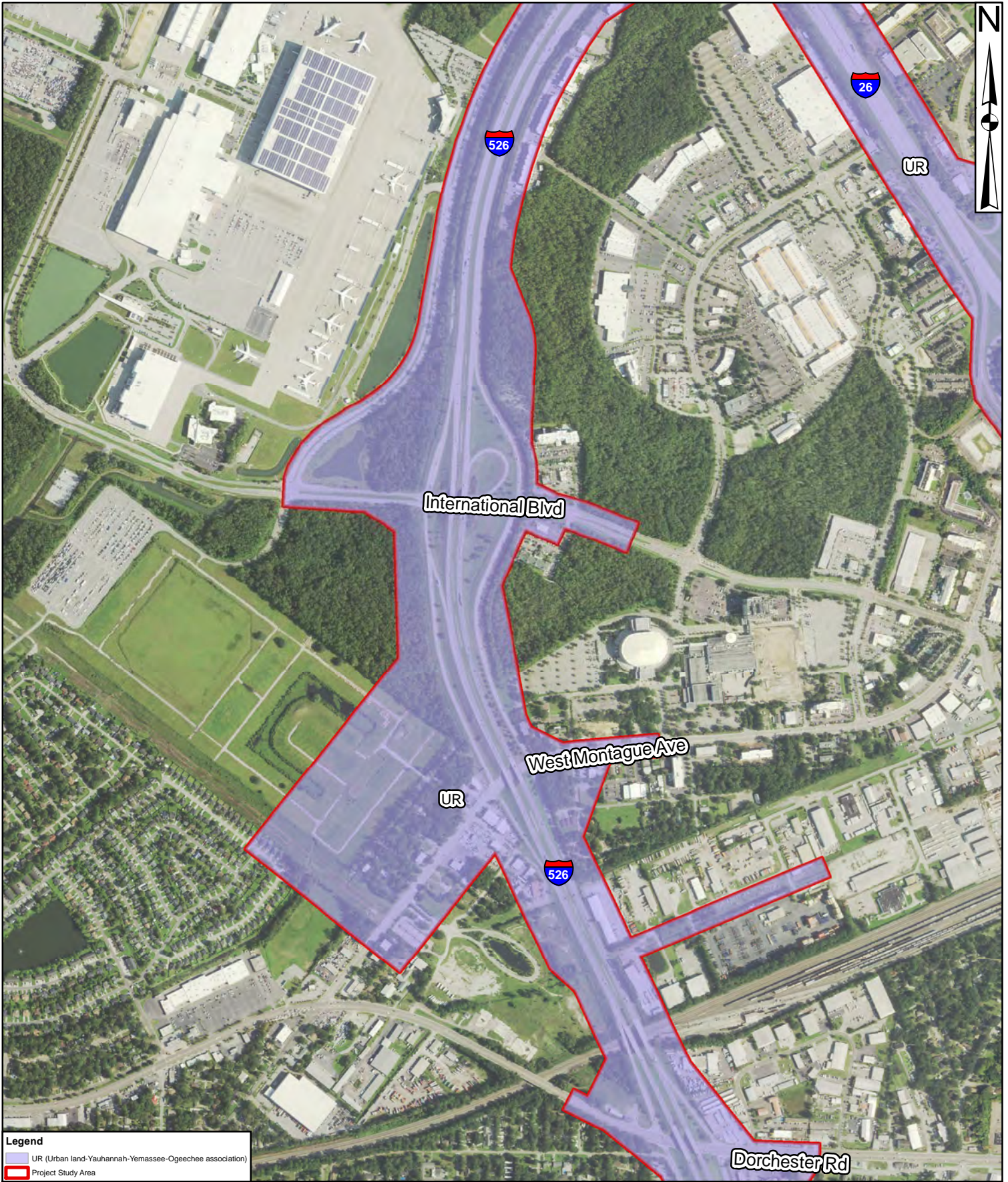
Drawn By: RHH  
 QA/QC: KLM



**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

NRCS Soils Data

Figure 3  
 Sheet 4 of 11





**Legend**  
 UR (Urban land-Yauhannah-Yemassee-Ogeechee association)  
 Project Study Area



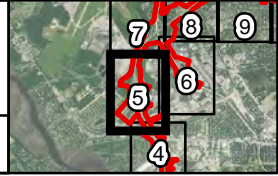

Source:  
 NRCS Charleston  
 County Soils

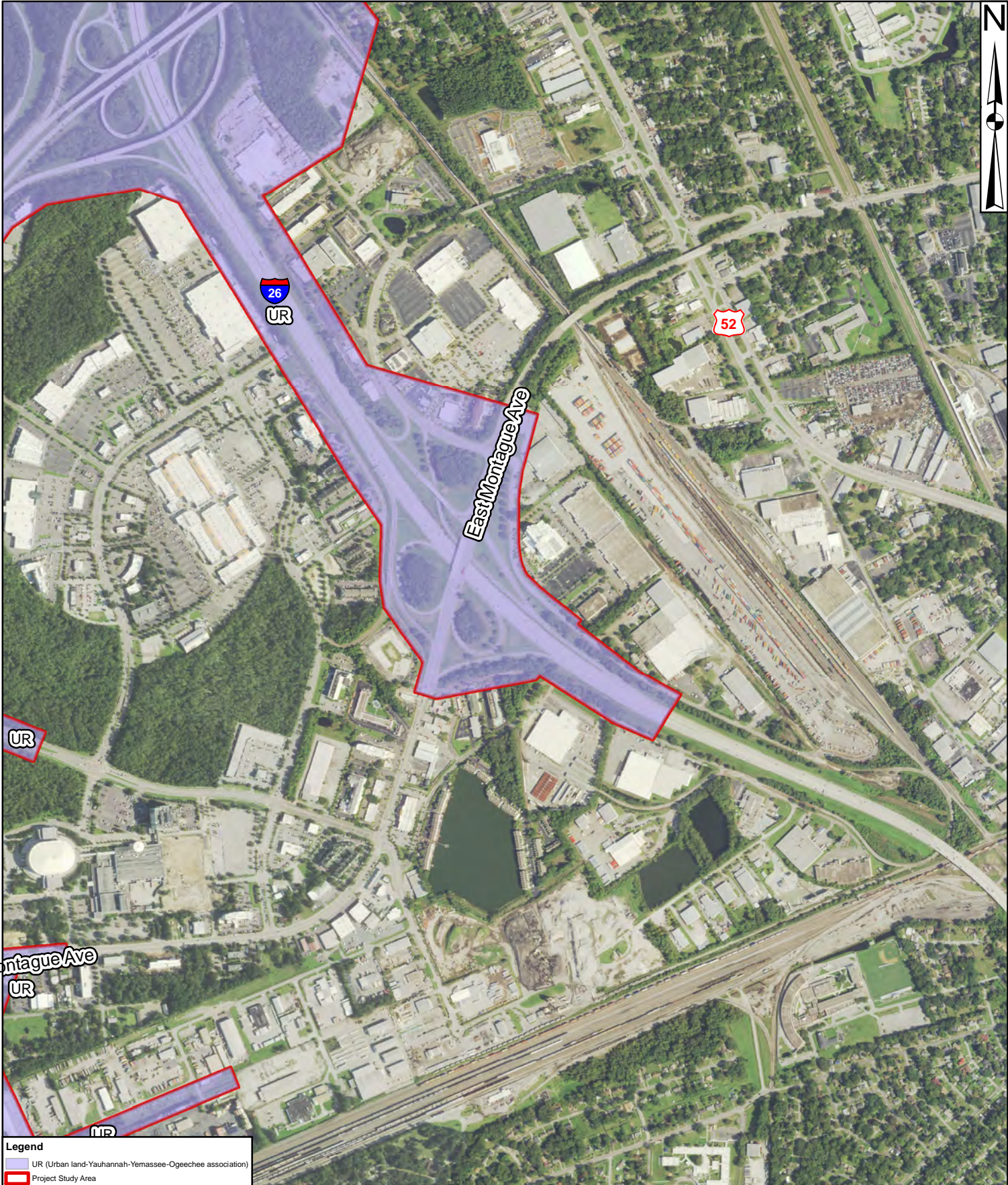
Drawn By: RHH  
 QA/QC: KLM

**I-526 Lowcountry Corridor West**  
 Charleston County  
 SCDOT P032102  
 February 2020

NRCS Soils Data

Figure 3  
 Sheet 5 of 11





**Legend**  
 UR (Urban land-Yauhannah-Yemassee-Ogeechee association)  
 Project Study Area




Source:  
 NRCS Charleston  
 County Soils

Drawn By: RHH  
 QA/QC: KLM

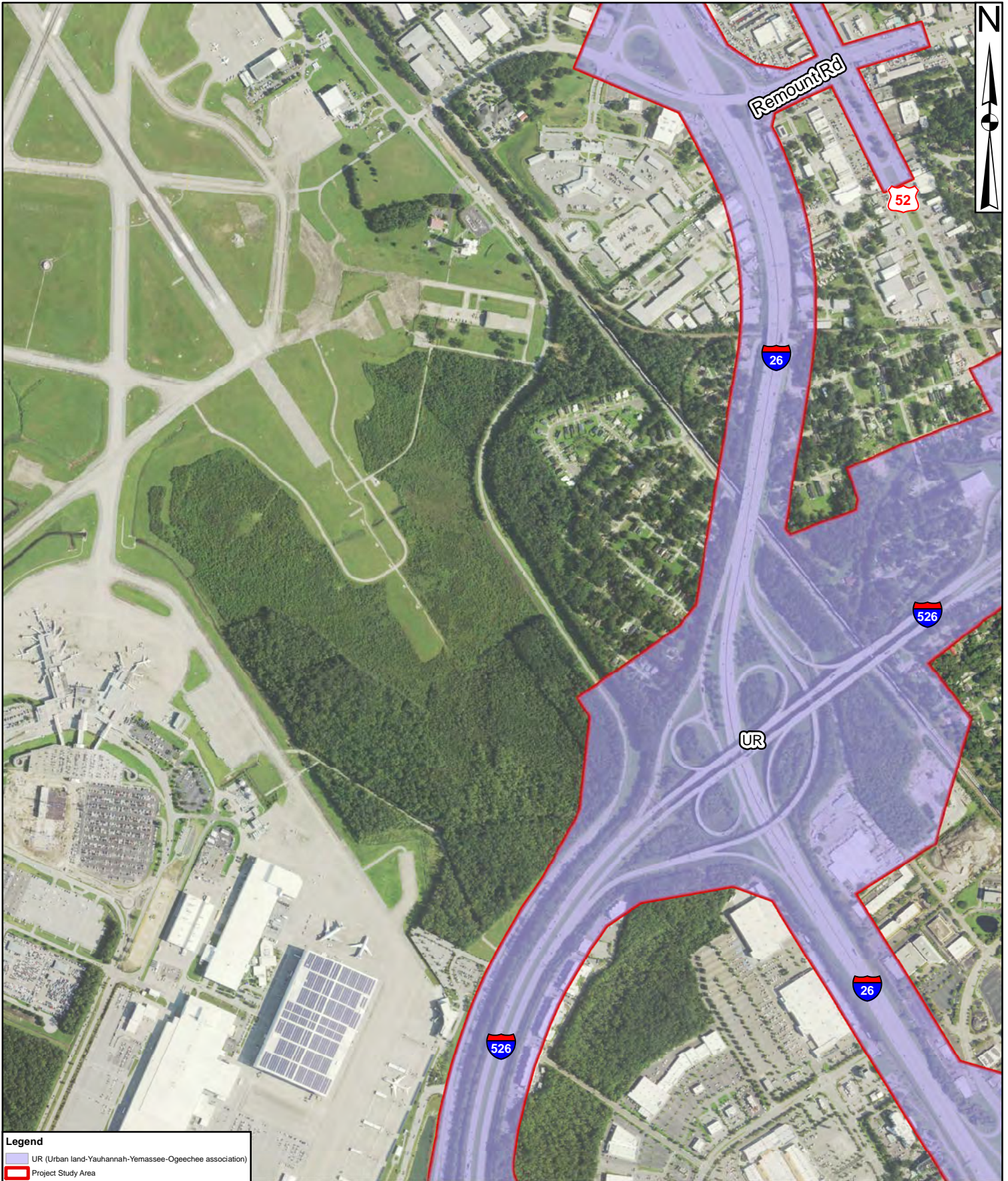
**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**



NRCS Soils Data

Figure 3  
 Sheet 6 of 11







**Legend**  
 UR (Urban land-Yauhannah-Yemassee-Ogeechee association)  
 Project Study Area



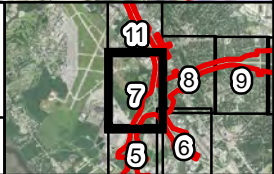

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 County Soils

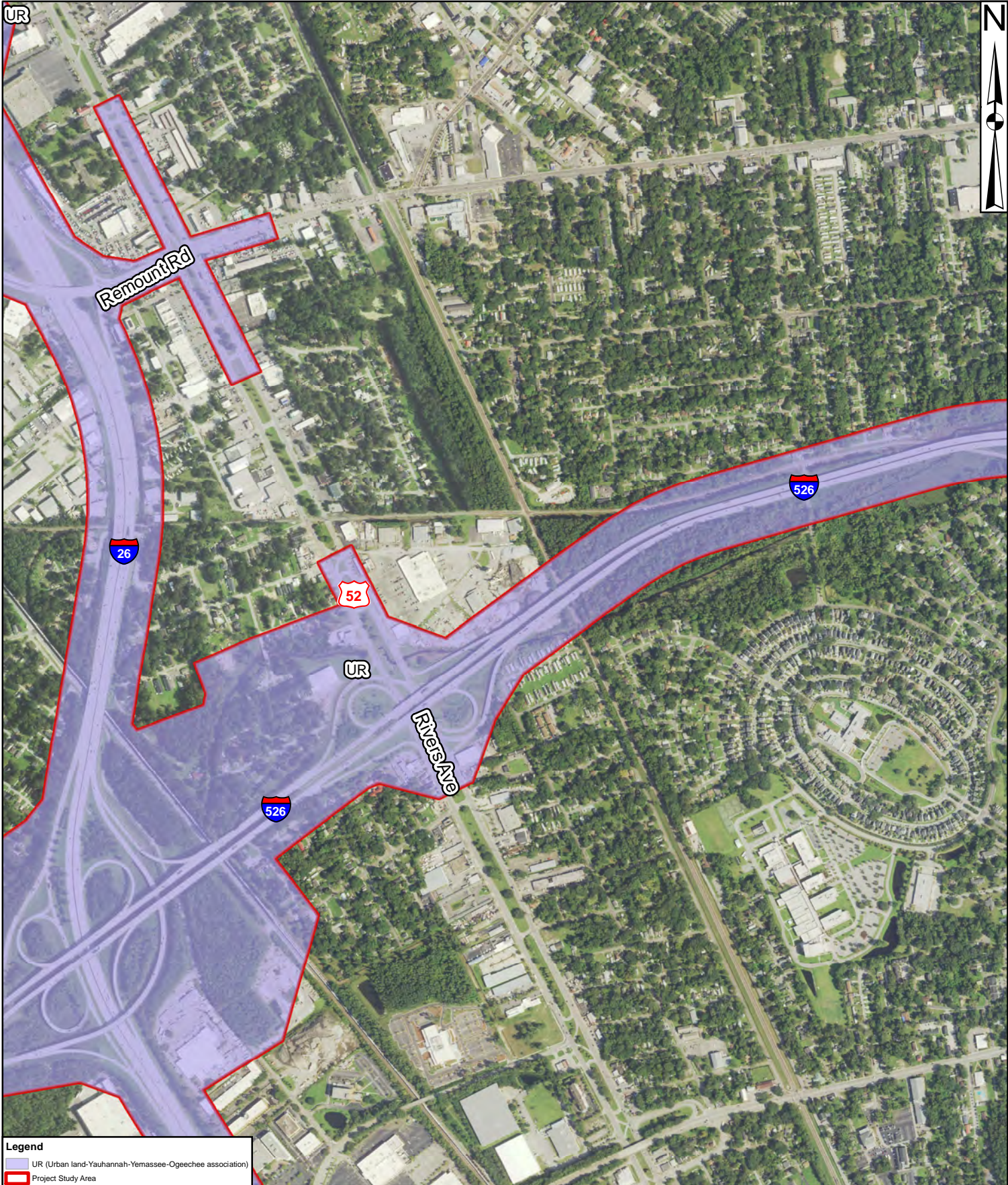
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 QA/QC: KLM

**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

NRCS Soils Data

Figure 3  
 Sheet 7 of 11





**Legend**  
 ■ UR (Urban land-Yauhannah-Yemassee-Ogeechee association)  
 ■ Project Study Area



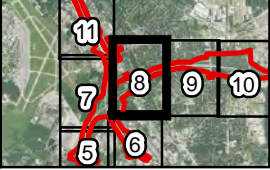

Source:  
 NRCS Charleston  
 County Soils

Drawn By: RHH  
 QA/QC: KLM



**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

NRCS Soils Data

Figure 3  
 Sheet 8 of 11





**Legend**  
 UR (Urban land-Yauhannah-Yemassee-Ogeechee association)  
 Project Study Area




Source:  
 NRCS Charleston  
 County Soils

Drawn By: RHH  
 QA/QC: KLM

**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

NRCS Soils Data

Figure 3  
 Sheet 9 of 11





**Legend**  
 UR (Urban land-Yauhannah-Yemassee-Ogeechee association)    W (Water)    Project Study Area




Source:  
 NRCS Charleston  
 County Soils

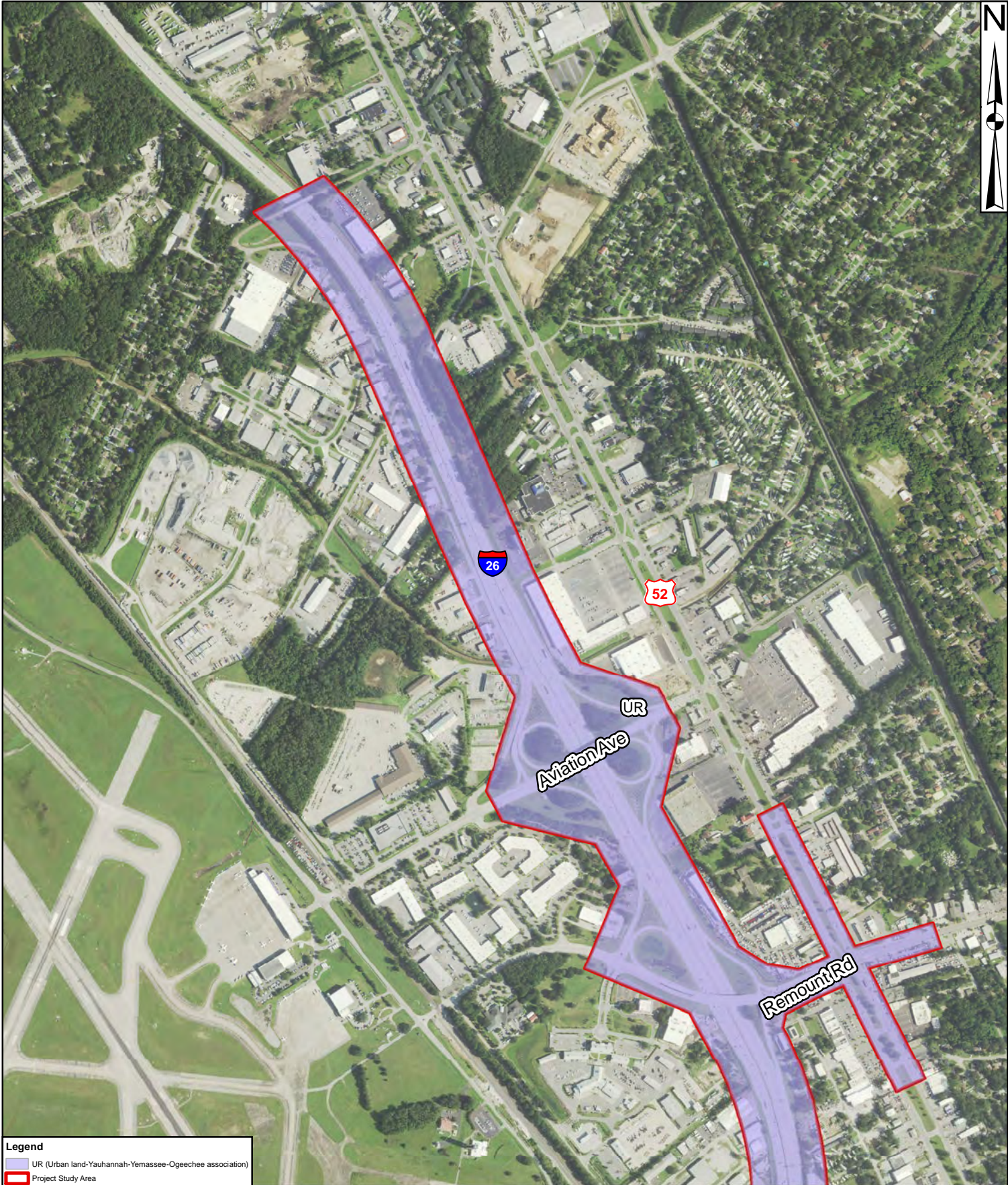
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 QA/QC: KLM

**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

NRCS Soils Data

Figure 3  
 Sheet 10 of 11





**Legend**  
 UR (Urban land-Yauhannah-Yemassee-Ogeechee association)  
 Project Study Area



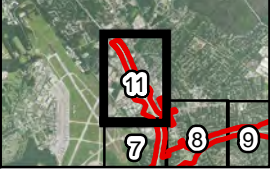

Source:  
 NRCS Charleston  
 County Soils

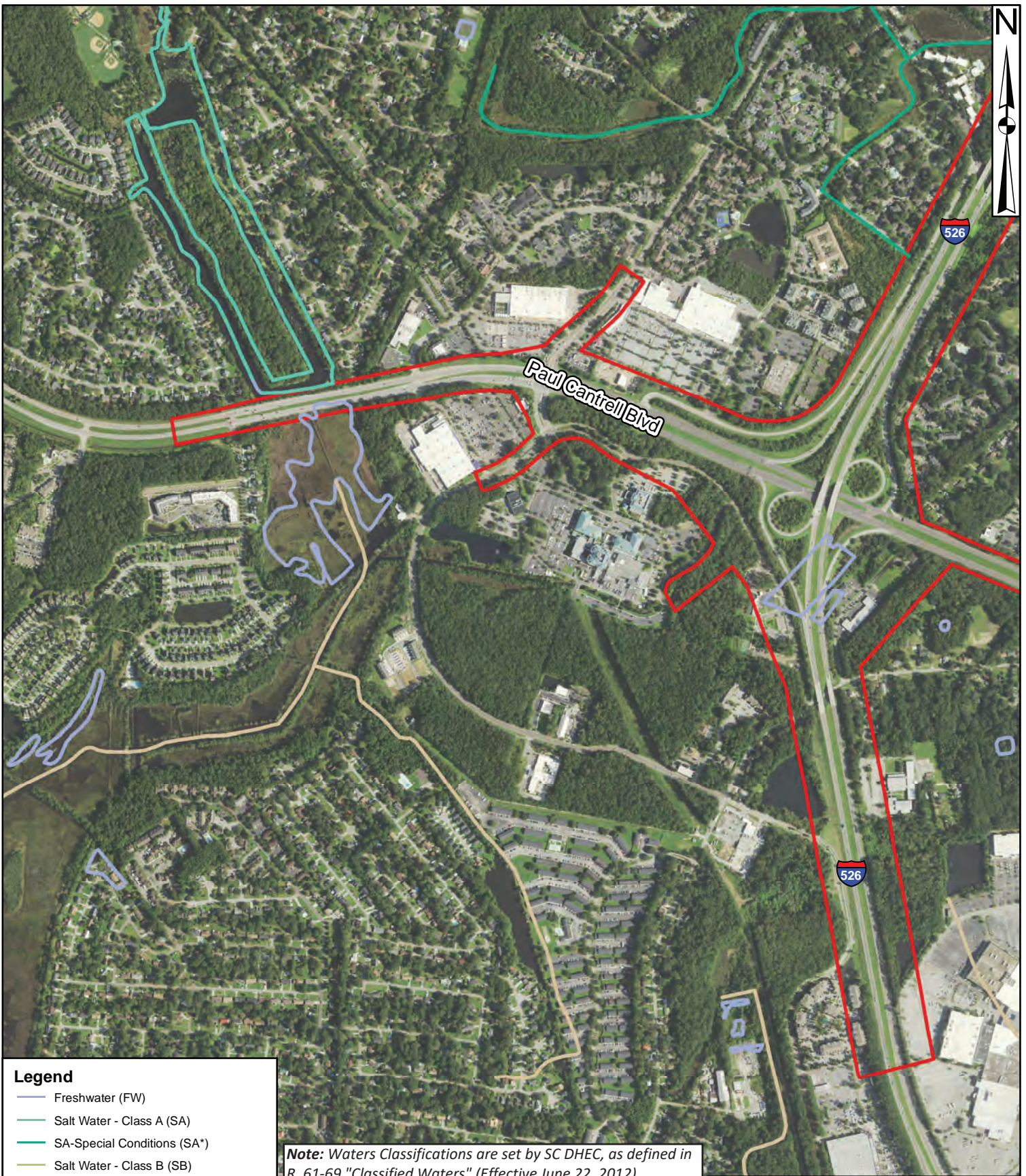
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 QA/QC: KLM

**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

NRCS Soils Data

Figure 3  
 Sheet 11 of 11





**Legend**

- Freshwater (FW)
- Salt Water - Class A (SA)
- SA-Special Conditions (SA\*)
- Salt Water - Class B (SB)
- SB-Special Conditions (SB\*)
- Project Study Area

**Note:** Waters Classifications are set by SC DHEC, as defined in R. 61-69 "Classified Waters" (Effective June 22, 2012).  
 The current location or extent of noted waters may vary based on a change in site conditions such as new development.



Source:  
 SCDHEC Water Quality Tool  
 2020  
 R.61-69 Effective 6/22/2012

**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

Drawn By: RHH  
 QA/QC: KLM

Waters Classification

Figure 5  
 Sheet 1 of 11

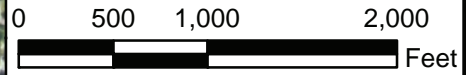




**Legend**

- Freshwater (FW)
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SCDHEC Water Quality Tool  
2020  
R.61-69 Effective 6/22/2012

**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

Drawn By: RHH  
QA/QC: KLM

Waters Classification

Figure 5  
Sheet 2 of 11





**Legend**

- Freshwater (FW)
- Salt Water - Class A (SA)
- SA-Special Conditions (SA\*)
- Salt Water - Class B (SB)
- SB-Special Conditions (SB\*)
- Project Study Area

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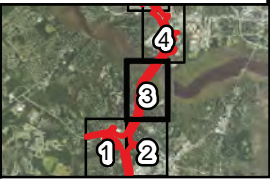
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 SCDHEC Water Quality Tool  
 2020  
 R.61-69 Effective 6/22/2012

**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

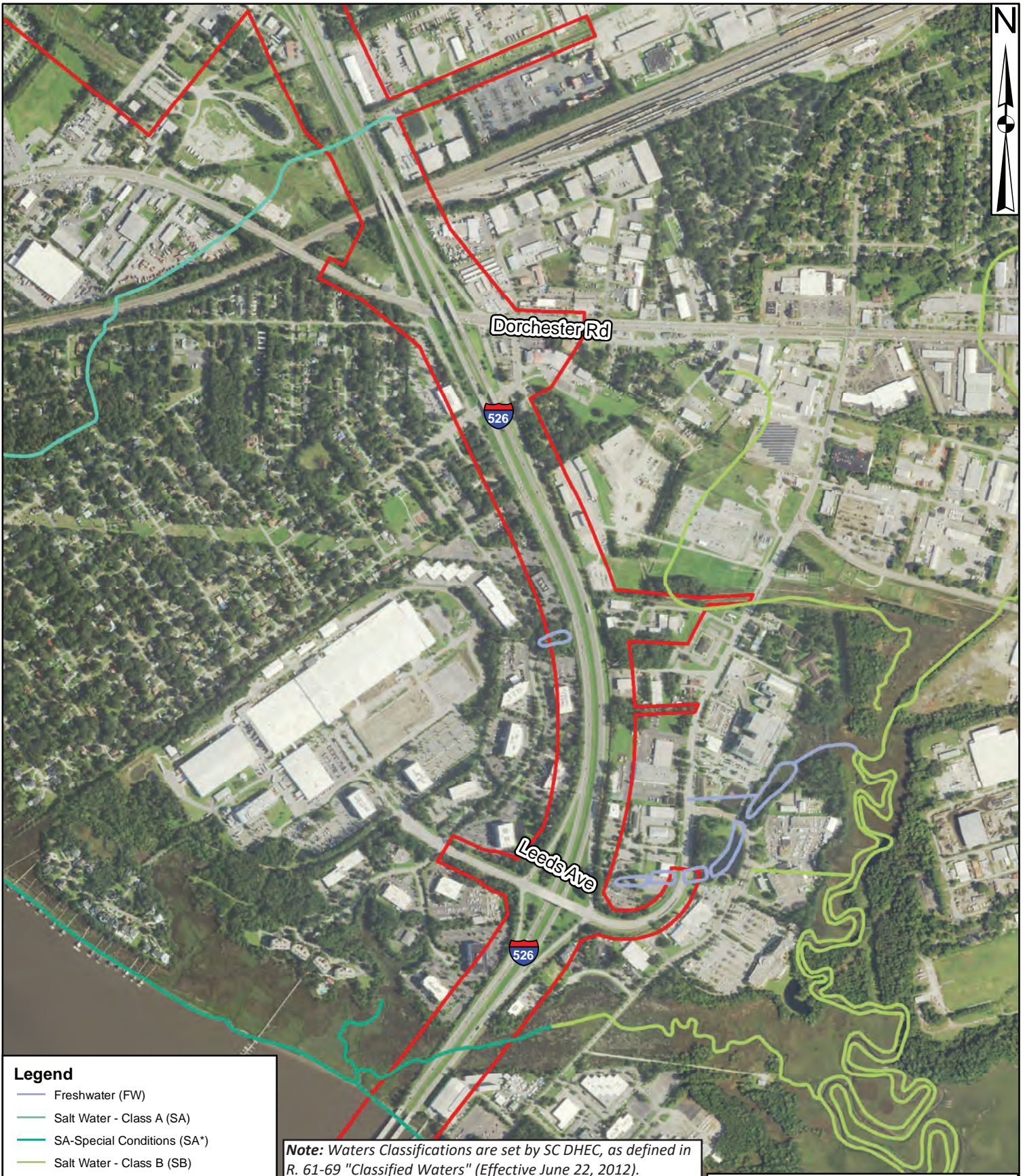
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 QA/QC: KLM

Waters Classification

Figure 5  
 Sheet 3 of 11



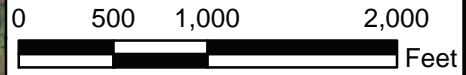




**Legend**

- Freshwater (FW)
- Salt Water - Class A (SA)
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 2020  
 R.61-69 Effective 6/22/2012

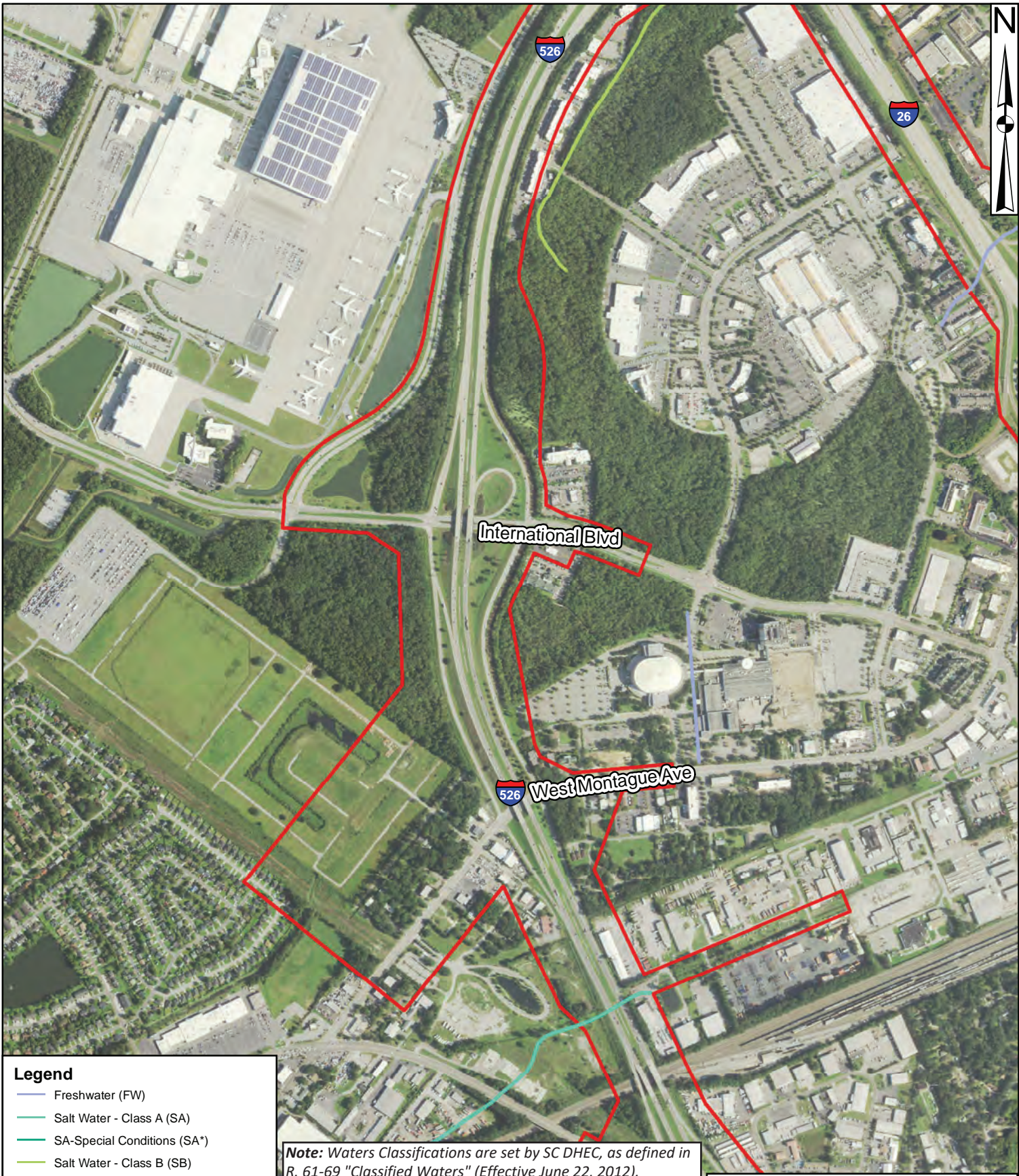
**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

Drawn By: RHH  
 QA/QC: KLM

Waters Classification

Figure 5  
 Sheet 4 of 11

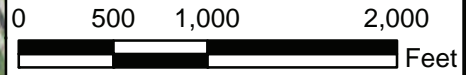




**Legend**

- Freshwater (FW)
- Salt Water - Class A (SA)
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- Salt Water - Class B (SB)
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- Project Study Area

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 SCDHEC Water Quality Tool  
 2020  
 R.61-69 Effective 6/22/2012

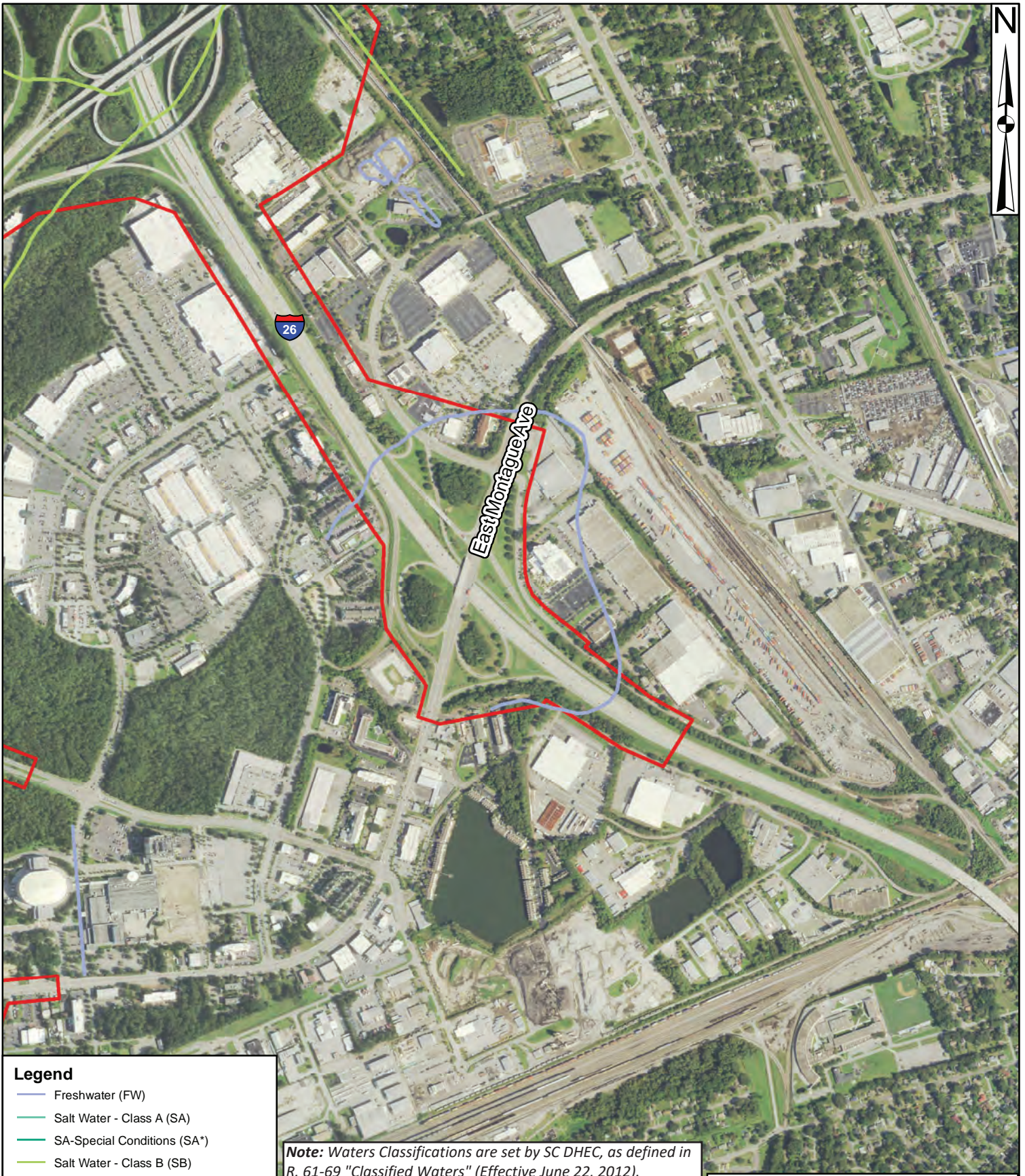
**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

Drawn By: RHH  
 QA/QC: KLM

Waters Classification

Figure 5  
 Sheet 5 of 11

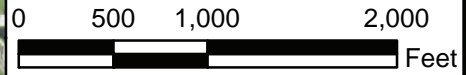




**Legend**

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**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

Drawn By: RHH  
 QA/QC: KLM

Waters Classification

Figure 5  
 Sheet 6 of 11

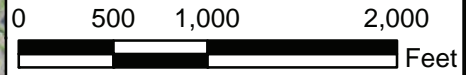




**Legend**

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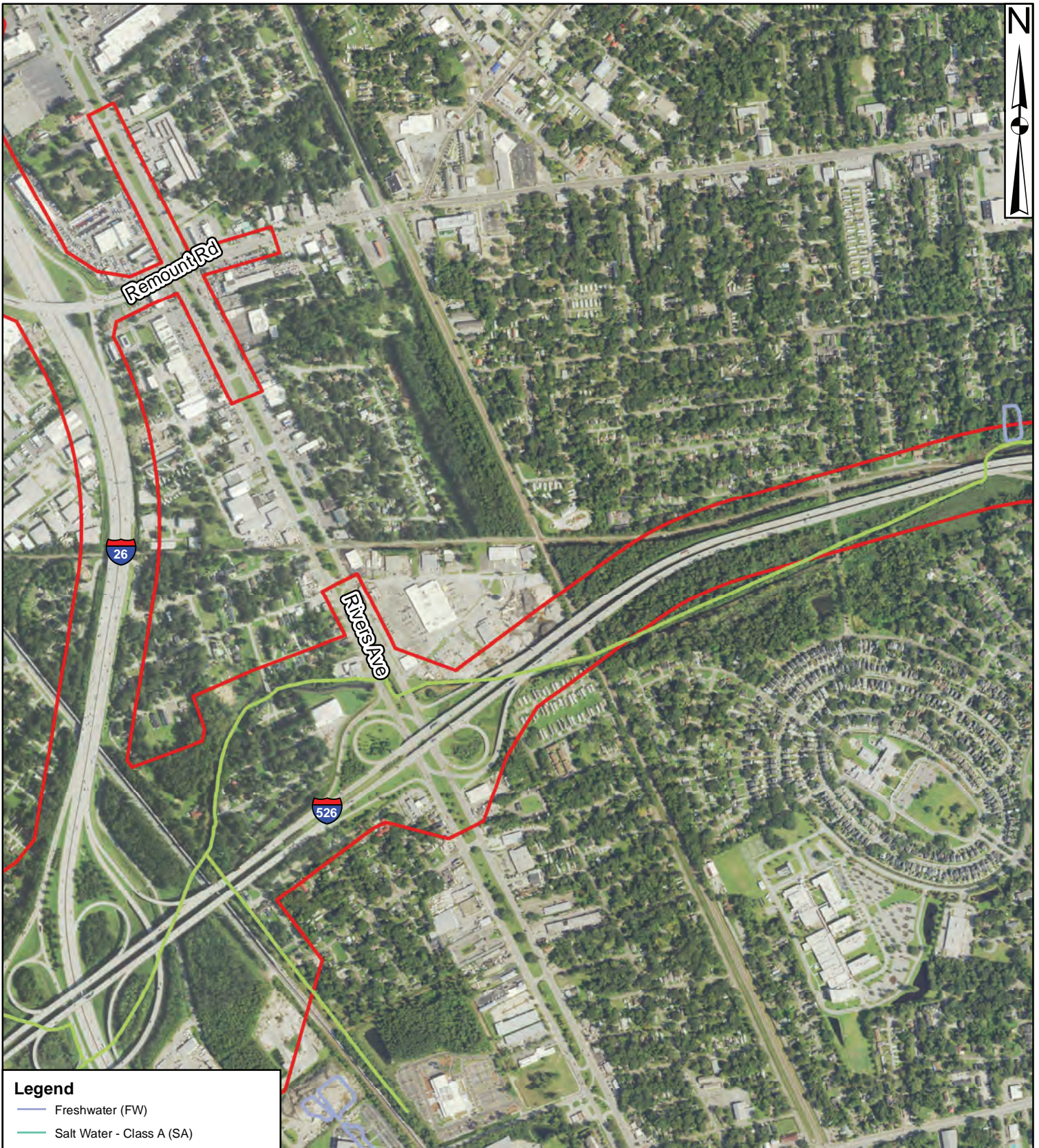
**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

Drawn By: RHH  
 QA/QC: KLM

Waters Classification

Figure 5  
 Sheet 7 of 11

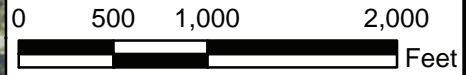




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 SCDHEC Water Quality Tool  
 2020  
 R.61-69 Effective 6/22/2012

**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

Drawn By: RHH  
 QA/QC: KLM

Waters Classification

Figure 5  
 Sheet 8 of 11

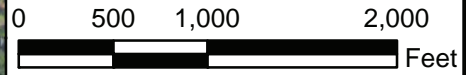




**Legend**

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Source:  
 SCDHEC Water Quality Tool  
 2020  
 R.61-69 Effective 6/22/2012

**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

Drawn By: RHH  
 QA/QC: KLM

Waters Classification

Figure 5  
 Sheet 9 of 11

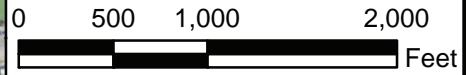




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 SCDHEC Water Quality Tool  
 2020  
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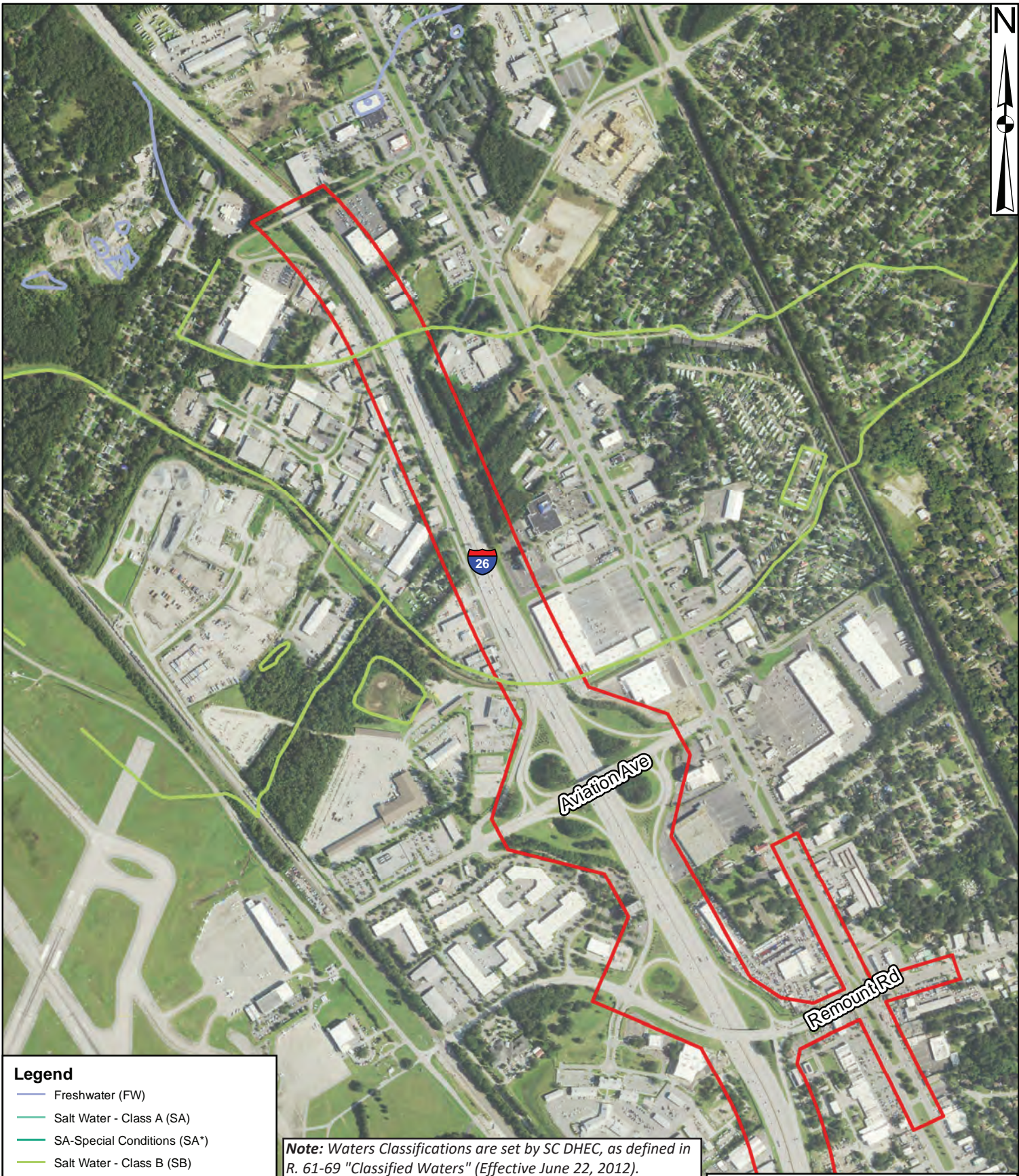
**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

Drawn By: RHH  
 QA/QC: KLM

Waters Classification

Figure 5  
 Sheet 10 of 11

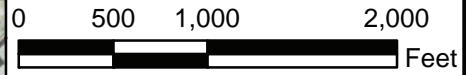




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 2020  
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**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

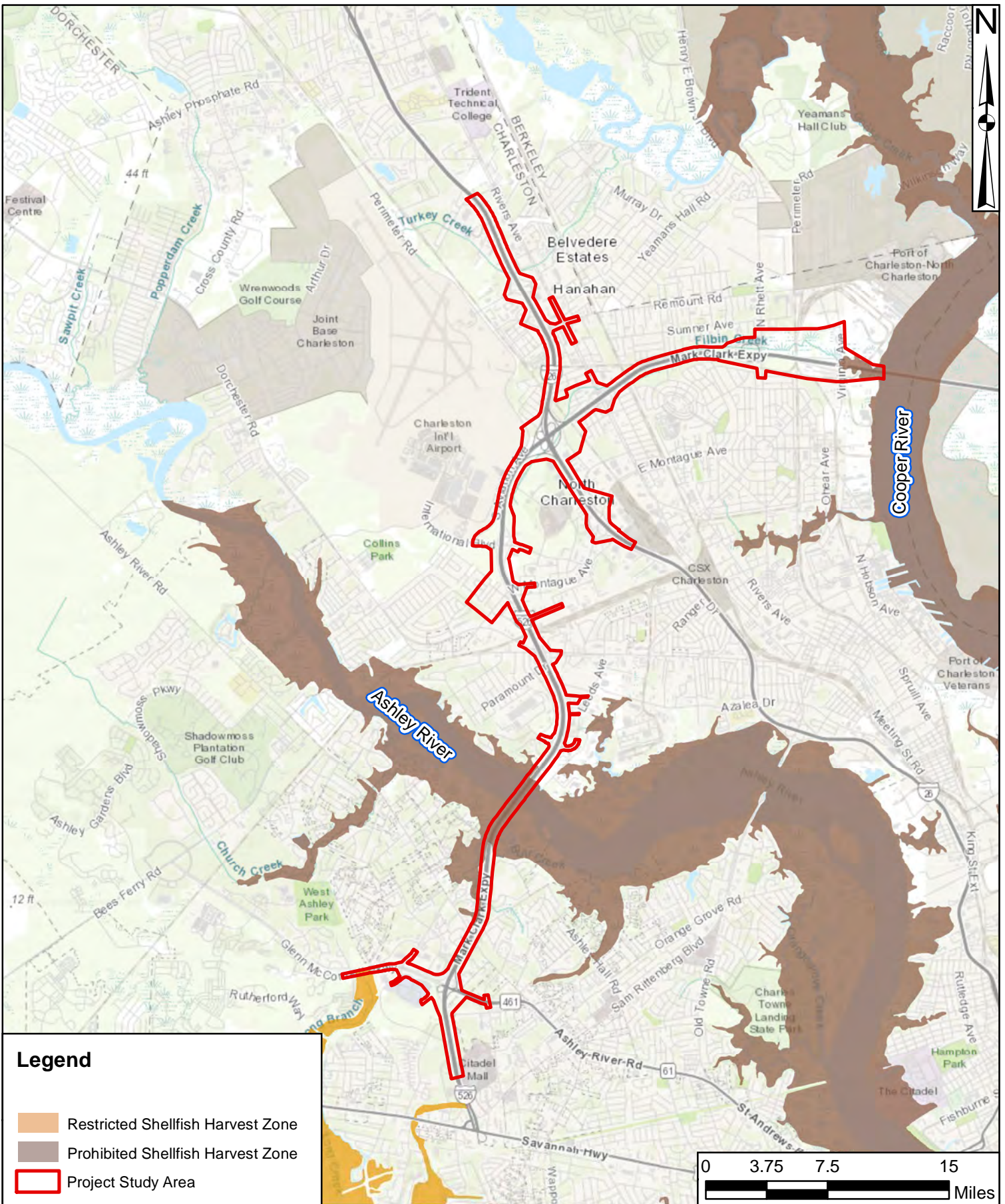
Drawn By: RHH  
 QA/QC: KLM

Waters Classification

Figure 5  
 Sheet 11 of 11







**Legend**

- Restricted Shellfish Harvest Zone
- Prohibited Shellfish Harvest Zone
- Project Study Area



Source:  
SCDHEC Water Quality Tool  
2020

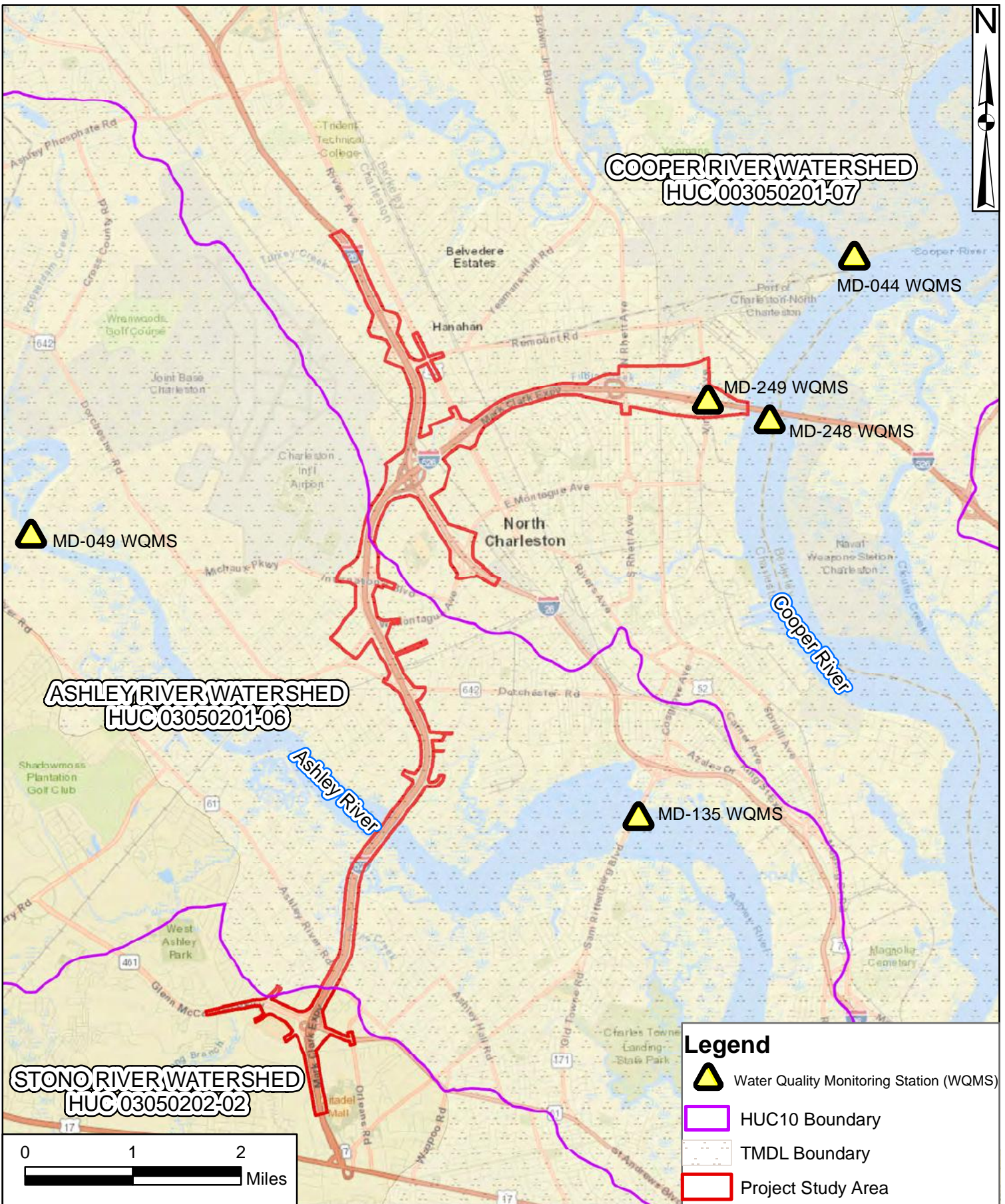
Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**





Shellfish Harvest  
Classification

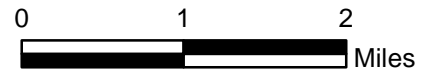





Figure 5

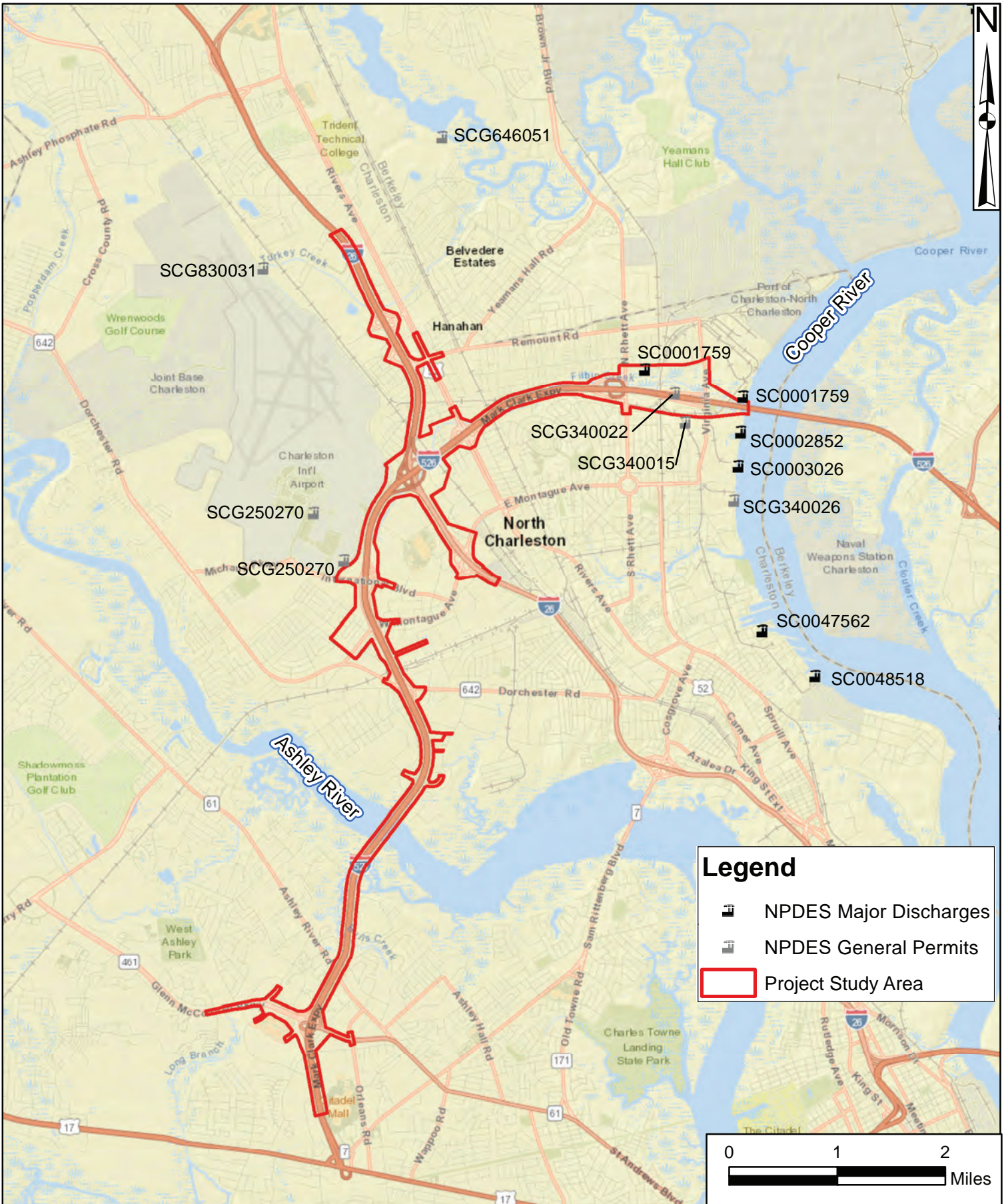


**Legend**




-  Water Quality Monitoring Station (WQMS)
-  HUC10 Boundary
-  TMDL Boundary
-  Project Study Area

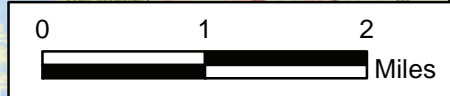


 	Source: USGS NHD January 2020	<b>I-526 Lowcountry Corridor West</b> <b>Charleston County</b> <b>SCDOT P032102</b> <b>April 2020</b>		
	Drawn By: RHH QA/QC: KLM	10-Digit HUC TMDL Boundary	Figure 6	



**Legend**

-  NPDES Major Discharges
-  NPDES General Permits
-  Project Study Area





Source:  
USGS NHD  
January 2020

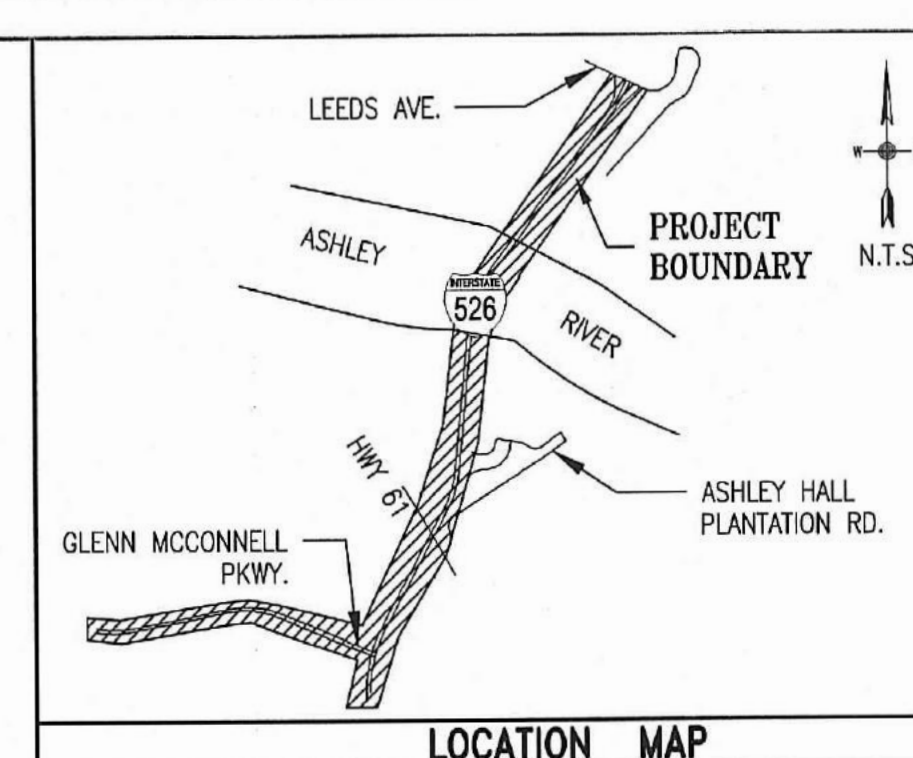
**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**April 2020**

Drawn By: RHH  
QA/QC: KLM

NPDES Permits

Figure 6



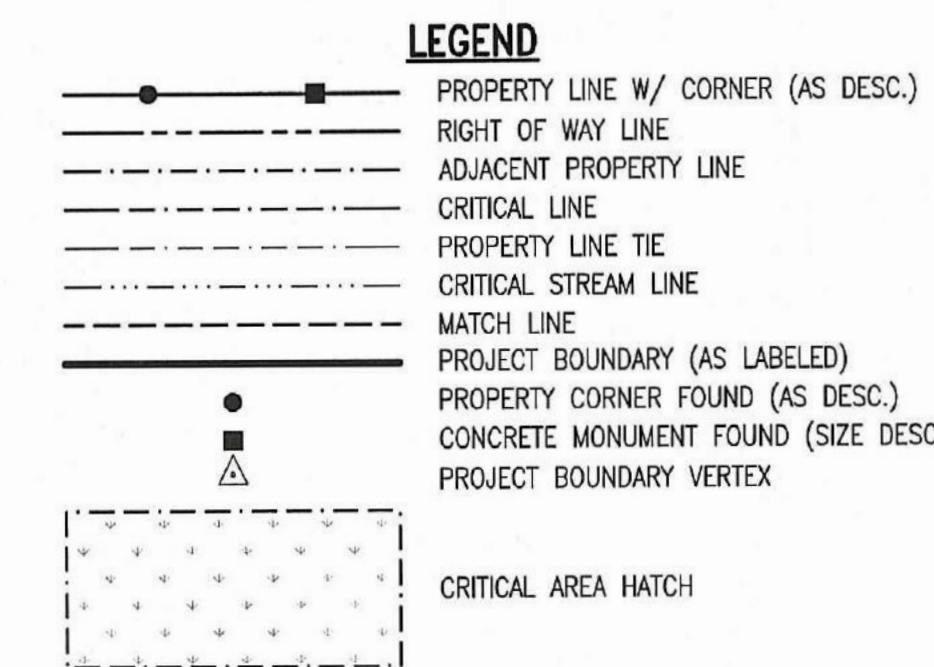


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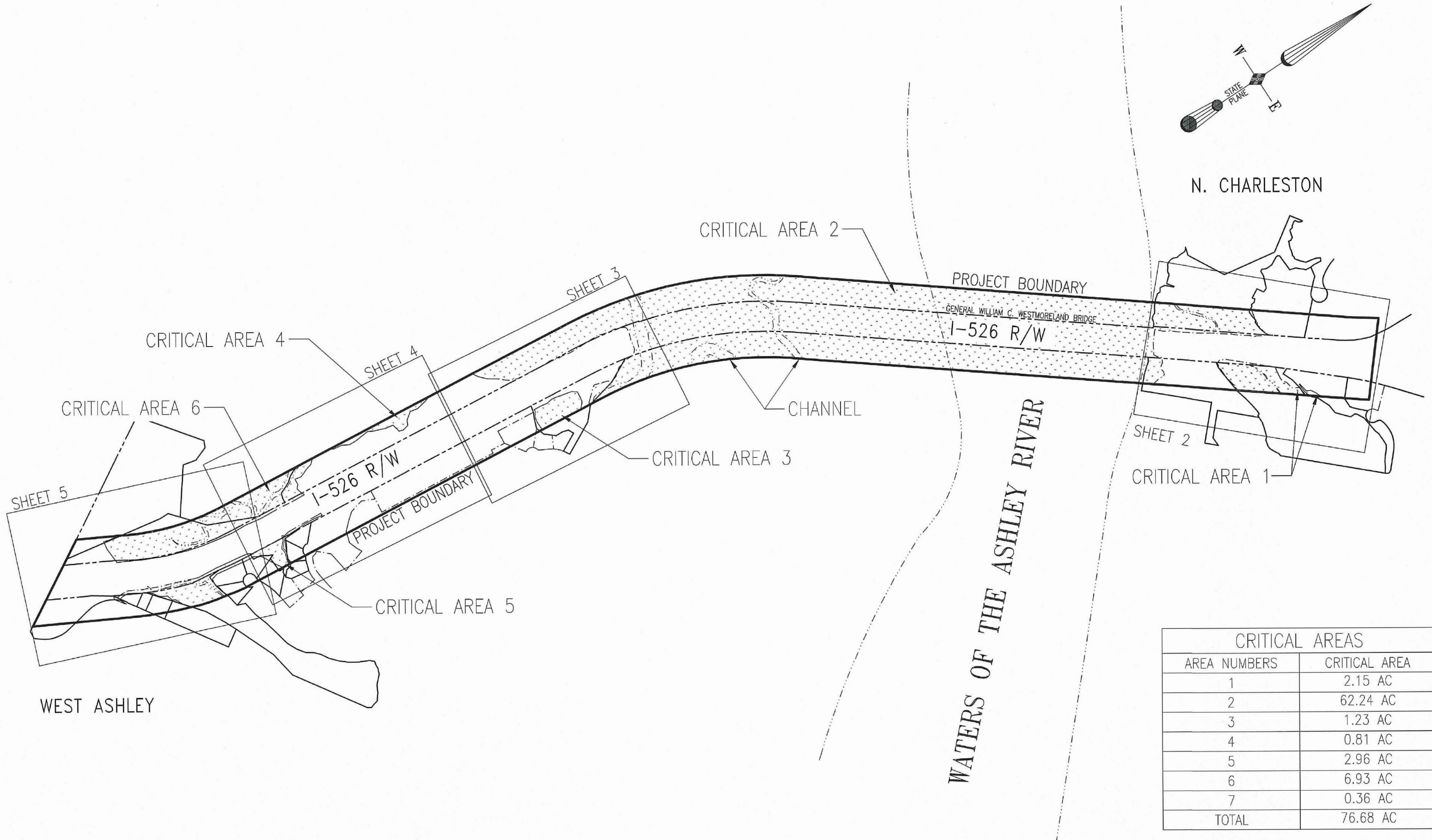
**REFERENCE PLAT BY:**

PLAT BOOK-PAGE	DATE	NAME
BX - 162	APRIL 26, 1989	GEORGE A.Z. JOHNSON
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BL - 132	DEC 31, 1986	H. EXO HILTON
L09 - 0517	OCT 15, 2009	ANDREW G. GILLETTE
	1983	SCOTT ROAD PLANS #10.765



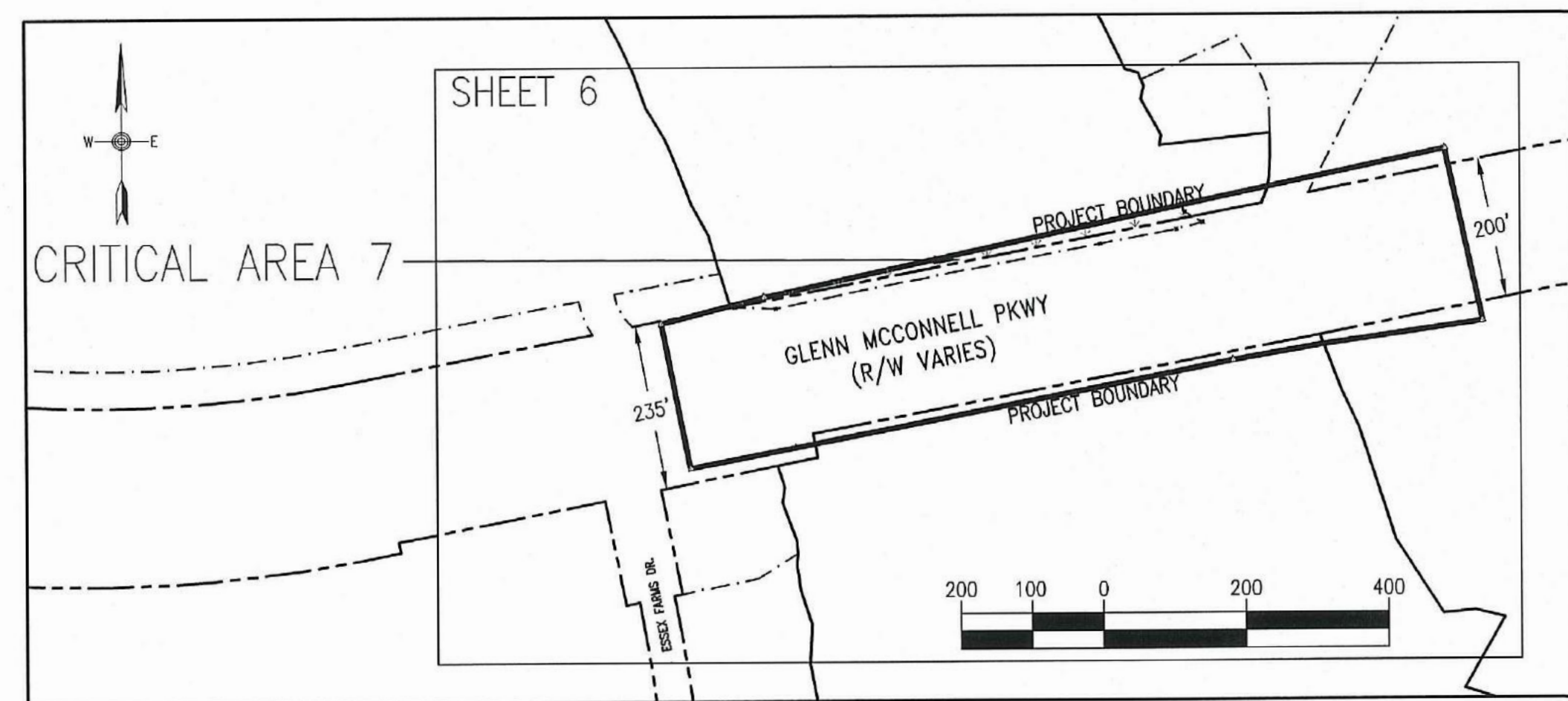
**ABBREVIATION LEGEND**

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- CMF CONCRETE MONUMENT FOUND (SIZE DESC.)
- IPF IRON PIPE FOUND (SIZE DESC.)



**CRITICAL AREAS**

AREA NUMBERS	CRITICAL AREA
1	2.15 AC
2	62.24 AC
3	1.23 AC
4	0.81 AC
5	2.96 AC
6	6.93 AC
7	0.36 AC
TOTAL	76.68 AC

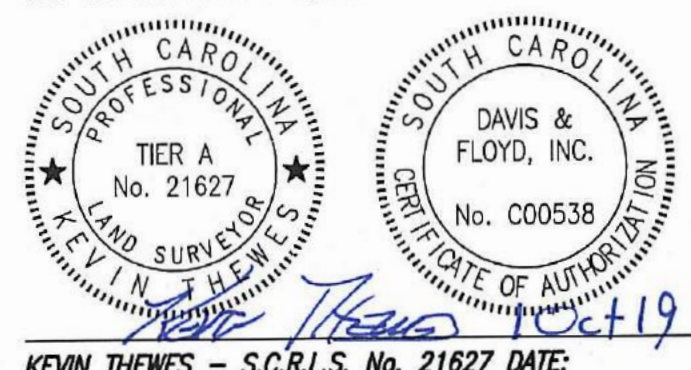


**CRITICAL LINE PLAT**  
 SHOWING  
 CRITICAL AREAS ALONG I-526 CORRIDOR  
 INCLUDING  
 CRITICAL AREAS 1 (2.15 AC), 2 (62.24 AC),  
 3 (1.23 AC), 4 (0.81 AC), 5 (2.96 AC),  
 6 (6.93 AC), AND 7 (0.36 AC)  
 LOCATED  
 CITY OF NORTH CHARLESTON  
 AND  
 CITY OF CHARLESTON  
 CHARLESTON COUNTY, SOUTH CAROLINA  
 D&F JOB #: 31667.00

SCALE: 1" = 400' DATE: 05/23/2019  
 400 200 0 400 800

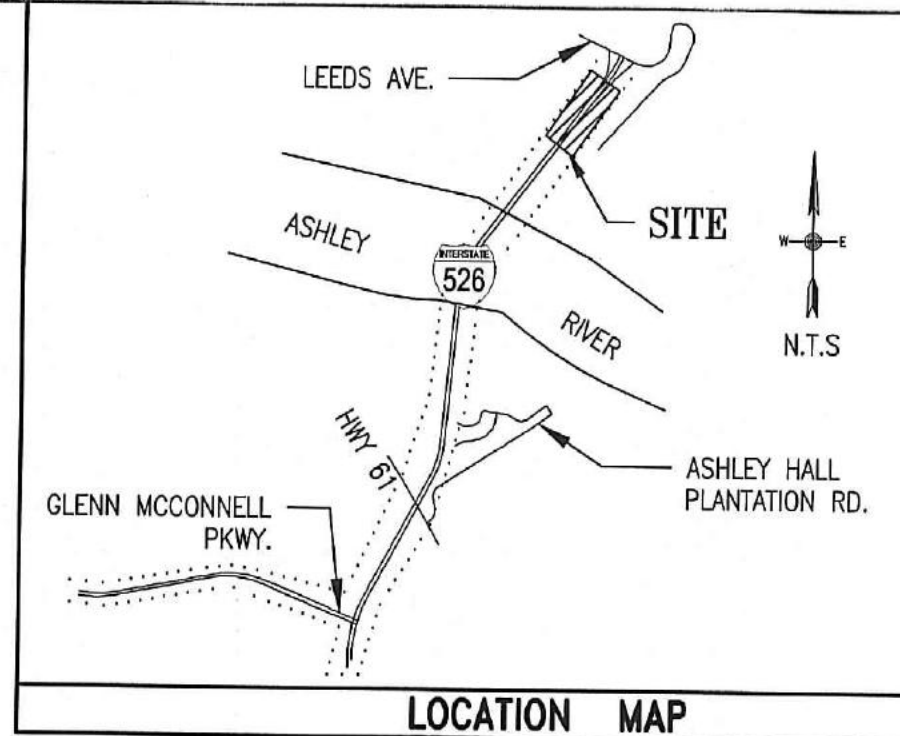
SHEET 01 of 06

I HEREBY STATE THAT TO THE BEST OF MY KNOWLEDGE, INFORMATION, AND BELIEF, THE SURVEY SHOWN HEREON WAS MADE IN ACCORDANCE WITH THE REQUIREMENTS OF THE MINIMUM STANDARDS MANUAL FOR THE PRACTICE OF LAND SURVEYING IN SOUTH CAROLINA, AND MEETS OR EXCEEDS THE REQUIREMENTS FOR A CLASS "A" SURVEY AS SPECIFIED THEREIN. THE AREA WAS DETERMINED BY THE COORDINATE METHOD OF AREA DETERMINATION. THE PRECISION OF THE UNADJUSTED FIELD SURVEY WAS GREATER THAN 1:10,000.



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*Kevin Thewes* 10-3-19  
 SIGNATURE DATE  
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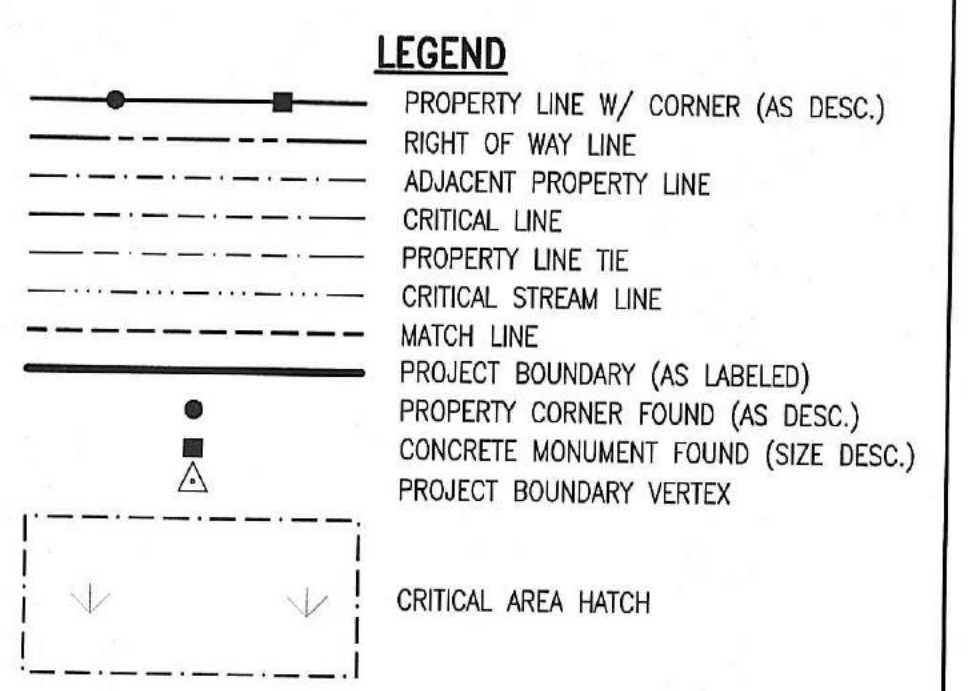


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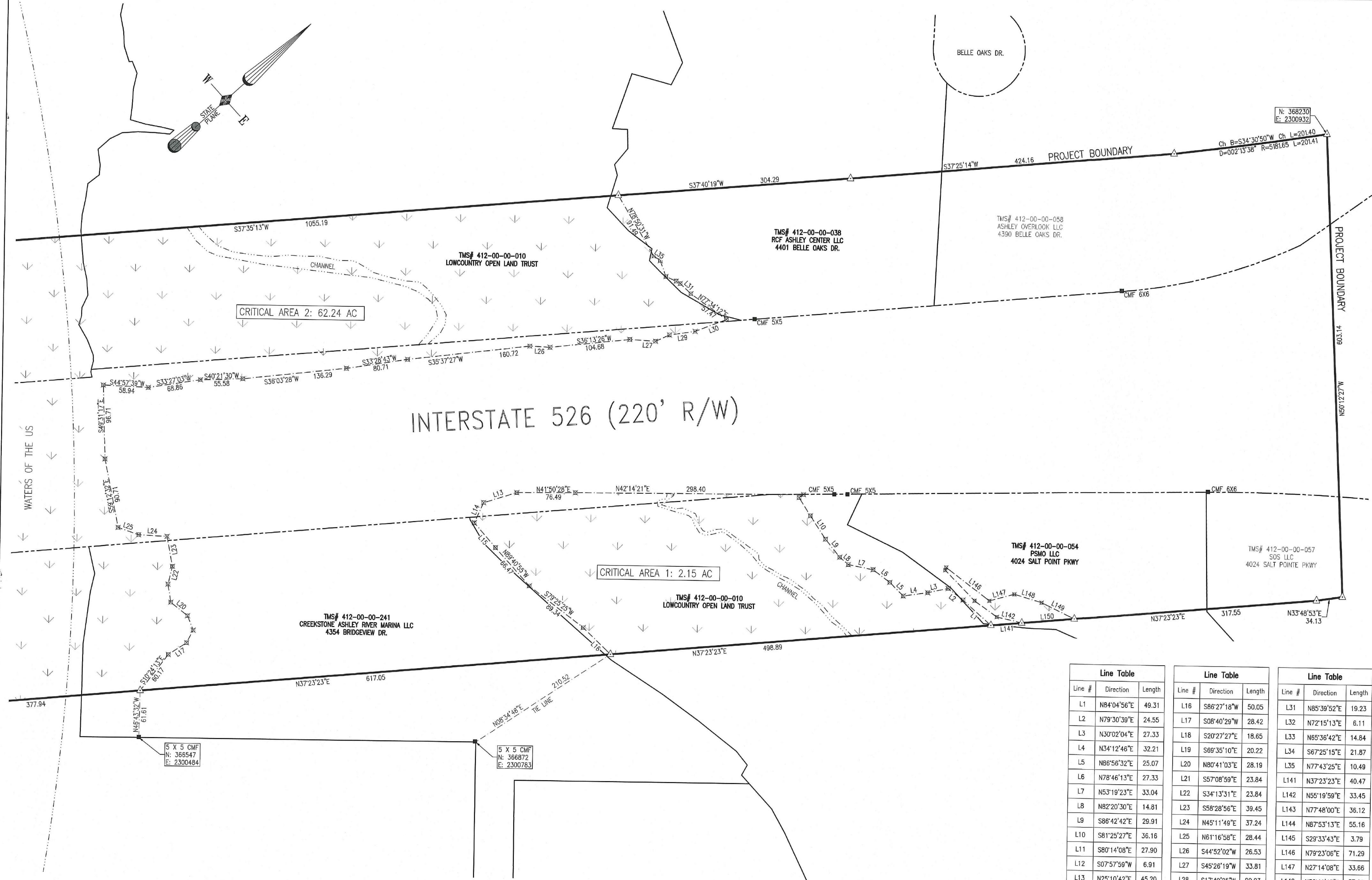
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13. ANDREW G. GILLETTE	OCT 15, 2009 L09 - 0517
14. SCDOT ROAD PLANS #10.765	- 1983



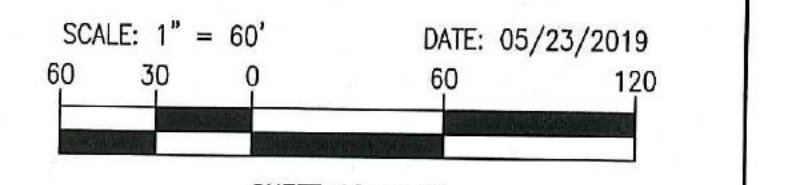
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Line #	Direction	Length	Line #	Direction	Length	Line #	Direction	Length
L1	N84°04'56"E	49.31	L16	S86°27'18"W	50.05	L31	N85°39'52"E	19.23
L2	N79°30'39"E	24.55	L17	S08°40'29"W	28.42	L32	N72°15'13"E	6.11
L3	N30°02'04"E	27.33	L18	S20°27'27"E	18.65	L33	N65°36'42"E	14.84
L4	N34°12'46"E	32.21	L19	S69°35'10"E	20.22	L34	S67°25'15"E	21.87
L5	N86°56'32"E	25.07	L20	N80°41'03"E	28.19	L35	N77°43'25"E	10.49
L6	N78°46'13"E	27.33	L21	S57°08'59"E	23.84	L141	N37°23'23"E	40.47
L7	N53°19'23"E	33.04	L22	S34°13'31"E	23.84	L142	N55°19'59"E	33.45
L8	N82°20'30"E	14.81	L23	S58°28'56"E	39.45	L143	N77°48'00"E	36.12
L9	S86°42'42"E	29.91	L24	N45°11'49"E	37.24	L144	N87°53'13"E	55.16
L10	S81°25'27"E	36.16	L25	N61°16'58"E	28.44	L145	S29°33'43"E	3.79
L11	S80°14'08"E	27.90	L26	S44°52'02"W	26.53	L146	N79°23'06"E	71.29
L12	S07°57'59"W	6.91	L27	S45°26'19"W	33.81	L147	N27°14'08"E	33.66
L13	N25°10'42"E	45.20	L28	S17°49'25"W	20.03	L148	N58°41'45"E	37.29
L14	N23°21'31"W	28.62	L29	S33°56'58"W	33.74	L149	N68°14'18"E	47.69
L15	N88°48'44"W	42.46	L30	S20°52'54"W	43.84	L150	N37°23'23"E	68.87

**CRITICAL LINE PLAT**  
 SHOWING  
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 INCLUDING  
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 AND  
 CITY OF CHARLESTON  
 CHARLESTON COUNTY, SOUTH CAROLINA  
 D&F JOB #: 31667.00



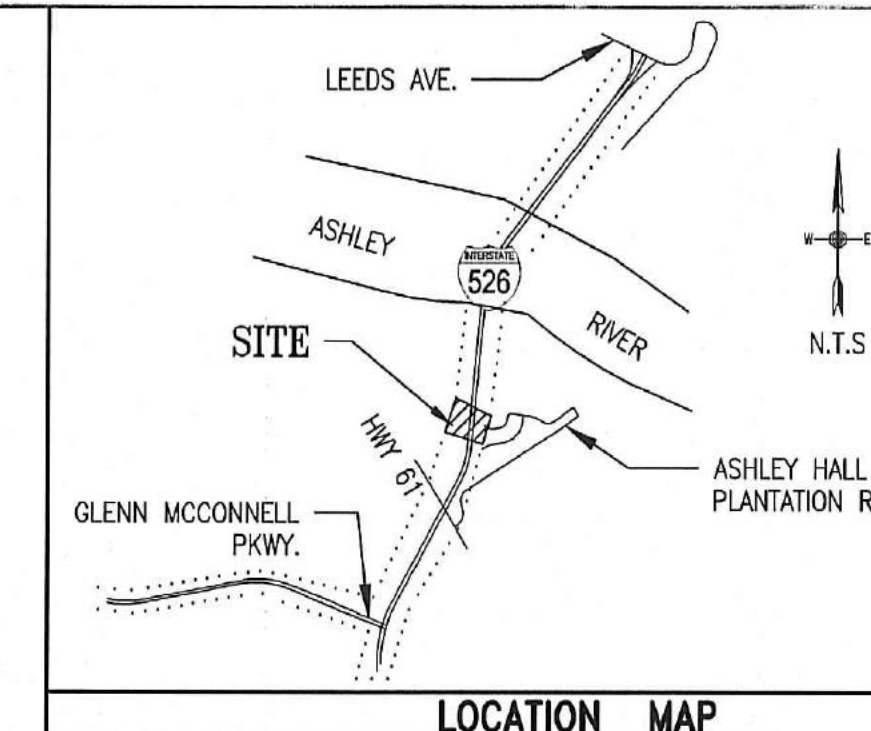
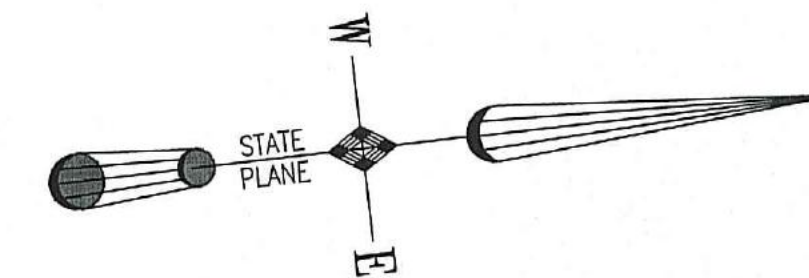
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 CHARLESTON, SC 29419  
 PHONE (843) 554-8602  
 KTHEWES@DAVISFLOYD.COM

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KEVIN THEWES - S.C.R.L.S. No. 21627 DATE: 10-3-19

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Josh Hoke 10-3-19  
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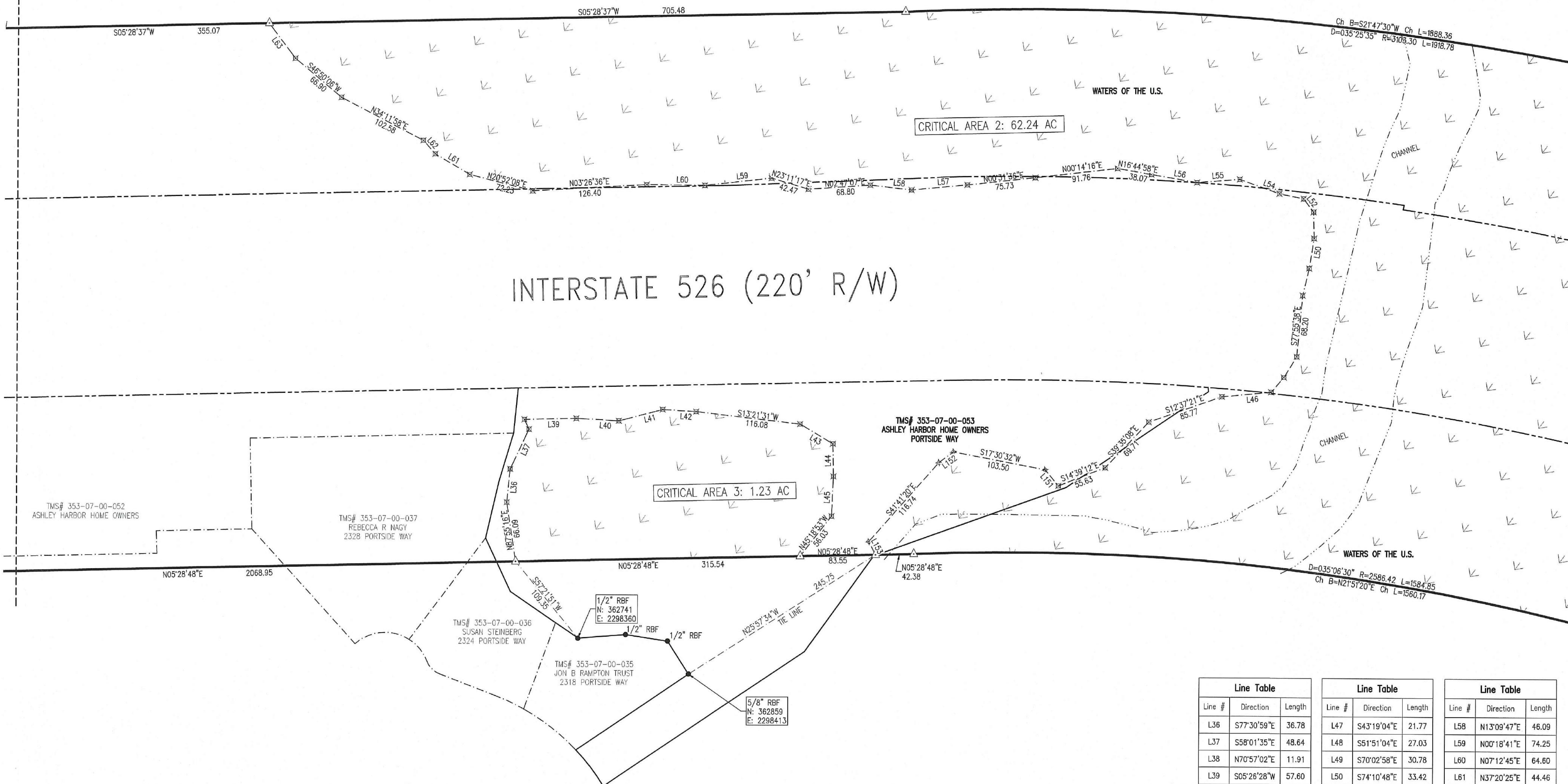
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| 12. H. EXO HILTON            | - DEC 31, 1986   | BL - 132   |
| 13. ANDREW G. GILLETTE       | - OCT 15, 2009   | LO9 - 0517 |
| 14. SCDOT ROAD PLANS #10.765 | - 1983           |            |

**LEGEND**

- PROPERTY LINE W/ CORNER (AS DESC.)
- +— RIGHT OF WAY LINE
- - - ADJACENT PROPERTY LINE
- - - CRITICAL LINE
- - - PROPERTY LINE TIE
- - - CRITICAL STREAM LINE
- - - MATCH LINE
- - - PROJECT BOUNDARY (AS LABELED)
- PROPERTY CORNER FOUND (AS DESC.)
- ▲ CONCRETE MONUMENT FOUND (SIZE DESC.)
- PROJECT BOUNDARY VERTEX
- ▭ CRITICAL AREA HATCH

**ABBREVIATION LEGEND**

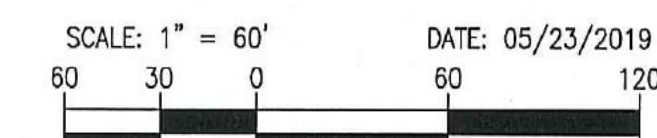
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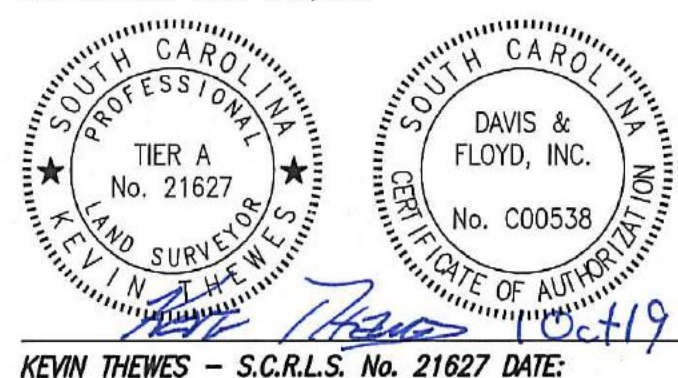
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L38	N70°57'02"E	11.91	L49	S70°02'58"E	30.78	L60	N07°12'45"E	64.60
L39	S05°26'28"W	57.60	L50	S74°10'48"E	33.42	L61	N37°20'25"E	44.46
L40	S09°59'43"W	47.16	L51	S84°39'10"E	29.12	L62	N54°58'08"E	19.99
L41	S07°59'10"E	50.21	L52	N59°22'45"E	18.31	L63	S59°45'54"W	48.48
L42	S10°03'33"W	37.13	L53	N18°02'49"E	27.38	L151	S57°06'43"W	23.03
L43	S37°17'04"W	42.40	L54	N26°23'00"E	46.51	L152	S29°36'40"E	19.99
L44	N84°23'46"W	36.04	L55	N02°26'17"E	47.54	L153	N69°04'01"E	16.36
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**D&F JOB #: 31667.00**



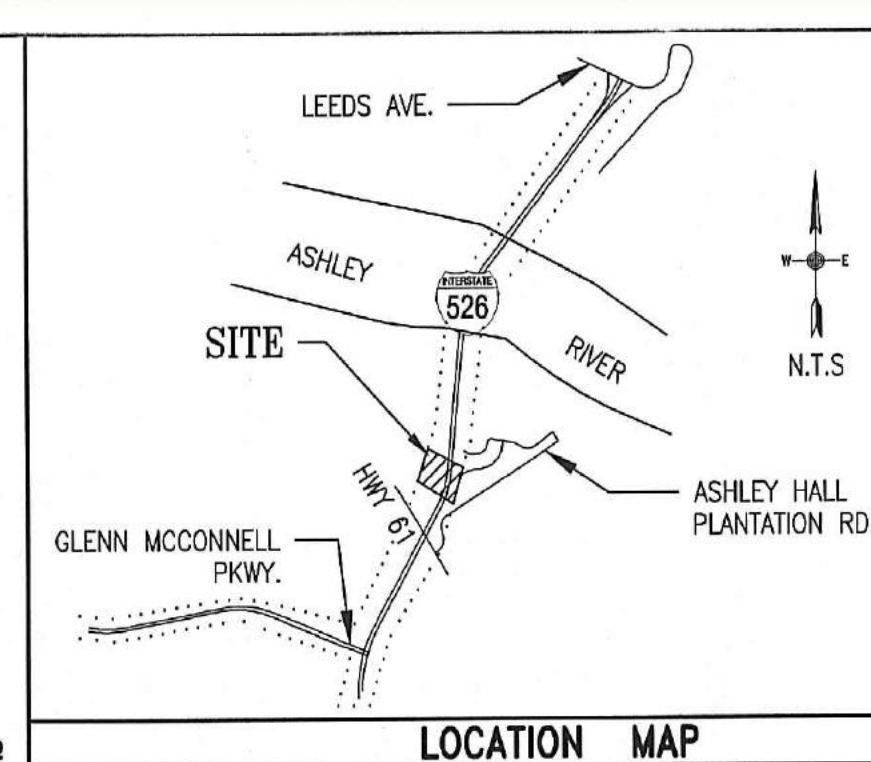
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*Joseph Thewes* 10-3-19  
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**LEGEND**

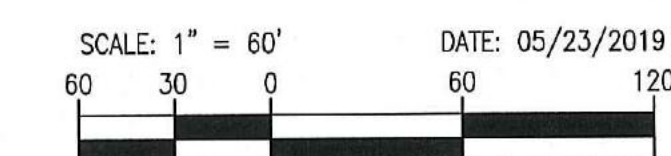
- PROPERTY LINE W/ CORNER (AS DESC.)
- RIGHT OF WAY LINE
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- CRITICAL LINE
- PROPERTY LINE TIE
- CRITICAL STREAM LINE
- MATCH LINE
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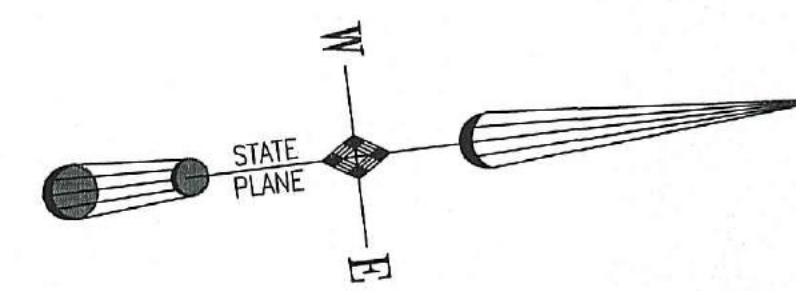
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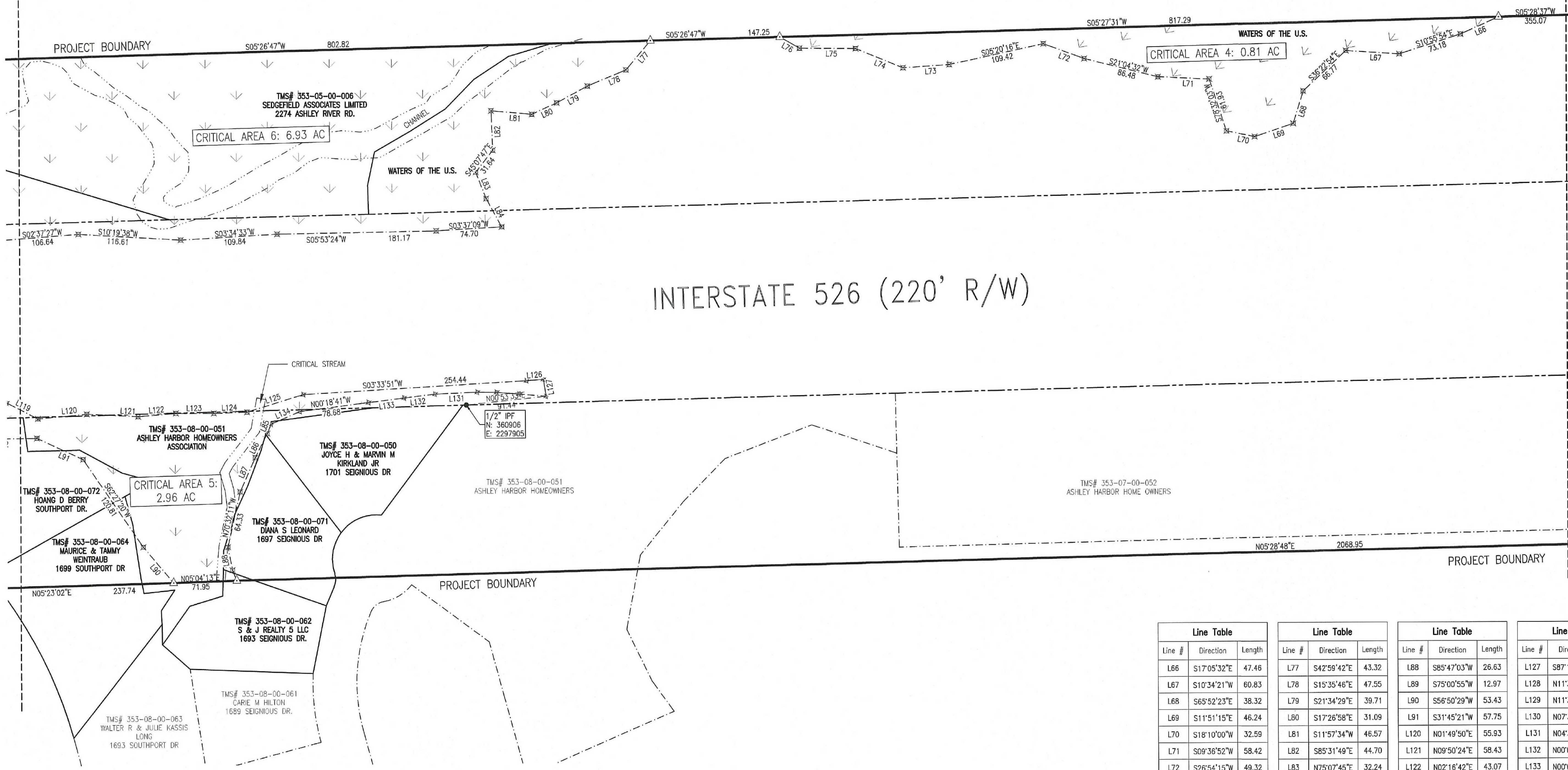
SHEET 04 of 06

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 KTHEWES@DAVISFLOYD.COM



SHEET 4  
 SHEET 5

SHEET 3  
 SHEET 4



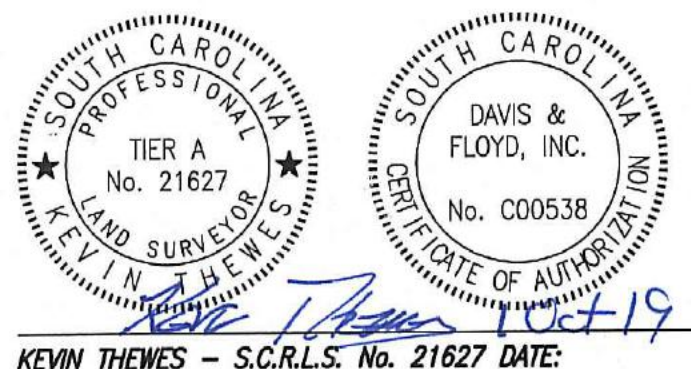
INTERSTATE 526 (220' R/W)

Line Table			Line Table			Line Table			Line Table		
Line #	Direction	Length	Line #	Direction	Length	Line #	Direction	Length	Line #	Direction	Length
L66	S17°05'32"E	47.46	L77	S42°58'42"E	43.32	L88	S85°47'03"W	26.63	L127	S87°19'53"W	19.37
L67	S10°34'21"W	60.83	L78	S15°35'46"E	47.55	L89	S75°00'55"W	12.97	L128	N11°34'25"E	30.89
L68	S65°52'23"E	38.32	L79	S21°34'29"E	39.71	L90	S56°50'29"W	53.43	L129	N11°34'25"E	25.71
L69	S11°51'15"E	46.24	L80	S17°26'58"E	31.09	L91	S31°45'21"W	57.75	L130	N07°36'13"E	21.96
L70	S18°10'00"W	32.59	L81	S11°57'34"W	46.57	L120	N01°49'50"E	55.93	L131	N04°30'53"E	48.19
L71	S09°36'52"W	58.42	L82	S85°31'49"E	44.70	L121	N09°50'24"E	58.43	L132	N00°04'01"W	35.37
L72	S26°54'15"W	49.32	L83	N75°07'45"E	32.24	L122	N02°16'42"E	43.07	L133	N00°04'01"W	40.79
L73	S03°05'03"W	52.76	L84	N68°09'07"E	36.64	L123	N06°59'02"E	43.23	L134	N16°16'55"W	35.79
L74	S29°03'30"W	58.21	L85	N60°57'56"W	11.53	L124	N05°00'44"E	37.86			
L75	S07°23'11"W	63.71	L86	N56°25'25"W	30.59	L125	S10°08'45"E	67.07			
L76	S36°35'27"W	25.72	L87	N59°00'35"W	42.36	L126	S02°36'09"W	19.12			

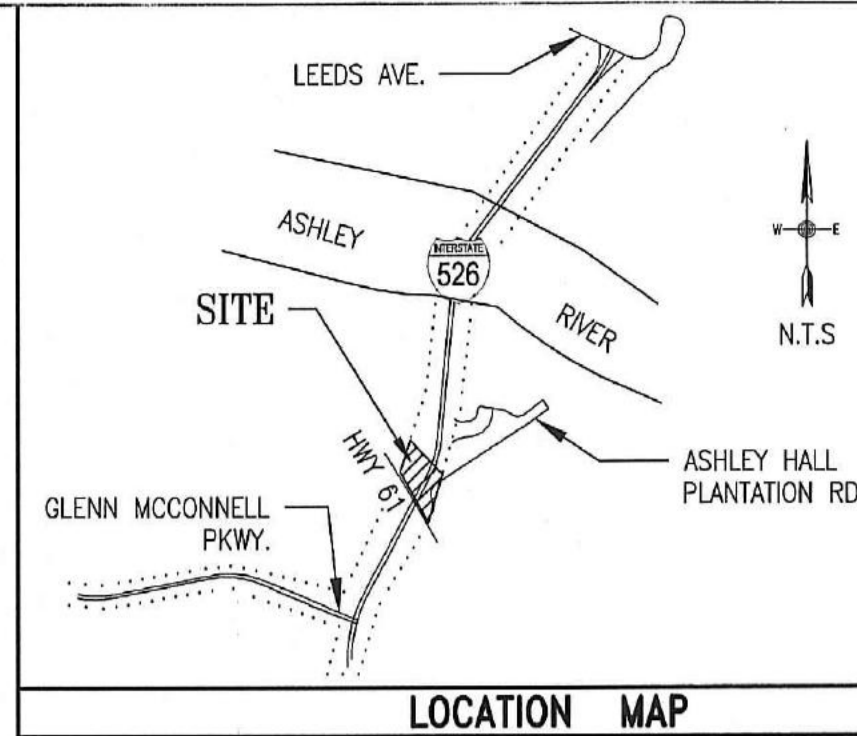
I HEREBY STATE THAT TO THE BEST OF MY KNOWLEDGE, INFORMATION, AND BELIEF, THE SURVEY SHOWN HEREON WAS MADE IN ACCORDANCE WITH THE REQUIREMENTS OF THE MINIMUM STANDARDS MANUAL FOR THE PRACTICE OF LAND SURVEYING IN SOUTH CAROLINA, AND MEETS OR EXCEEDS THE REQUIREMENTS FOR A CLASS "A" SURVEY AS SPECIFIED THEREIN. THE AREA WAS DETERMINED BY THE COORDINATE METHOD OF AREA DETERMINATION. THE PRECISION OF THE UNADJUSTED FIELD SURVEY WAS GREATER THAN 1:10,000.

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*Josh Abbe* 10-3-19  
 SIGNATURE DATE  
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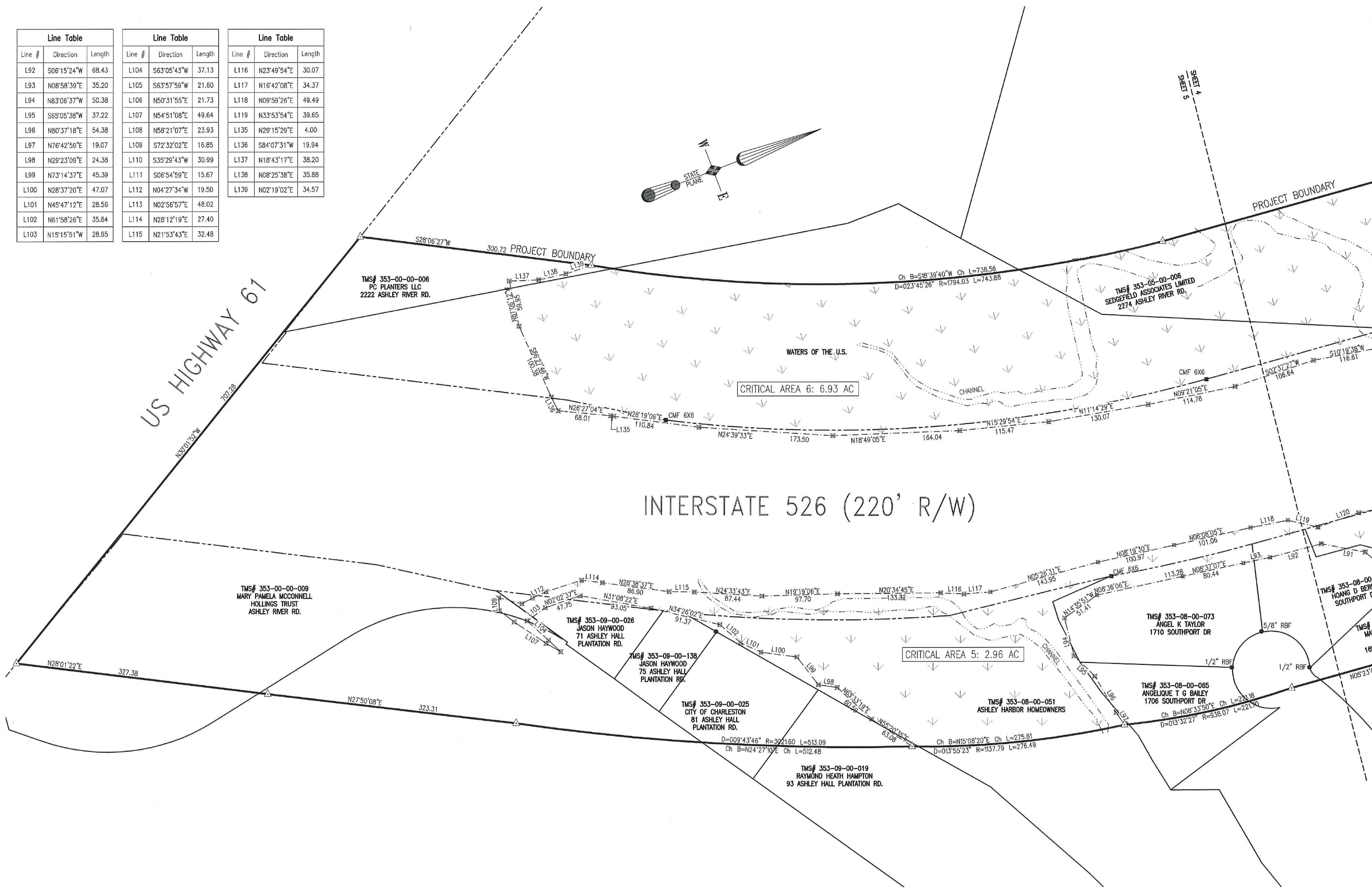
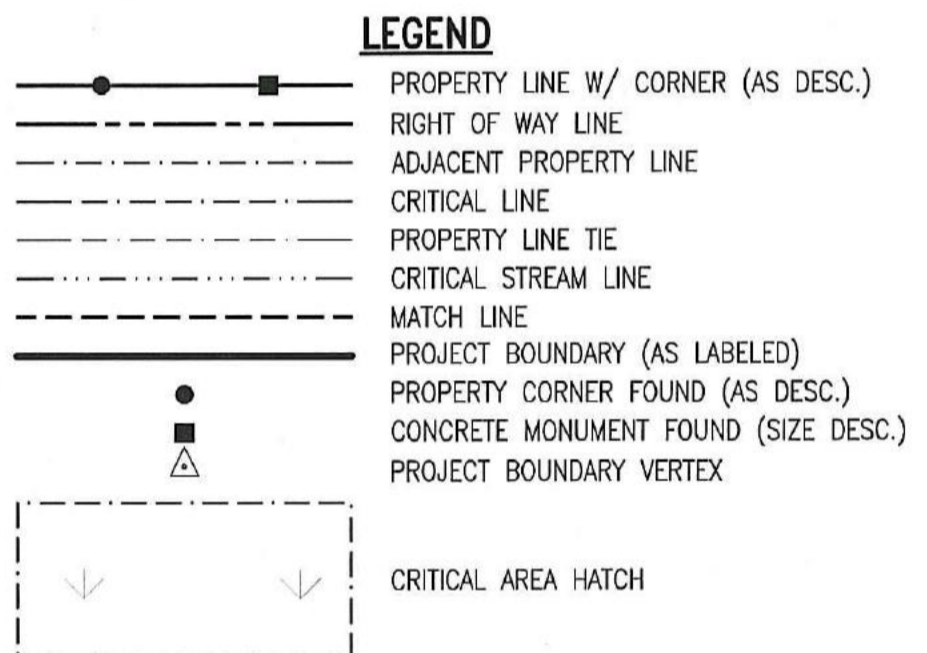


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L93	N08°58'39"E	35.20	L105	S63°57'59"W	21.60	L117	N16°42'08"E	34.37
L94	N83°06'37"W	50.38	L106	N50°31'55"E	21.73	L118	N09°59'26"E	49.49
L95	S65°05'38"W	37.22	L107	N54°51'08"E	49.64	L119	N33°53'54"E	39.65
L96	N80°37'18"E	54.38	L108	N58°21'07"E	23.93	L135	N29°15'29"E	4.00
L97	N76°42'59"E	19.07	L109	S72°32'02"E	16.85	L136	S84°07'31"W	19.94
L98	N28°23'09"E	24.38	L110	S35°29'43"W	30.99	L137	N18°43'17"E	38.20
L99	N73°14'37"E	45.39	L111	S06°54'59"E	15.67	L138	N08°25'38"E	35.88
L100	N28°37'20"E	47.07	L112	N04°27'34"W	19.50	L139	N02°19'02"E	34.57
L101	N45°47'12"E	28.56	L113	N02°56'57"E	48.02			
L102	N61°58'26"E	35.84	L114	N28°12'19"E	27.40			
L103	N15°15'51"W	28.95	L115	N21°53'43"E	32.48			

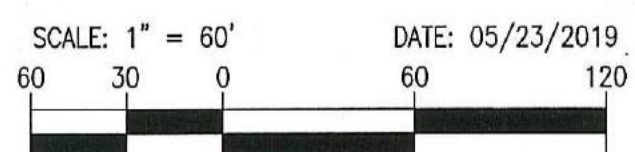


- GENERAL NOTES:**
- STATE PLANE COORDINATES ARE FOR GIS PURPOSES ONLY.
  - POINT FLAG LABELS AND SOME LINE TAG LABELS HAVE BEEN TURNED OFF FOR CLARITY

- REFERENCE PLAT BY:**
- | PLAT                         | DATE             | PLAT BOOK-PAGE |
|------------------------------|------------------|----------------|
| 1. GEORGE A.Z. JOHNSON       | - APRIL 26, 1989 | BX - 162       |
| 2. GEORGE A.Z. JOHNSON       | - JUNE 25, 1990  | CA - 024       |
| 3. JOHN O. PLEXICO           | - SEPT. 25, 1986 | BL - 063       |
| 4. GEORGE A.Z. JOHNSON       | - SEPT. 12, 1990 | CA - 103       |
| 5. HAROLD J. LOMOND          | - APRIL 27, 1973 | R - 085        |
| 6. JOHN O. PLEXICO           | - SEPT. 25, 1986 | BL - 063       |
| 7. GEORGE A.Z. JOHNSON       | - APRIL 28, 1990 | BZ - 152       |
| 8. F. LEE HOWELL             | - SEPT. 21, 2011 | L11 - 255      |
| 9. JULIUS E. CROWMELL        | - DEC. 11, 1941  | F - 104        |
| 10. GEORGE A.Z. JOHNSON      | - FEB. 20, 2008  | EJ - 911       |
| 11. THOMAS B.V. BESSETT      | - MAY 18, 1989   | BW - M 67      |
| 12. H. EXO HILTON            | - DEC. 31, 1986  | BL - 132       |
| 13. ANDREW G. GILLETTE       | - OCT. 15, 2009  | L09 - 0517     |
| 14. SCDOT ROAD PLANS #10.765 | - 1983           |                |

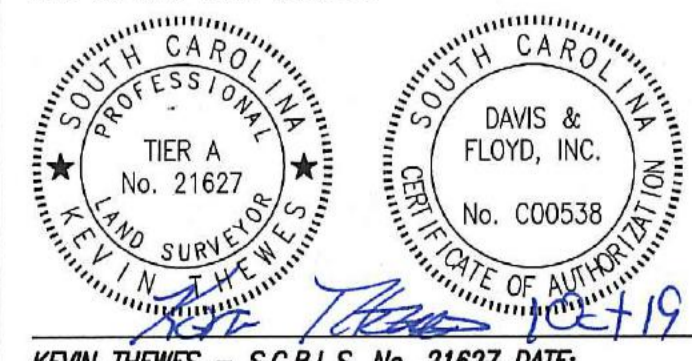


**CRITICAL LINE PLAT**  
 SHOWING  
 CRITICAL AREAS ALONG I-526 CORRIDOR  
 INCLUDING  
 CRITICAL AREAS 1 (2.15 AC), 2 (62.24 AC),  
 3 (1.23 AC), 4 (0.81 AC), 5 (2.96 AC),  
 6 (6.93 AC), AND 7 (0.36 AC)  
 LOCATED  
 CITY OF NORTH CHARLESTON  
 AND  
 CITY OF CHARLESTON  
 CHARLESTON COUNTY, SOUTH CAROLINA  
 D&F JOB #: 31667.00



SHEET 05 of 06  
**DAVIS & FLOYD, INC**  
 POST OFFICE BOX 61599  
 CHARLESTON, SC 29419  
 PHONE (843) 554-8802  
 KTHEWS@DAVISFLOYD.COM

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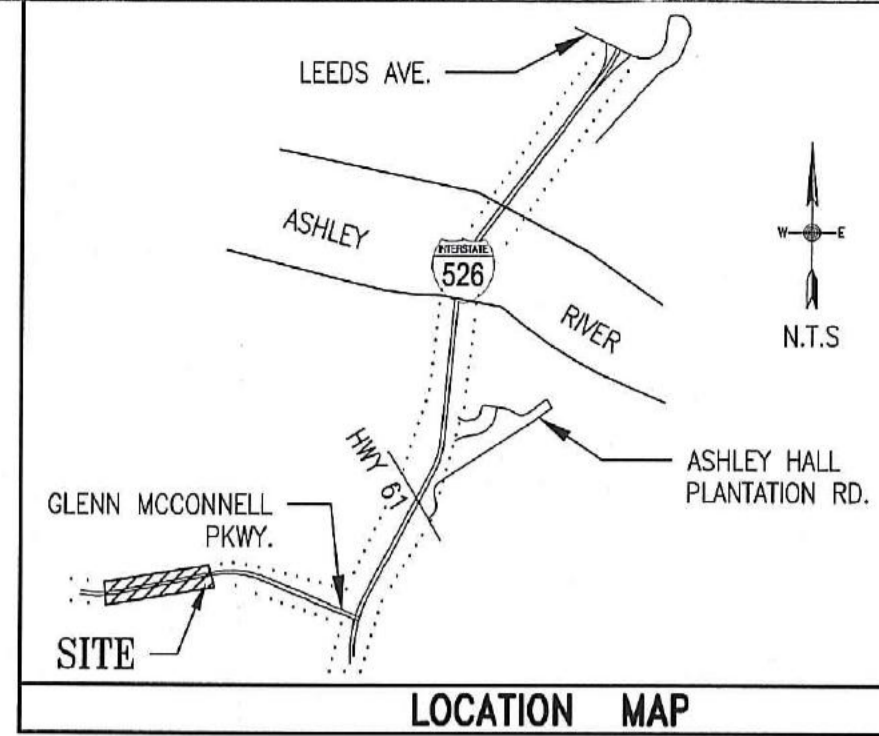
KEVIN THEWES - S.C.R.L.S. No. 21627 DATE: 10-3-19

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*Josh Hoke* 10-3-19  
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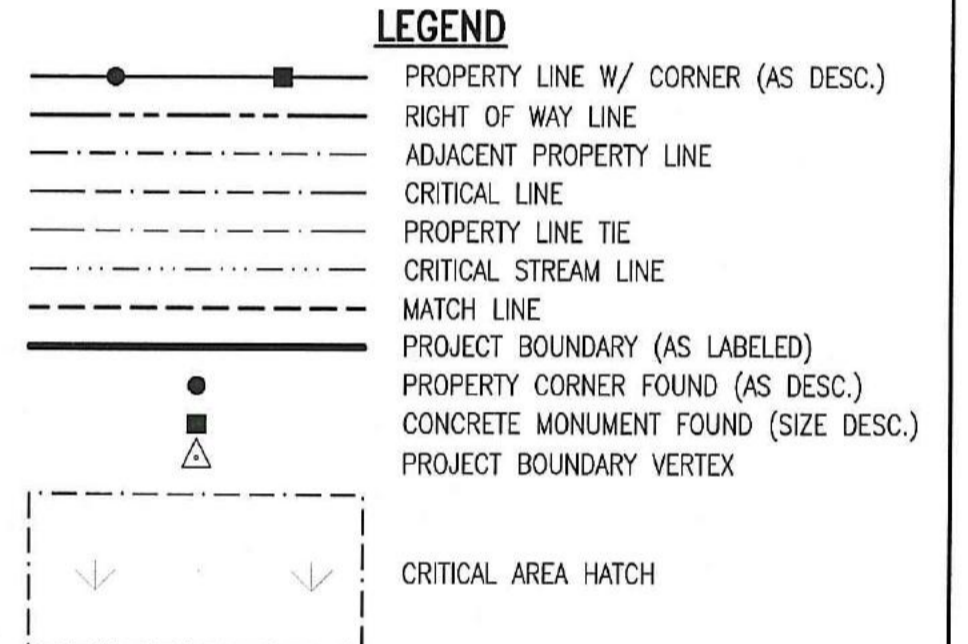
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L159	S25°55'08"E	11.79



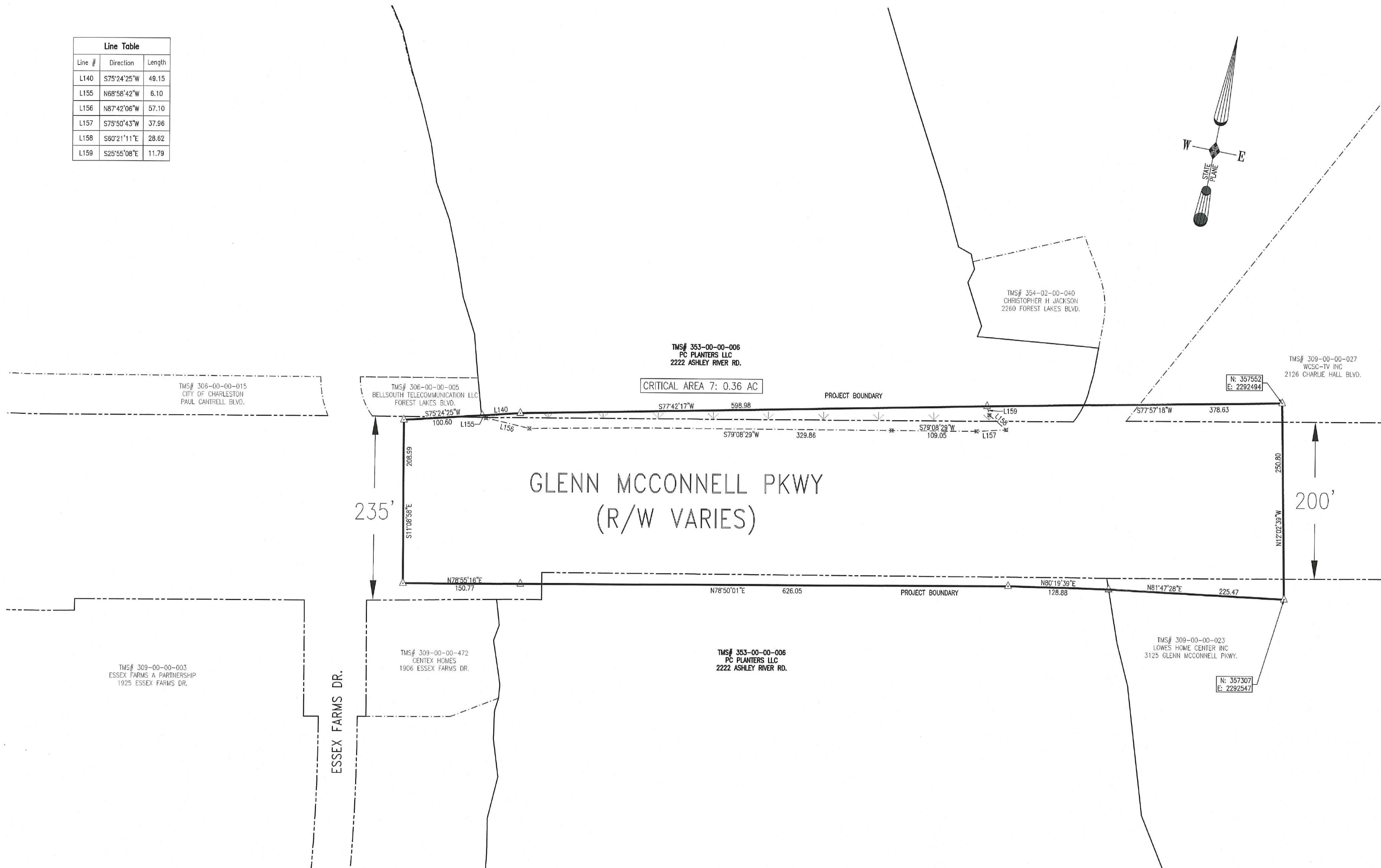
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**REFERENCE PLAT BY:**

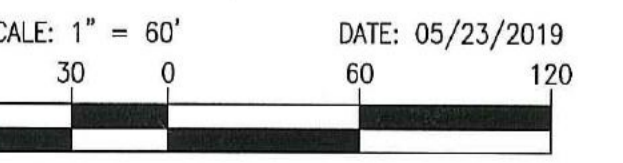
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BL - 063	SEPT. 25, 1986	JOHN O. PLEXICO
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R - 085	APRIL 27, 1973	HAROLD J. LOWMID
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L11 - 255	SEPT 21, 2011	F. LEE HOWELL
F - 104	DEC 11, 1941	JULIUS E. CROMWELL
EJ - 911	FEB 20, 2008	GEORGE A.Z. JOHNSON
BW - M 67	MAY 18, 1989	THOMAS BV. BESSETT
BL - 132	DEC 31, 1986	H. EXO HILTON
LO9 - 0517	OCT 15, 2009	ANDREW G. GILLETTE
		SCOTT ROAD PLANS #10.785 - 1983



- ABBREVIATION LEGEND**
- RBF REBAR FOUND (SIZE DESC.)
  - CMF CONCRETE MONUMENT FOUND (SIZE DESC.)
  - IPF IRON PIPE FOUND (SIZE DESC.)



**CRITICAL LINE PLAT**  
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 D&F JOB #: 31667.00



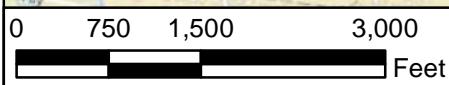
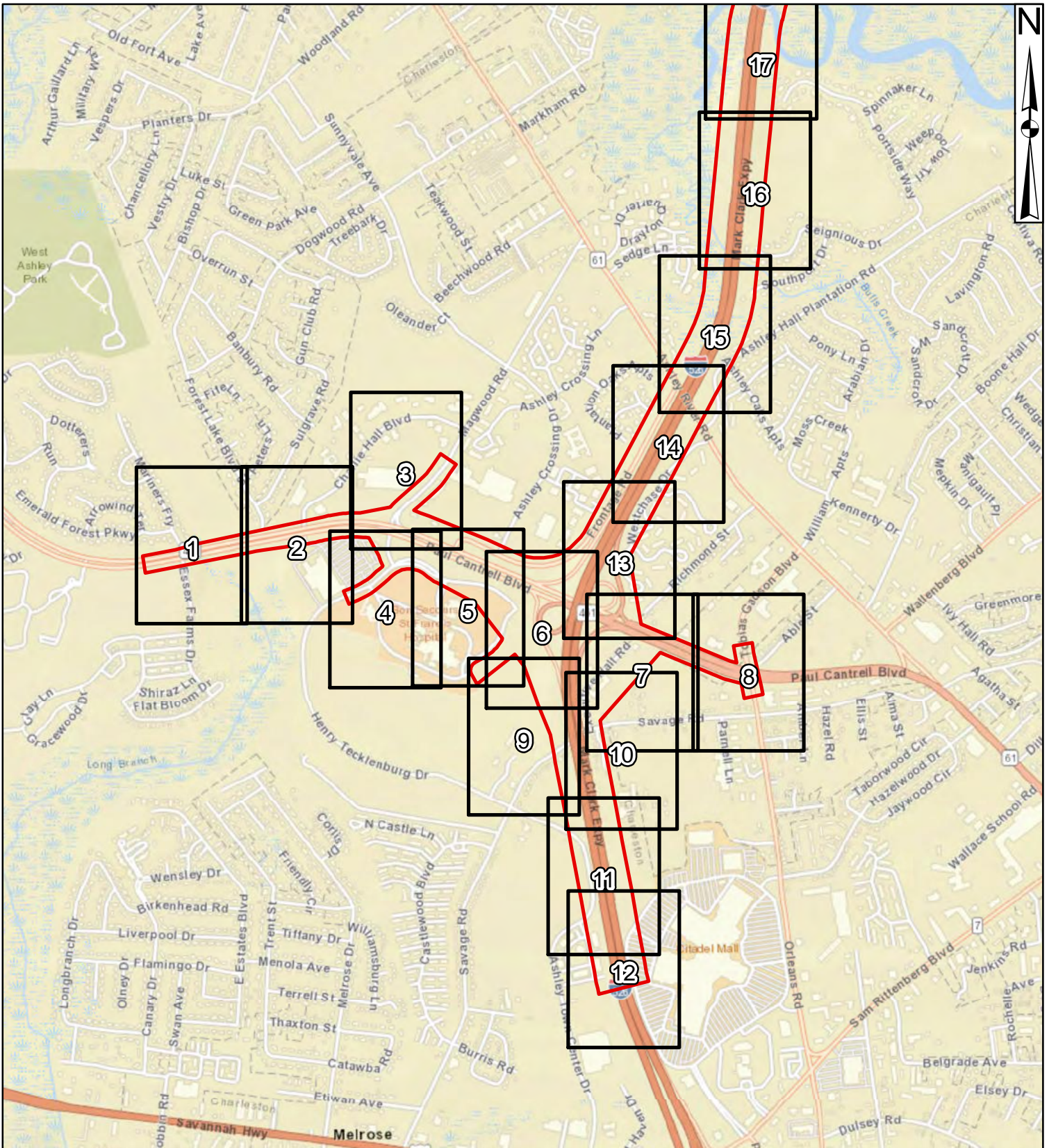
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*Kevin Thewes* 10-3-19  
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**KEVIN THEWES - S.C.R.L.S. No. 21627 DATE:**



**Legend**  
 Project Study Area (1611.97 Acres)



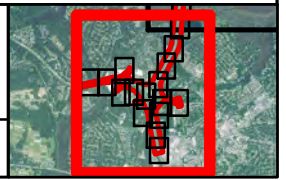
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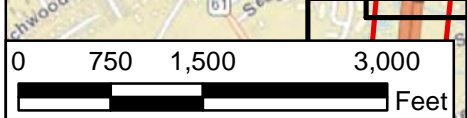
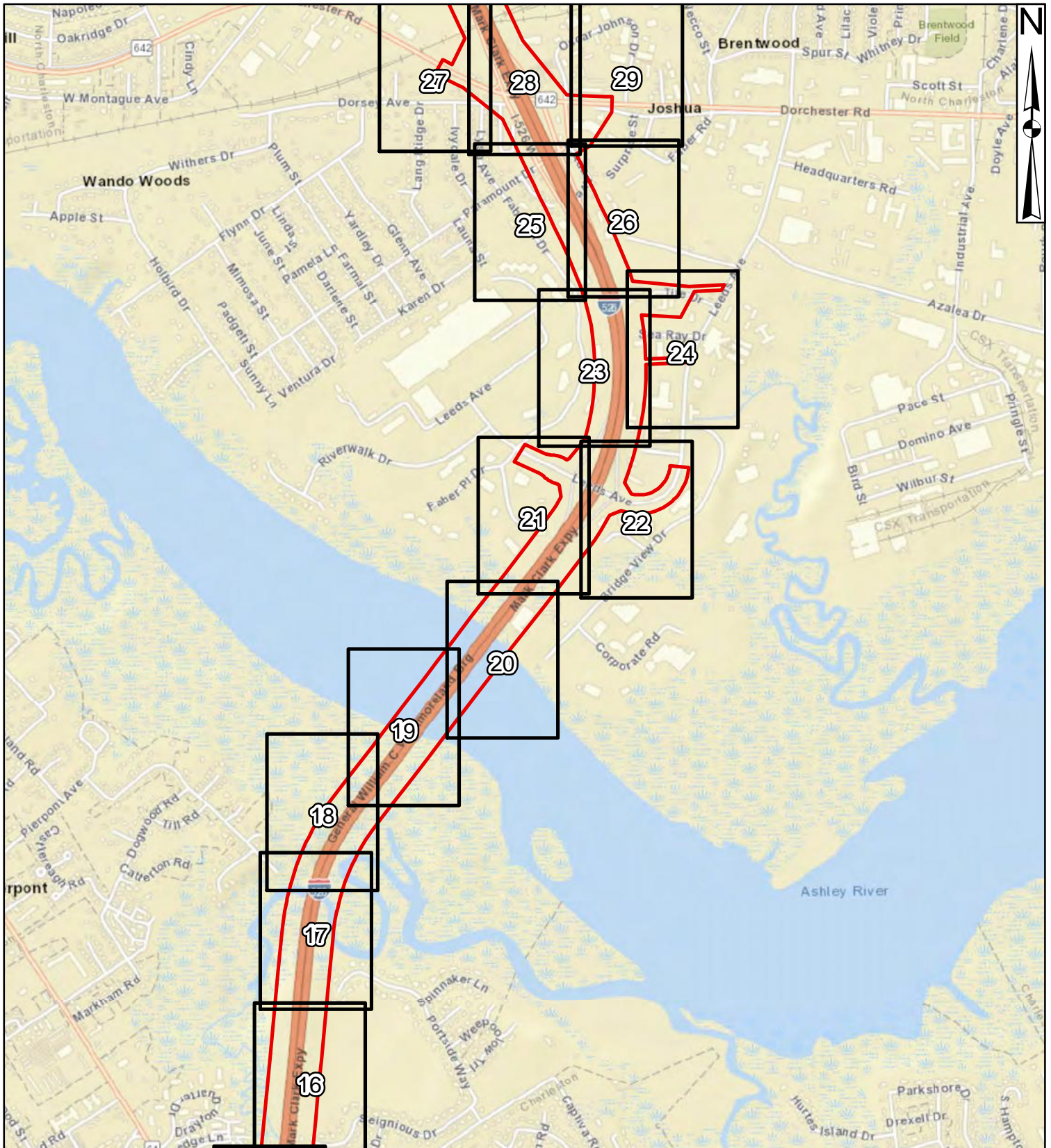
Drawn By: RHH  
 QA/QC: KLM

I-526 Lowcountry Corridor West  
 Charleston County  
 SCDOT P032102  
 October 31 2019

Grid Index Layout

**Figure 8**  
 Sheet 1 of 6





**Legend**

Project Study Area (1611.97 Acres)

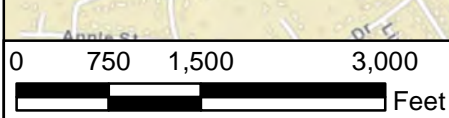
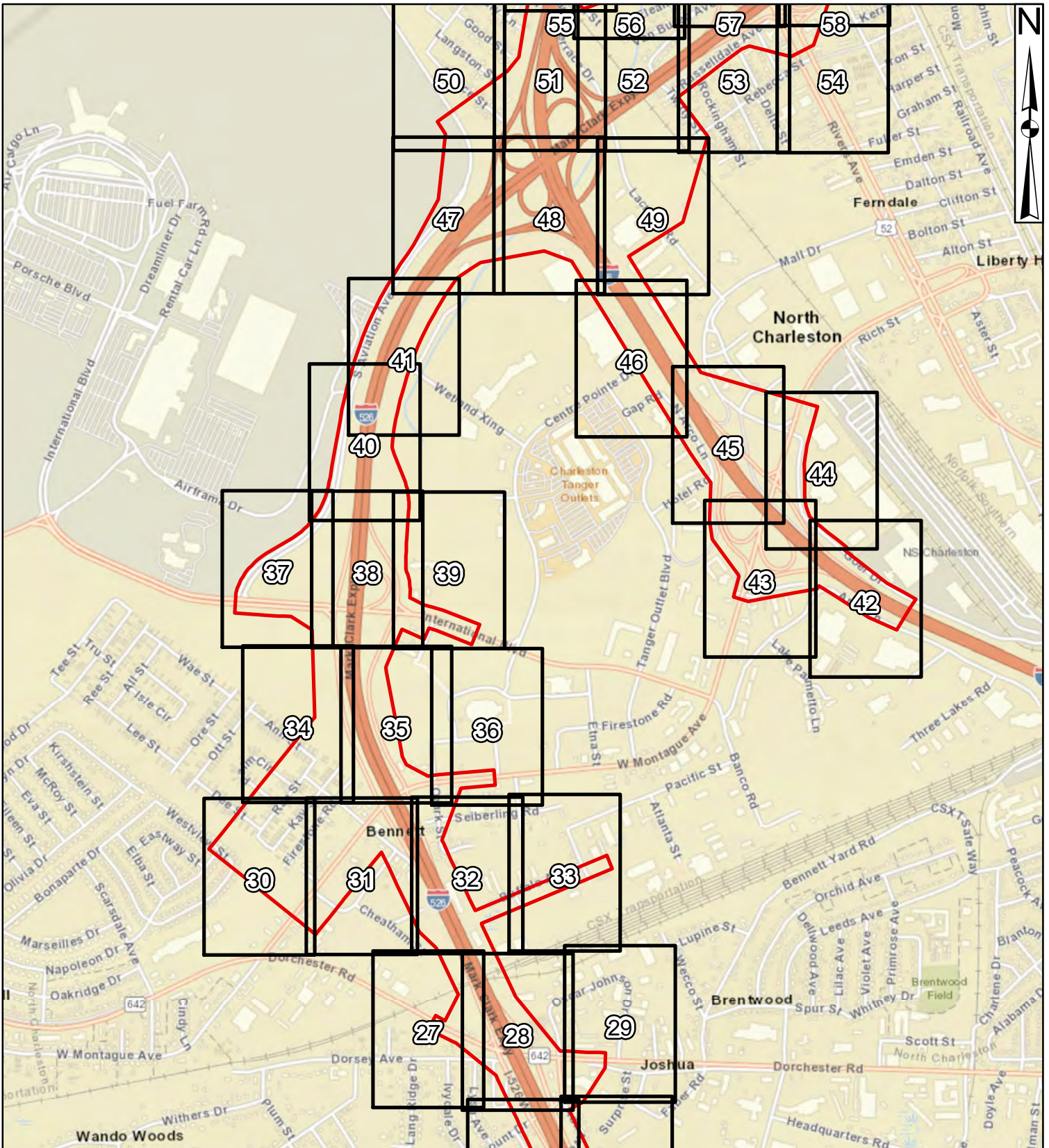
Source:  
NRCS NAIP Aerial  
2017

Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Grid Index Layout

Sheet 2 of 6



**Legend**

Project Study Area (1611.97 Acres)

Source:  
NRCS NAIP Aerial  
2017

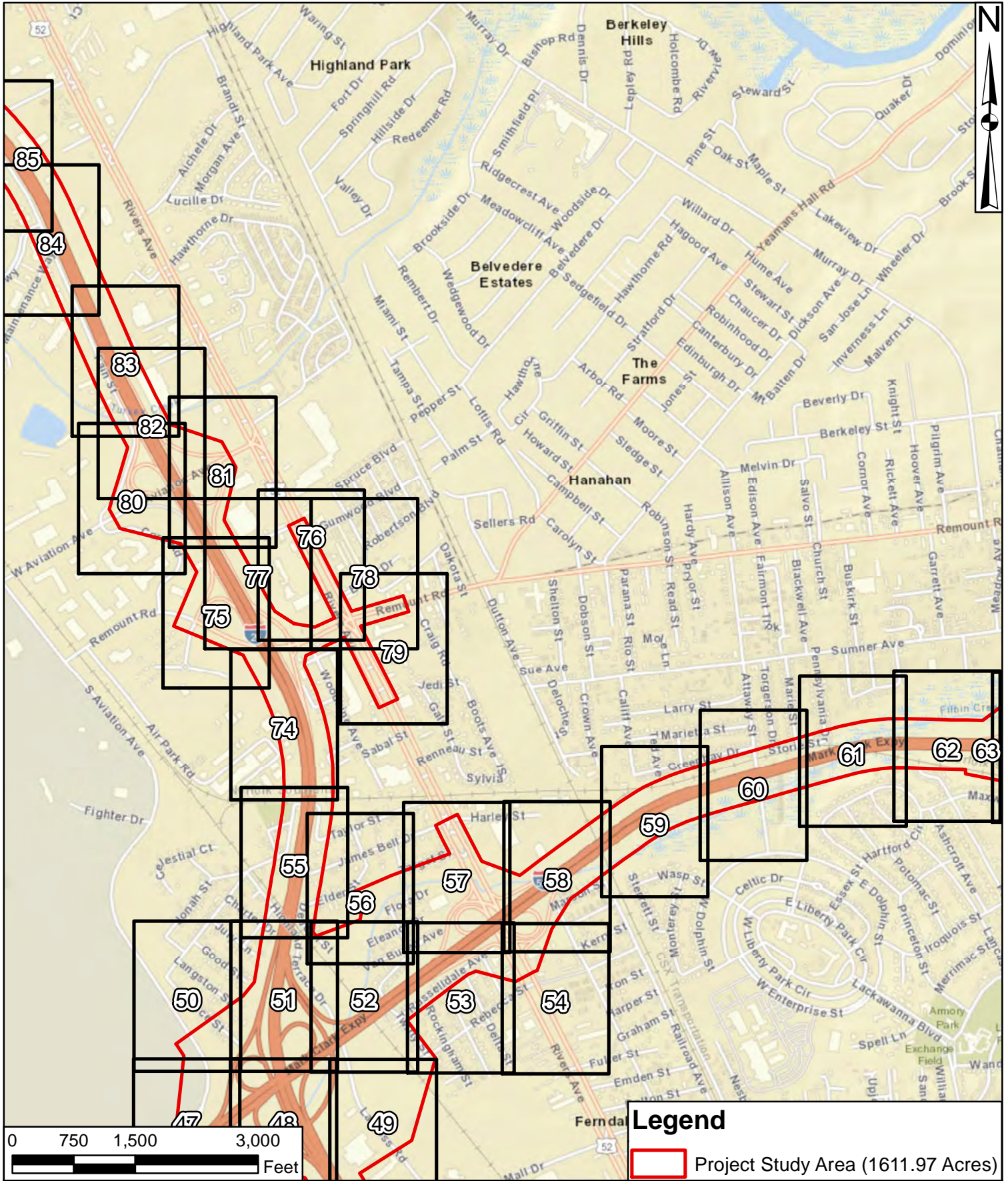
Drawn By: RHH  
QA/QC: KLM

I-526 Lowcountry Corridor West  
Charleston County  
SCDOT P032102  
October 31 2019

Grid Index Layout

Sheet 3 of 6






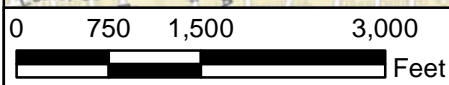
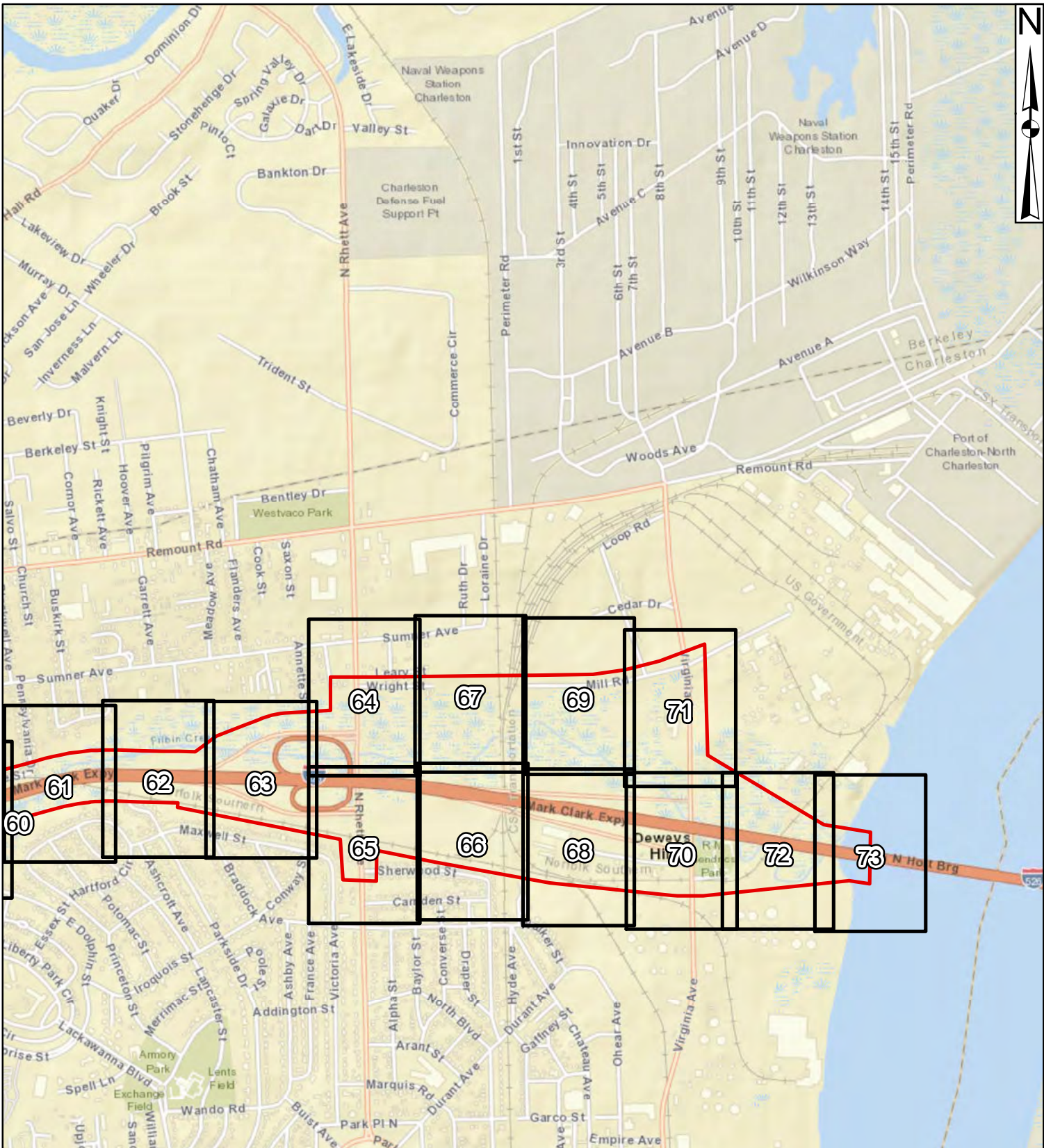


**Legend**

 Project Study Area (1611.97 Acres)



 	Source: NRCS NAIP Aerial 2017	I-526 Lowcountry Corridor West Charleston County SCDOT P032102 October 31 2019		
	Drawn By: RHH QA/QC: KLM	Grid Index Layout	Sheet 4 of 6	



**Legend**  
 Project Study Area (1611.97 Acres)



Source:  
 NRCS NAIP Aerial  
 2017

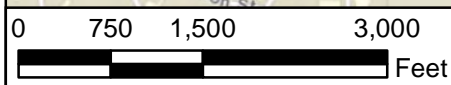
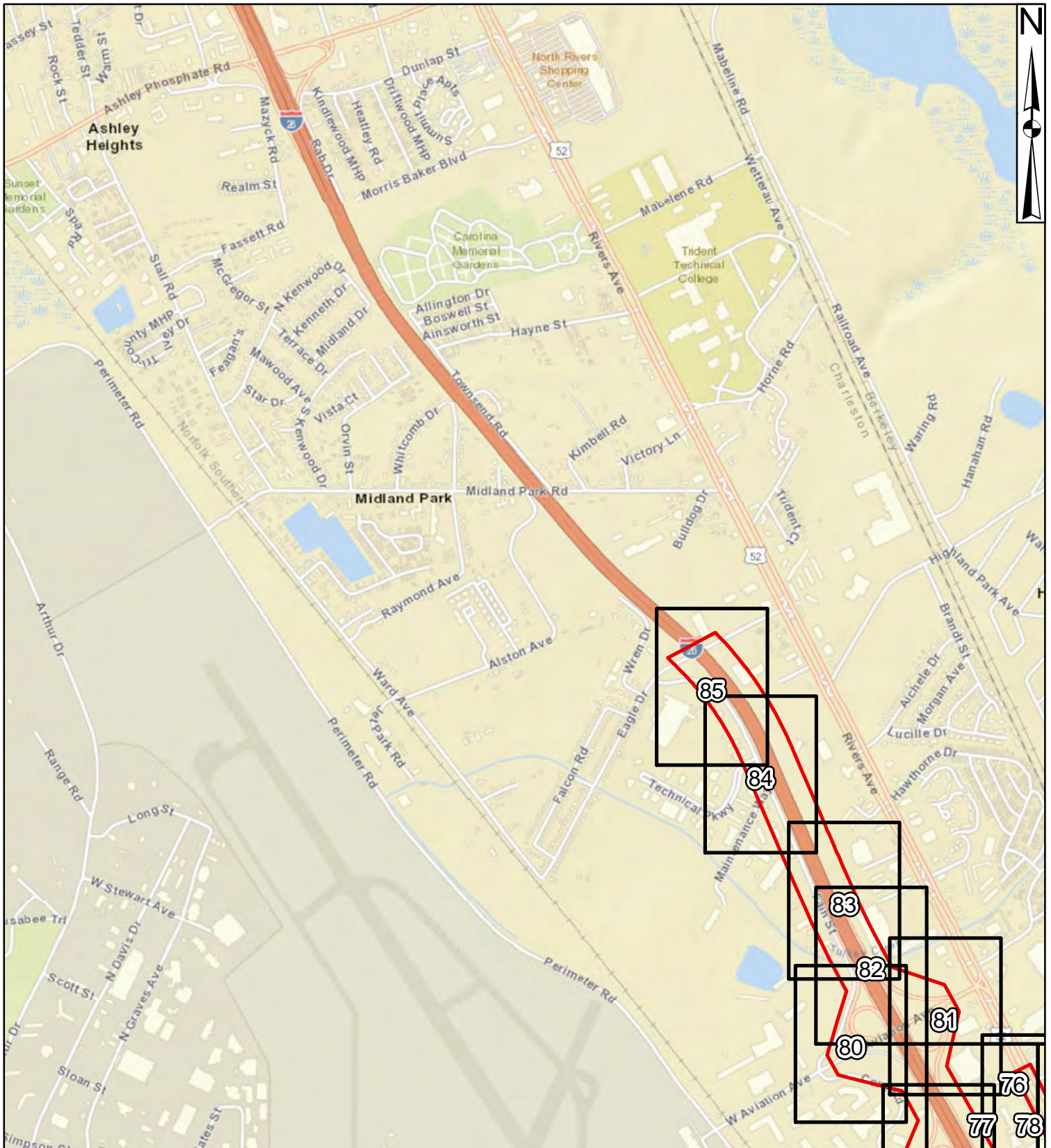
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 QA/QC: KLM


**I-526 Lowcountry Corridor West**  
 Charleston County  
 SCDOT P032102  
 October 31 2019

Grid Index Layout

Sheet 5 of 6





**Legend**  
 Project Study Area (1611.97 Acres)




Source:  
 NRCS NAIP Aerial  
 2017

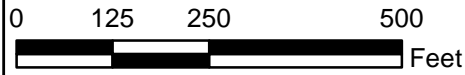
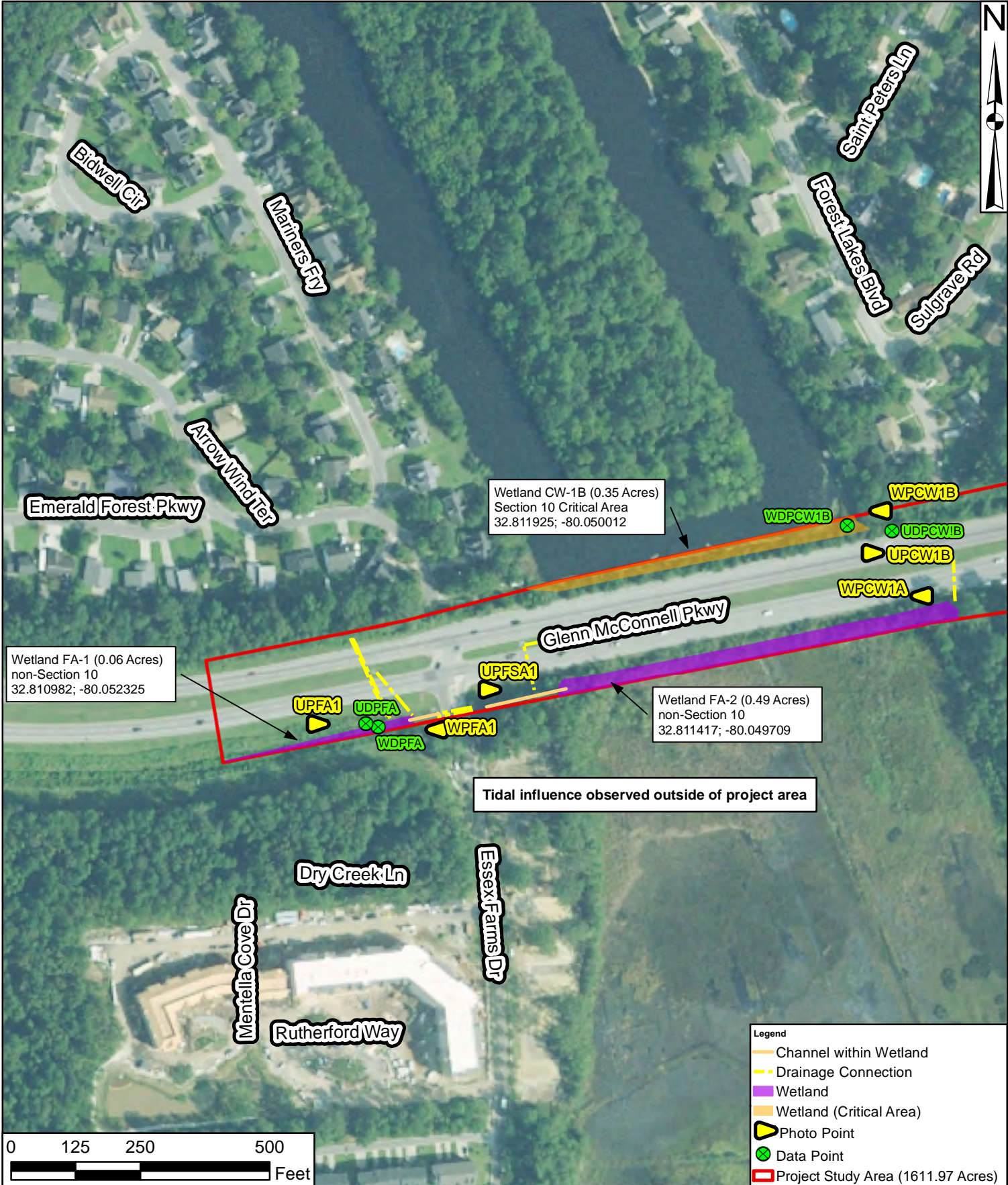
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**I-526 Lowcountry Corridor West**  
 Charleston County  
 SCDOT P032102  
 October 31 2019

Grid Index Layout

Sheet 6 of 6





Legend	
	Channel within Wetland
	Drainage Connection
	Wetland
	Wetland (Critical Area)
	Photo Point
	Data Point
	Project Study Area (1611.97 Acres)

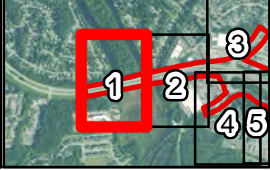
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Drawn By: RHH  
QA/QC: KLM

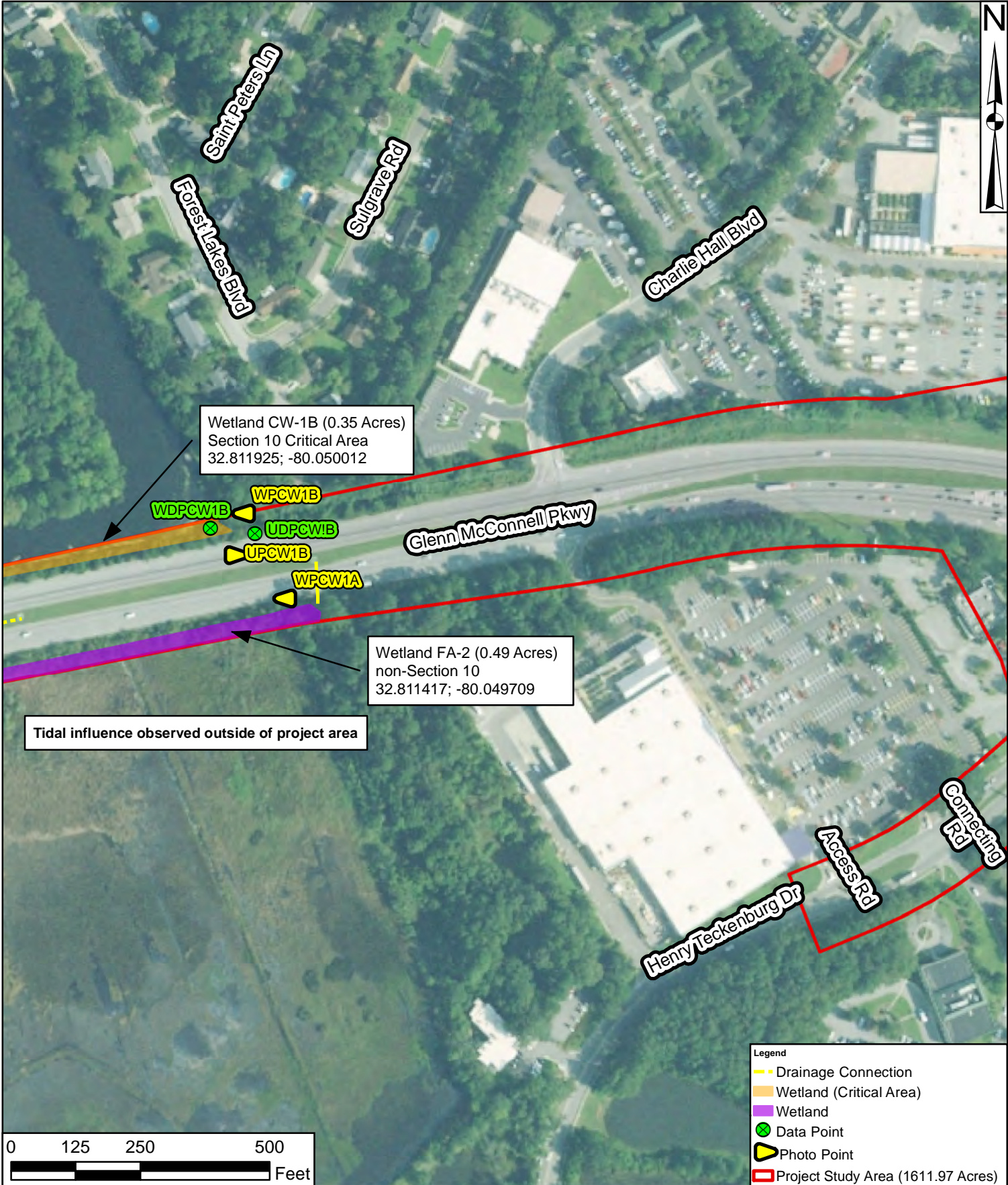
I-526 Lowcountry Corridor West  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

**Figure 8**  
Sheet 1 of 85





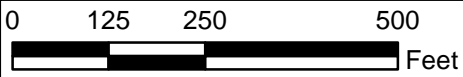


Wetland CW-1B (0.35 Acres)  
Section 10 Critical Area  
32.811925; -80.050012

Wetland FA-2 (0.49 Acres)  
non-Section 10  
32.811417; -80.049709

Tidal influence observed outside of project area

- Legend**
- Drainage Connection
  - Wetland (Critical Area)
  - Wetland
  - Data Point
  - Photo Point
  - Project Study Area (1611.97 Acres)



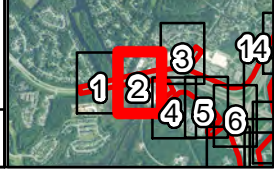
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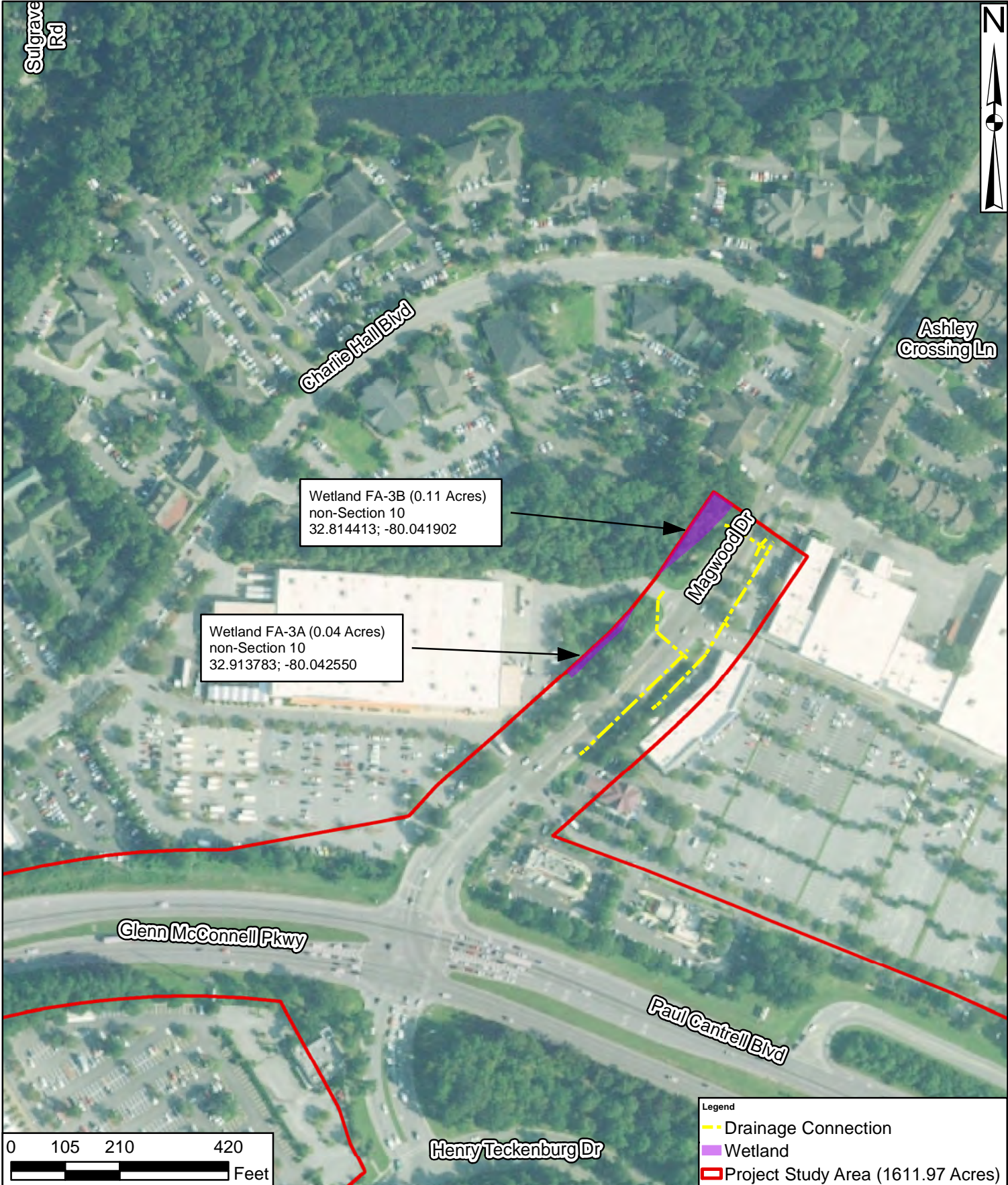
Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 2 of 85

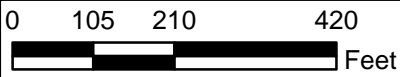




Wetland FA-3B (0.11 Acres)  
non-Section 10  
32.814413; -80.041902

Wetland FA-3A (0.04 Acres)  
non-Section 10  
32.913783; -80.042550

- Legend
- Drainage Connection
  - Wetland
  - ▭ Project Study Area (1611.97 Acres)



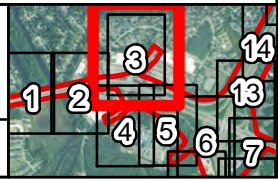
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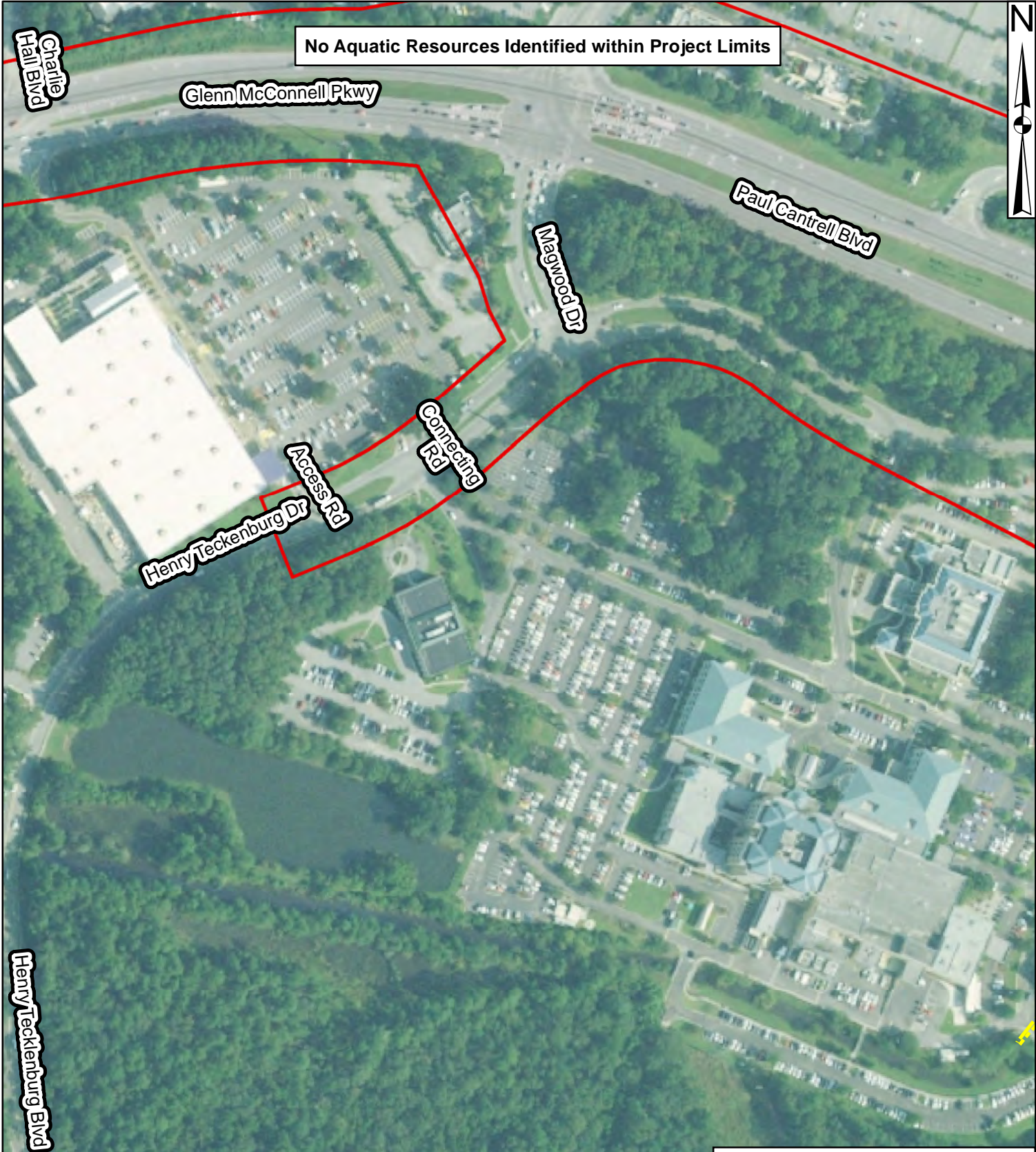
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QA/QC: KLM

I-526 Low Country Corridor West  
Charleston County  
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October 31 2019

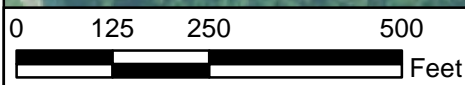
Aquatic Resources

Sheet 3 of 85





No Aquatic Resources Identified within Project Limits



- Legend**
- Drainage Connection
  - Project Study Area (1611.97 Acres)



Source:  
NRCS NAIP Aerial  
2017

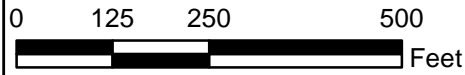
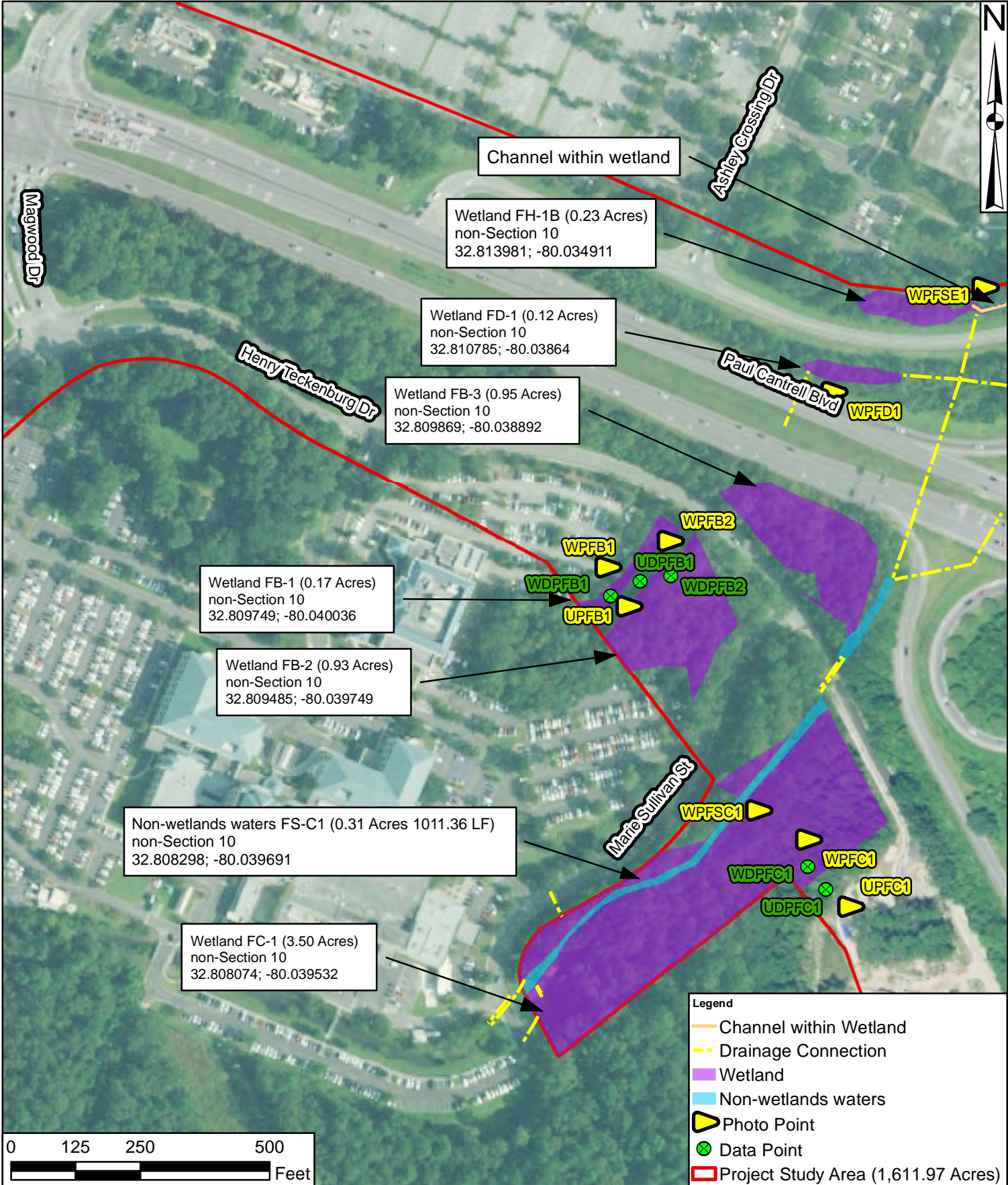
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QA/QC: KLM

**I-526 Low Country Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 4 of 85





- Legend**
- Channel within Wetland
  - - Drainage Connection
  - Wetland
  - Non-wetlands waters
  - ▶ Photo Point
  - Data Point
  - Project Study Area (1,611.97 Acres)

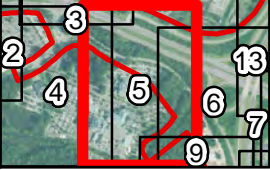
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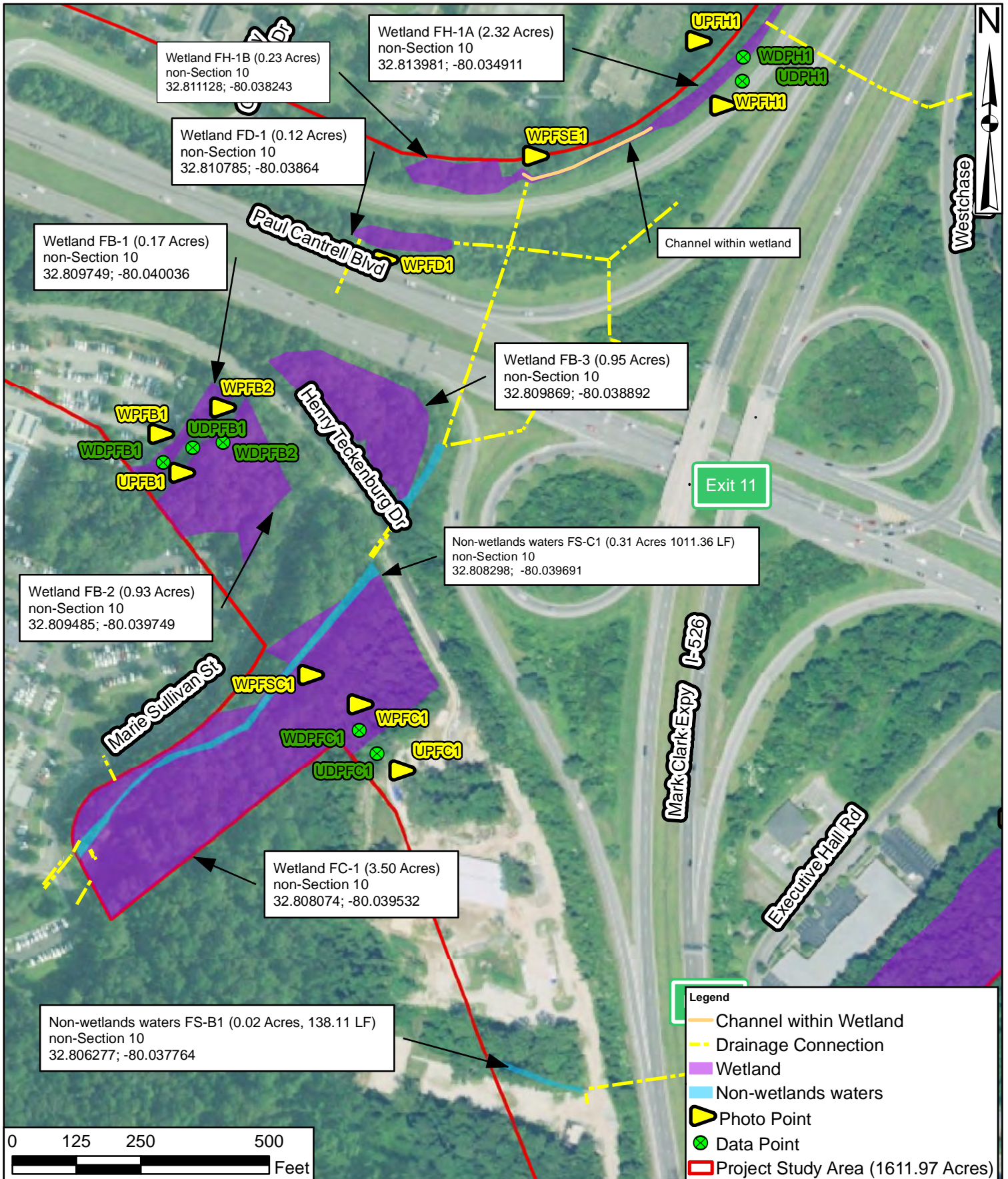
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QA/QC: KLM

I-526 Lowcountry Corridor West  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 5 of 85





Wetland FH-1B (0.23 Acres)  
non-Section 10  
32.811128; -80.038243

Wetland FH-1A (2.32 Acres)  
non-Section 10  
32.813981; -80.034911

Wetland FD-1 (0.12 Acres)  
non-Section 10  
32.810785; -80.03864

Wetland FB-1 (0.17 Acres)  
non-Section 10  
32.809749; -80.040036

Wetland FB-3 (0.95 Acres)  
non-Section 10  
32.809869; -80.038892

Wetland FB-2 (0.93 Acres)  
non-Section 10  
32.809485; -80.039749

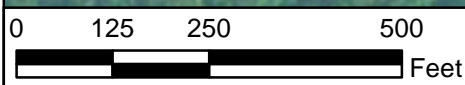
Non-wetlands waters FS-C1 (0.31 Acres 1011.36 LF)  
non-Section 10  
32.808298; -80.039691

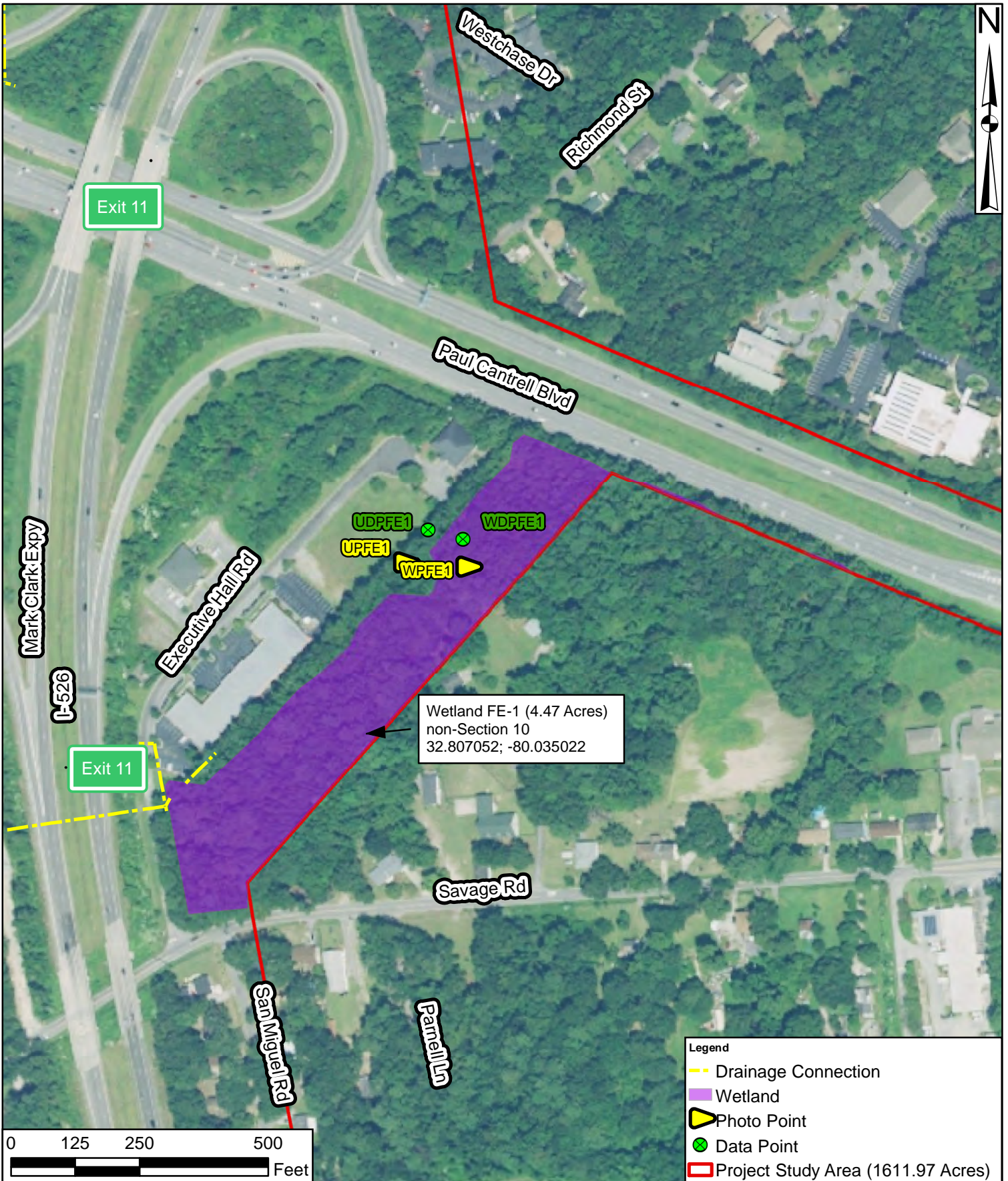
Wetland FC-1 (3.50 Acres)  
non-Section 10  
32.808074; -80.039532

Non-wetlands waters FS-B1 (0.02 Acres, 138.11 LF)  
non-Section 10  
32.806277; -80.037764

**Legend**

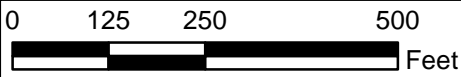
- Channel within Wetland
- - - Drainage Connection
- Wetland
- Non-wetlands waters
- ▲ Photo Point
- Data Point
- Project Study Area (1611.97 Acres)





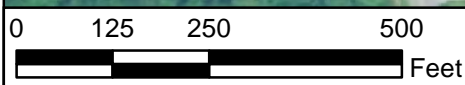
Wetland FE-1 (4.47 Acres)  
 non-Section 10  
 32.807052; -80.035022

- Legend**
- Drainage Connection
  - Wetland
  - ▶ Photo Point
  - Data Point
  - Project Study Area (1611.97 Acres)





Wetland FE-1 (4.47 Acres)  
 non-Section 10  
 32.807052; -80.035022



Legend	
	Drainage Connection
	Wetland
	Project Study Area (1611.97 Acres)

Source:  
 NRCS NAIP Aerial  
 2017

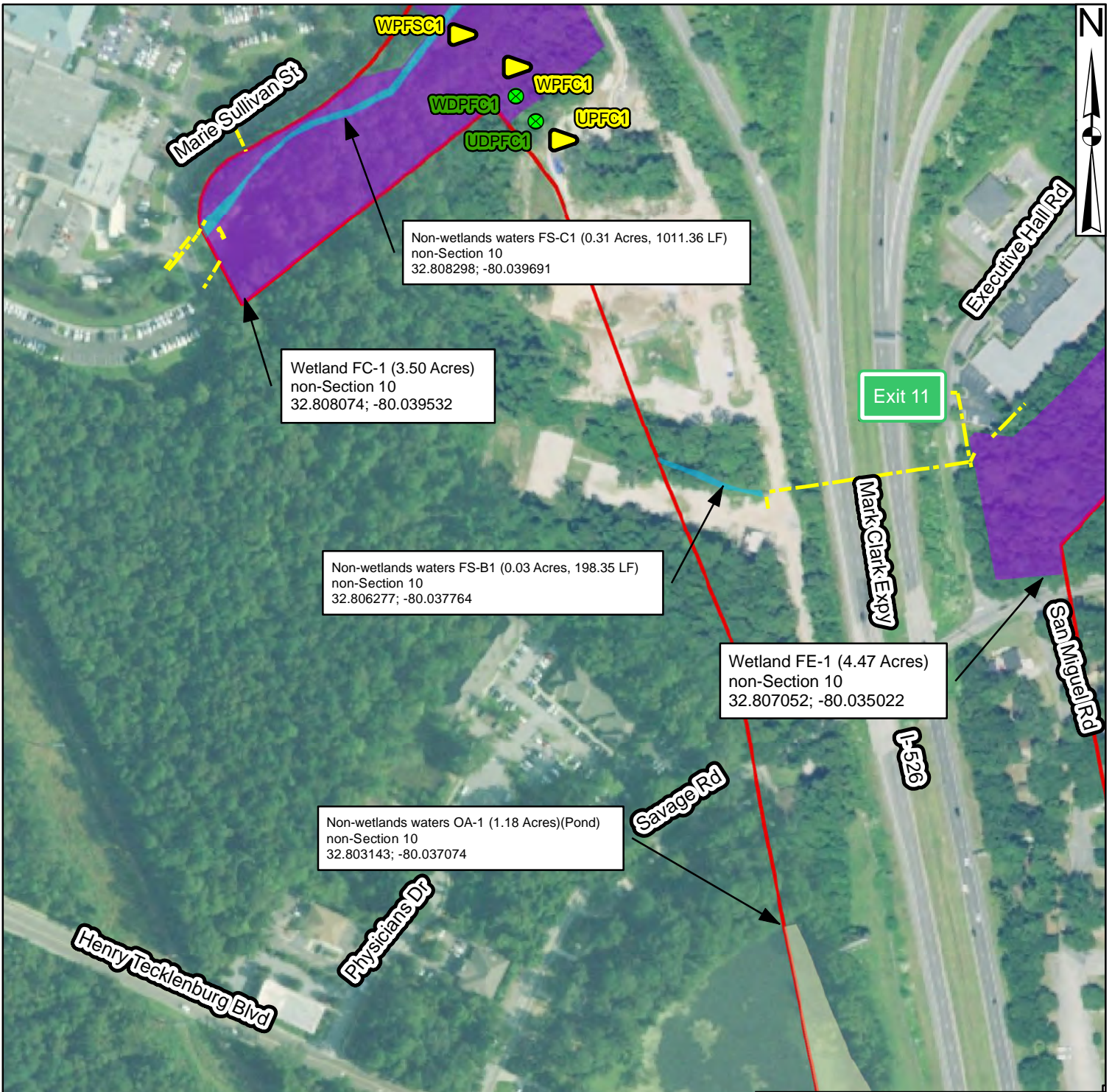
Drawn By: RHH  
 QA/QC: KLM

I-526 Lowcountry Corridor West  
 Charleston County  
 SCDOT P032102  
 October 31 2019

Aquatic Resources

Sheet 8 of 85





Non-wetlands waters FS-C1 (0.31 Acres, 1011.36 LF)  
non-Section 10  
32.808298; -80.039691

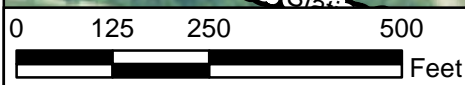
Wetland FC-1 (3.50 Acres)  
non-Section 10  
32.808074; -80.039532

Non-wetlands waters FS-B1 (0.03 Acres, 198.35 LF)  
non-Section 10  
32.806277; -80.037764

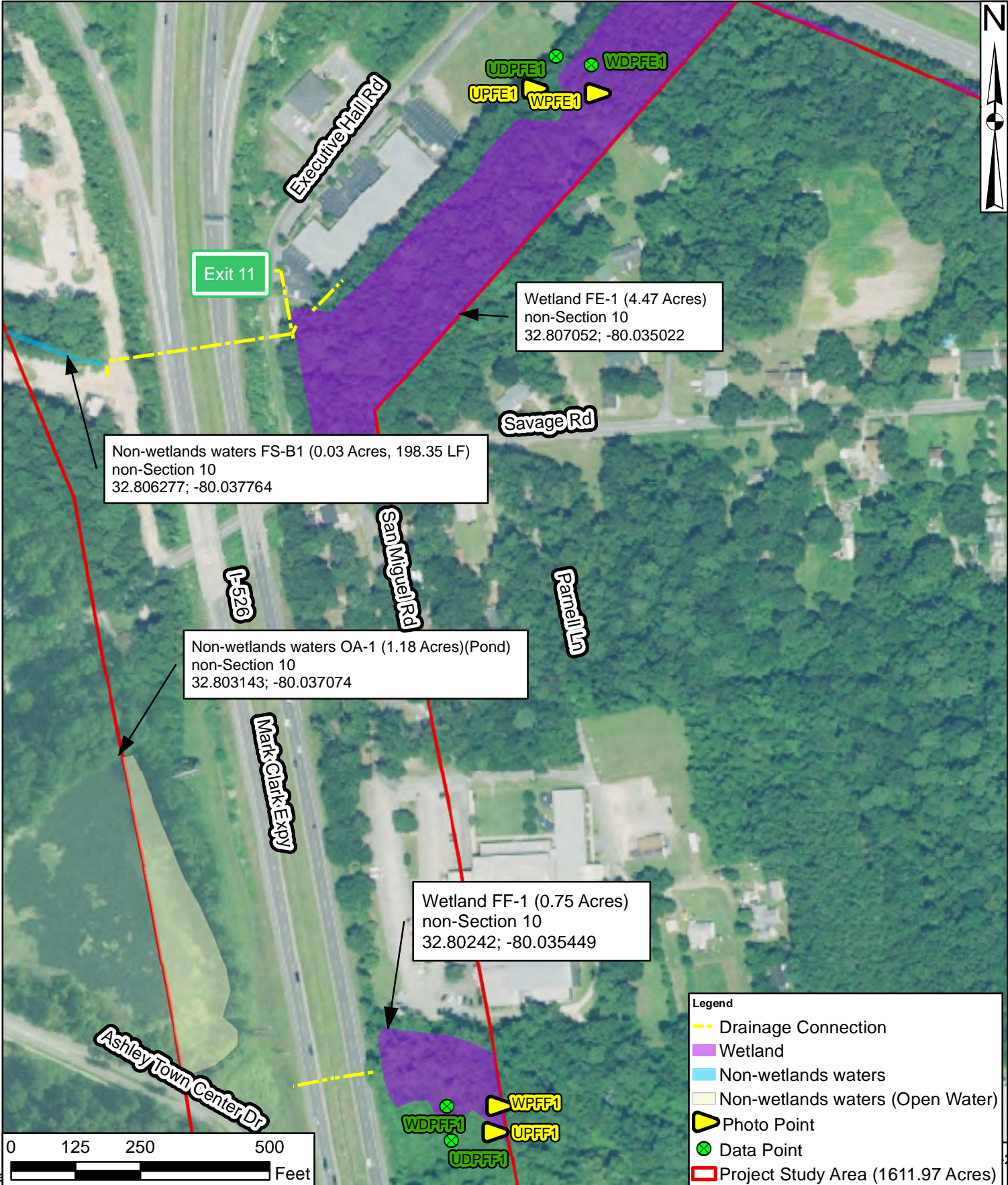
Wetland FE-1 (4.47 Acres)  
non-Section 10  
32.807052; -80.035022

Non-wetlands waters OA-1 (1.18 Acres)(Pond)  
non-Section 10  
32.803143; -80.037074

- Legend**
- Drainage Connection
  - Wetland
  - Non-wetlands waters
  - Non-wetlands waters (Open Water)
  - ▲ Photo Point
  - Data Point
  - Project Study Area (1611.97 Acres)







Exit 11

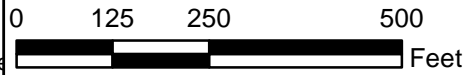
Wetland FE-1 (4.47 Acres)  
non-Section 10  
32.807052; -80.035022

Non-wetlands waters FS-B1 (0.03 Acres, 198.35 LF)  
non-Section 10  
32.806277; -80.037764

Non-wetlands waters OA-1 (1.18 Acres)(Pond)  
non-Section 10  
32.803143; -80.037074

Wetland FF-1 (0.75 Acres)  
non-Section 10  
32.80242; -80.035449

- Legend**
- Drainage Connection
  - Wetland
  - Non-wetlands waters
  - Non-wetlands waters (Open Water)
  - ▶ Photo Point
  - Data Point
  - Project Study Area (1611.97 Acres)



2.803143; -80.037074



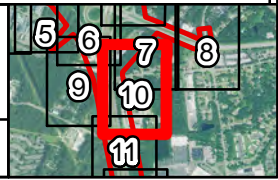
Source:  
NRCS NAIP Aerial  
2017

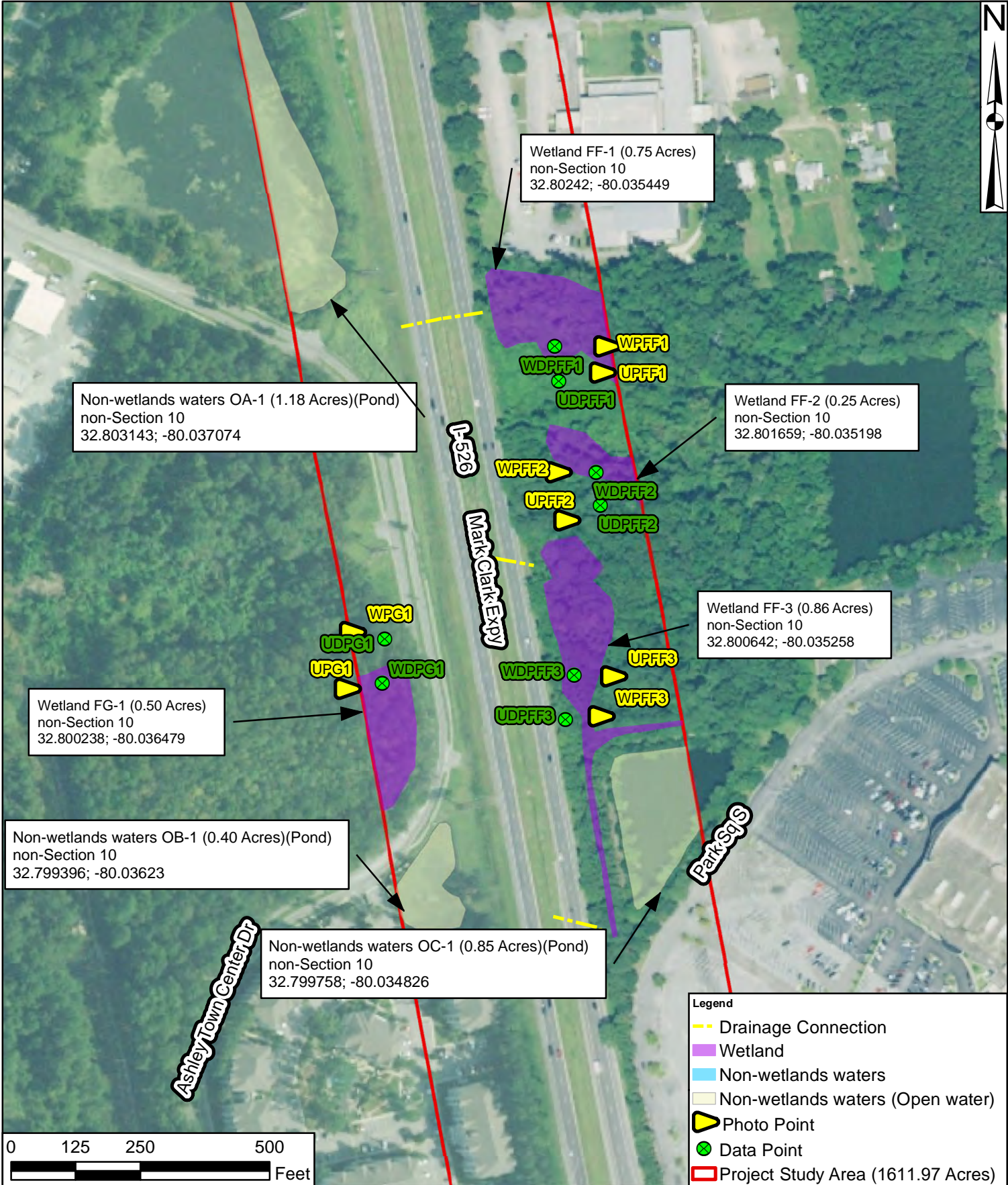
Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 10 of 85





Non-wetlands waters OA-1 (1.18 Acres)(Pond)  
non-Section 10  
32.803143; -80.037074

Wetland FF-1 (0.75 Acres)  
non-Section 10  
32.80242; -80.035449

Wetland FF-2 (0.25 Acres)  
non-Section 10  
32.801659; -80.035198

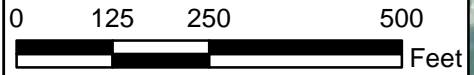
Wetland FG-1 (0.50 Acres)  
non-Section 10  
32.800238; -80.036479

Wetland FF-3 (0.86 Acres)  
non-Section 10  
32.800642; -80.035258

Non-wetlands waters OB-1 (0.40 Acres)(Pond)  
non-Section 10  
32.799396; -80.03623

Non-wetlands waters OC-1 (0.85 Acres)(Pond)  
non-Section 10  
32.799758; -80.034826

- Legend
- Drainage Connection
  - Wetland
  - Non-wetlands waters
  - Non-wetlands waters (Open water)
  - Photo Point
  - Data Point
  - Project Study Area (1611.97 Acres)



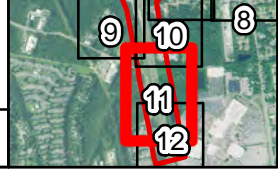
Source:  
NRCS NAIP Aerial  
2017

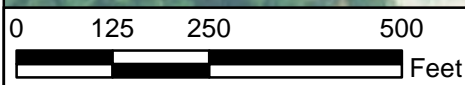
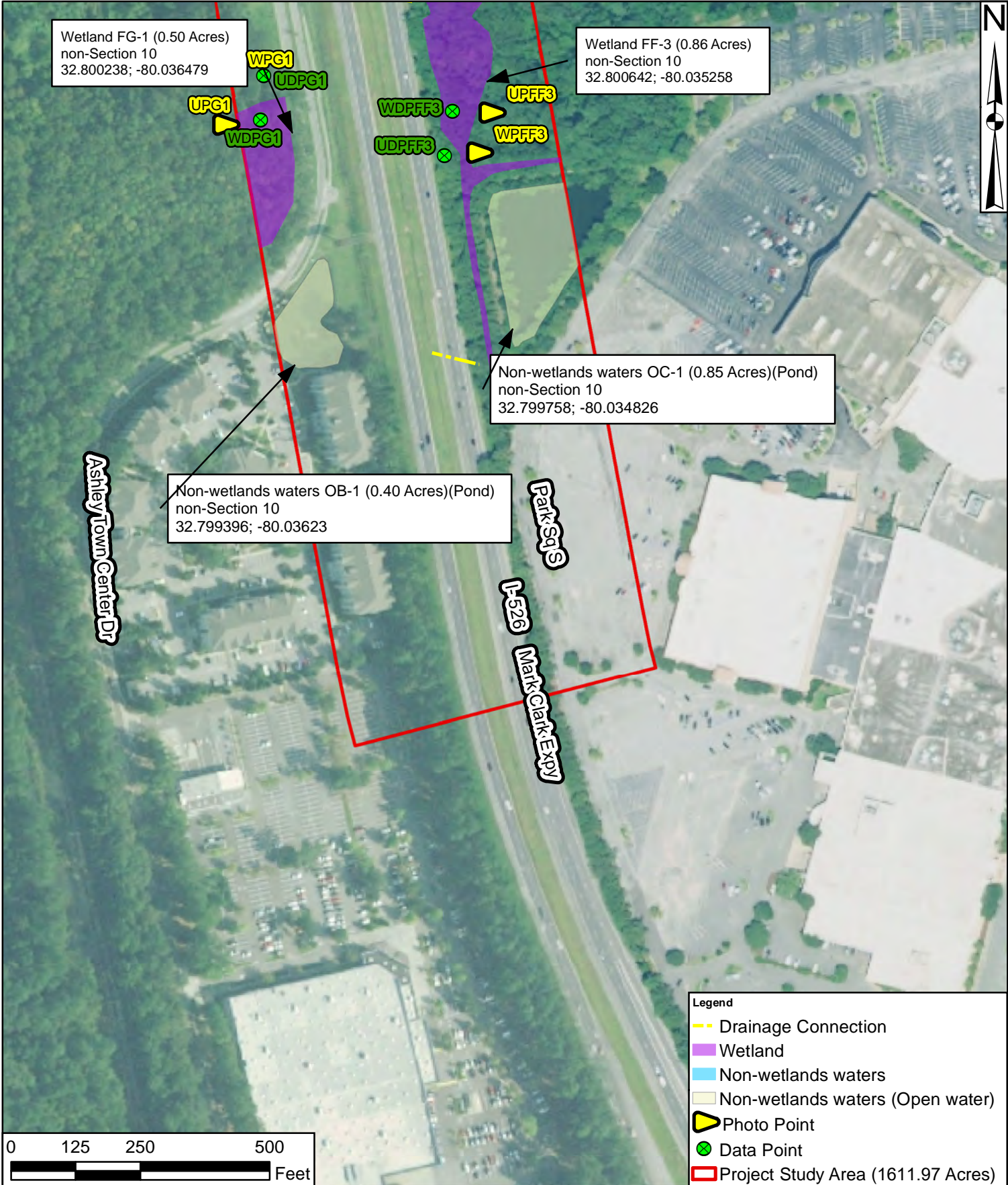
Drawn By: RHH  
QA/QC: KLM

I-526 Lowcountry Corridor West  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 11 of 85





- Legend**
- Drainage Connection
  - Wetland
  - Non-wetlands waters
  - Non-wetlands waters (Open water)
  - ▶ Photo Point
  - Data Point
  - Project Study Area (1611.97 Acres)



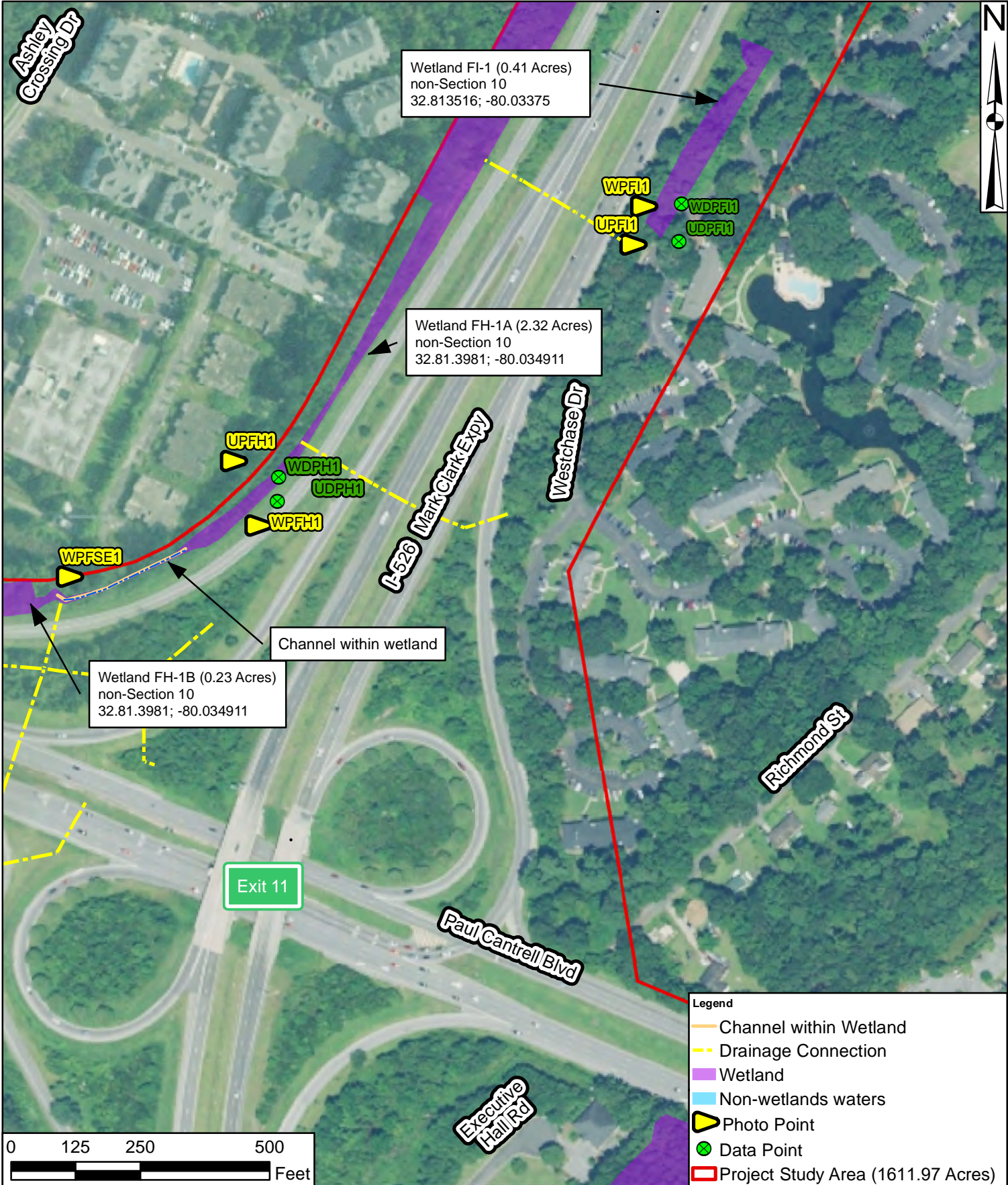
Source:  
NRCS NAIP Aerial  
2017

Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources





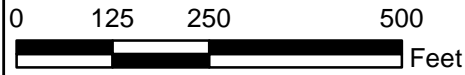
Wetland FI-1 (0.41 Acres)  
non-Section 10  
32.813516; -80.03375

Wetland FH-1A (2.32 Acres)  
non-Section 10  
32.81.3981; -80.034911

Wetland FH-1B (0.23 Acres)  
non-Section 10  
32.81.3981; -80.034911

Channel within wetland

- Legend**
- Channel within Wetland
  - - - Drainage Connection
  - Wetland
  - Non-wetlands waters
  - ▶ Photo Point
  - Data Point
  - Project Study Area (1611.97 Acres)



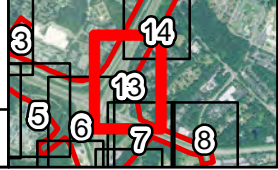
Source:  
NRCS NAIP Aerial  
2017

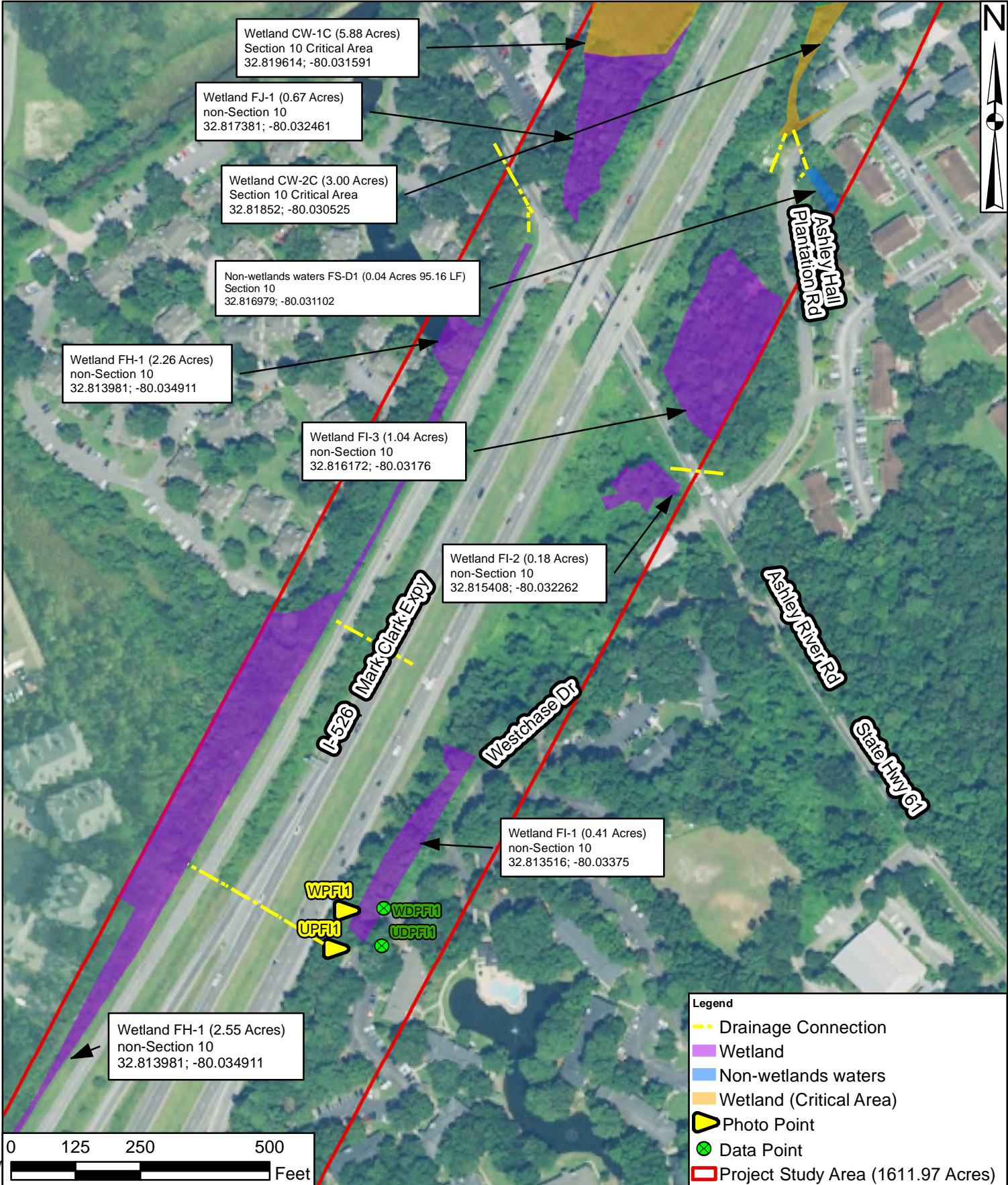
Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 13 of 85





Wetland CW-1C (5.88 Acres)  
Section 10 Critical Area  
32.819614; -80.031591

Wetland FJ-1 (0.67 Acres)  
non-Section 10  
32.817381; -80.032461

Wetland CW-2C (3.00 Acres)  
Section 10 Critical Area  
32.81852; -80.030525

Non-wetlands waters FS-D1 (0.04 Acres 95.16 LF)  
Section 10  
32.816979; -80.031102

Wetland FH-1 (2.26 Acres)  
non-Section 10  
32.813981; -80.034911

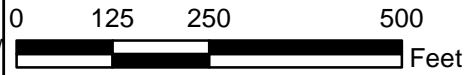
Wetland FI-3 (1.04 Acres)  
non-Section 10  
32.816172; -80.03176

Wetland FI-2 (0.18 Acres)  
non-Section 10  
32.815408; -80.032262

Wetland FI-1 (0.41 Acres)  
non-Section 10  
32.813516; -80.03375

Wetland FH-1 (2.55 Acres)  
non-Section 10  
32.813981; -80.034911

- Legend**
- Drainage Connection
  - Wetland
  - Non-wetlands waters
  - Wetland (Critical Area)
  - ▶ Photo Point
  - Data Point
  - Project Study Area (1611.97 Acres)

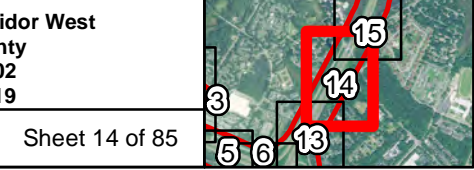


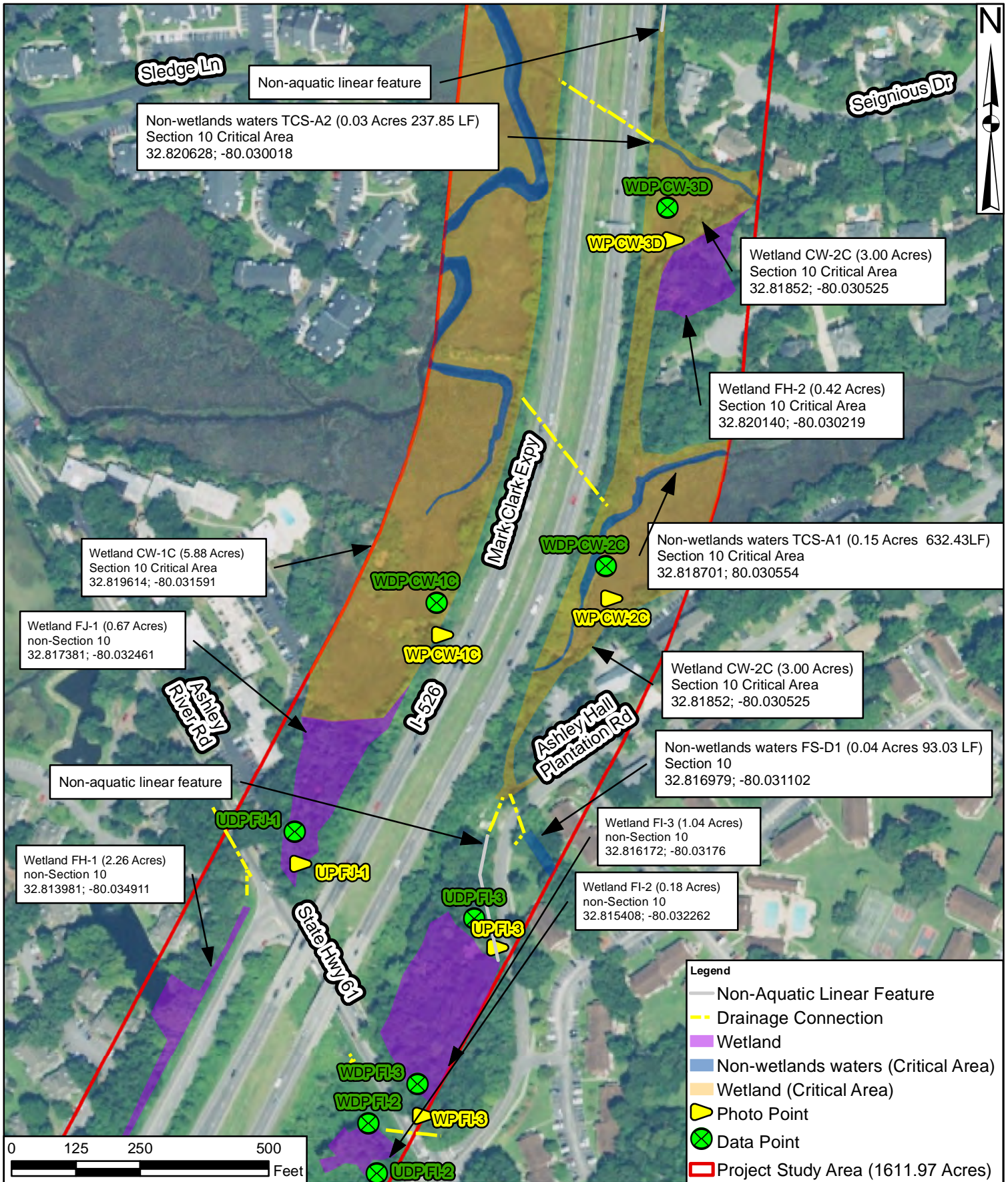
Source:  
NRCS NAIP Aerial  
2017

Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources





**Sledge Ln**  
 Non-aquatic linear feature  
 Non-wetlands waters TCS-A2 (0.03 Acres 237.85 LF)  
 Section 10 Critical Area  
 32.820628; -80.030018

**Wetland CW-2C (3.00 Acres)**  
 Section 10 Critical Area  
 32.81852; -80.030525

**Wetland FH-2 (0.42 Acres)**  
 Section 10 Critical Area  
 32.820140; -80.030219

**Wetland CW-1C (5.88 Acres)**  
 Section 10 Critical Area  
 32.819614; -80.031591

**Non-wetlands waters TCS-A1 (0.15 Acres 632.43LF)**  
 Section 10 Critical Area  
 32.818701; 80.030554

**Wetland FJ-1 (0.67 Acres)**  
 non-Section 10  
 32.817381; -80.032461

**Wetland CW-2C (3.00 Acres)**  
 Section 10 Critical Area  
 32.81852; -80.030525

**Ashey River Rd**

**Ashley Hall Plantation Rd**

Non-aquatic linear feature

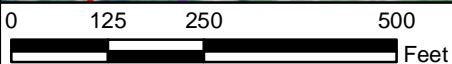
**Non-wetlands waters FS-D1 (0.04 Acres 93.03 LF)**  
 Section 10  
 32.816979; -80.031102

**Wetland FH-1 (2.26 Acres)**  
 non-Section 10  
 32.813981; -80.034911

**Wetland FI-3 (1.04 Acres)**  
 non-Section 10  
 32.816172; -80.03176

**Wetland FI-2 (0.18 Acres)**  
 non-Section 10  
 32.815408; -80.032262

- Legend**
- Non-Aquatic Linear Feature
  - - - Drainage Connection
  - Wetland
  - Non-wetlands waters (Critical Area)
  - Wetland (Critical Area)
  - Photo Point
  - Data Point
  - Project Study Area (1611.97 Acres)



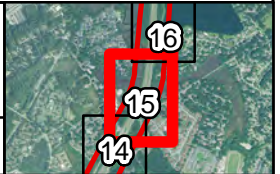
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 2017

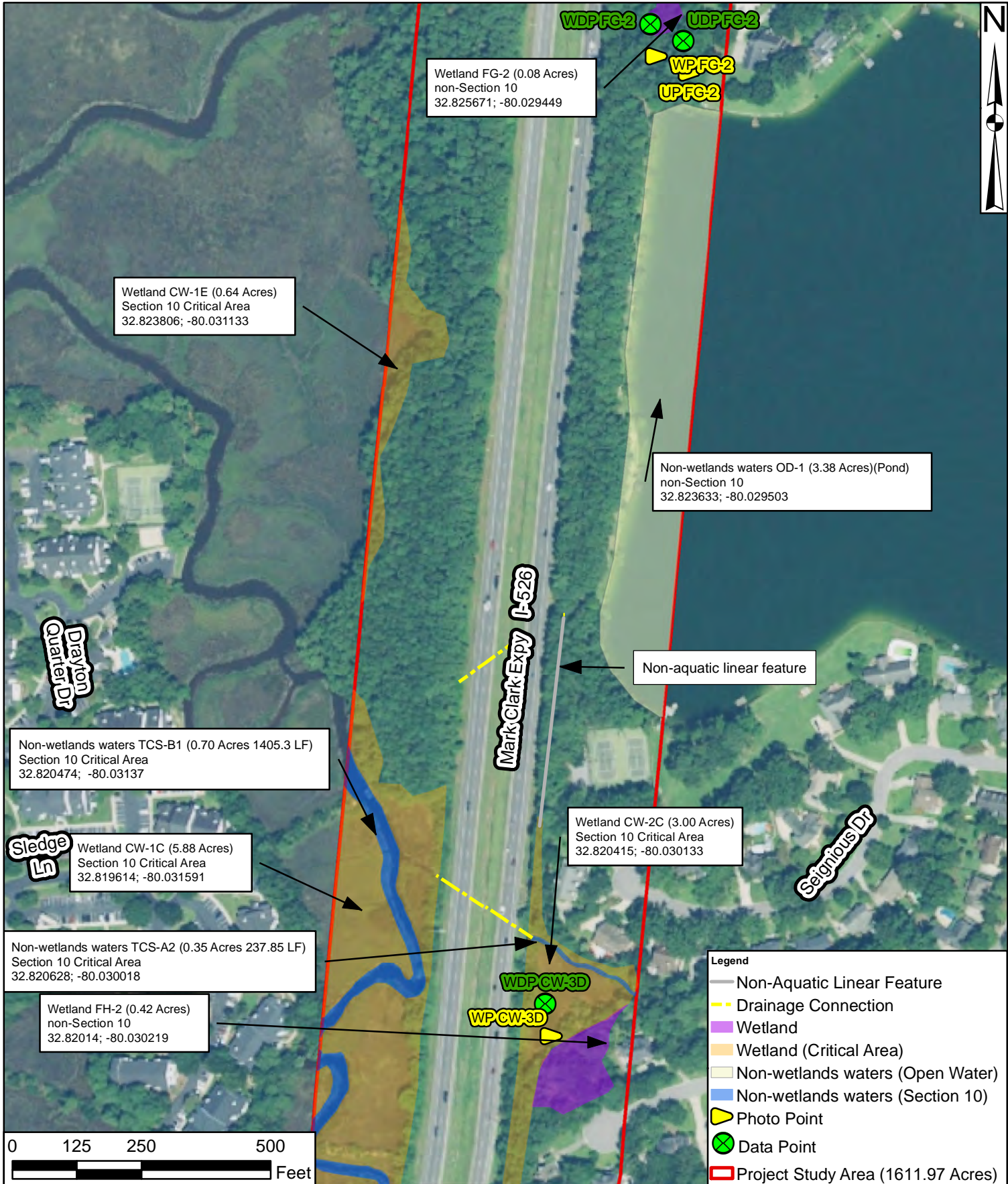
Drawn By: RHH  
 QA/QC: KLM

**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**October 31 2019**

Aquatic Resources

Sheet 15 of 85





Wetland CW-1E (0.64 Acres)  
Section 10 Critical Area  
32.823806; -80.031133

Wetland FG-2 (0.08 Acres)  
non-Section 10  
32.825671; -80.029449

Non-wetlands waters OD-1 (3.38 Acres)(Pond)  
non-Section 10  
32.823633; -80.029503

Non-wetlands waters TCS-B1 (0.70 Acres 1405.3 LF)  
Section 10 Critical Area  
32.820474; -80.03137

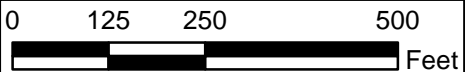
Wetland CW-1C (5.88 Acres)  
Section 10 Critical Area  
32.819614; -80.031591

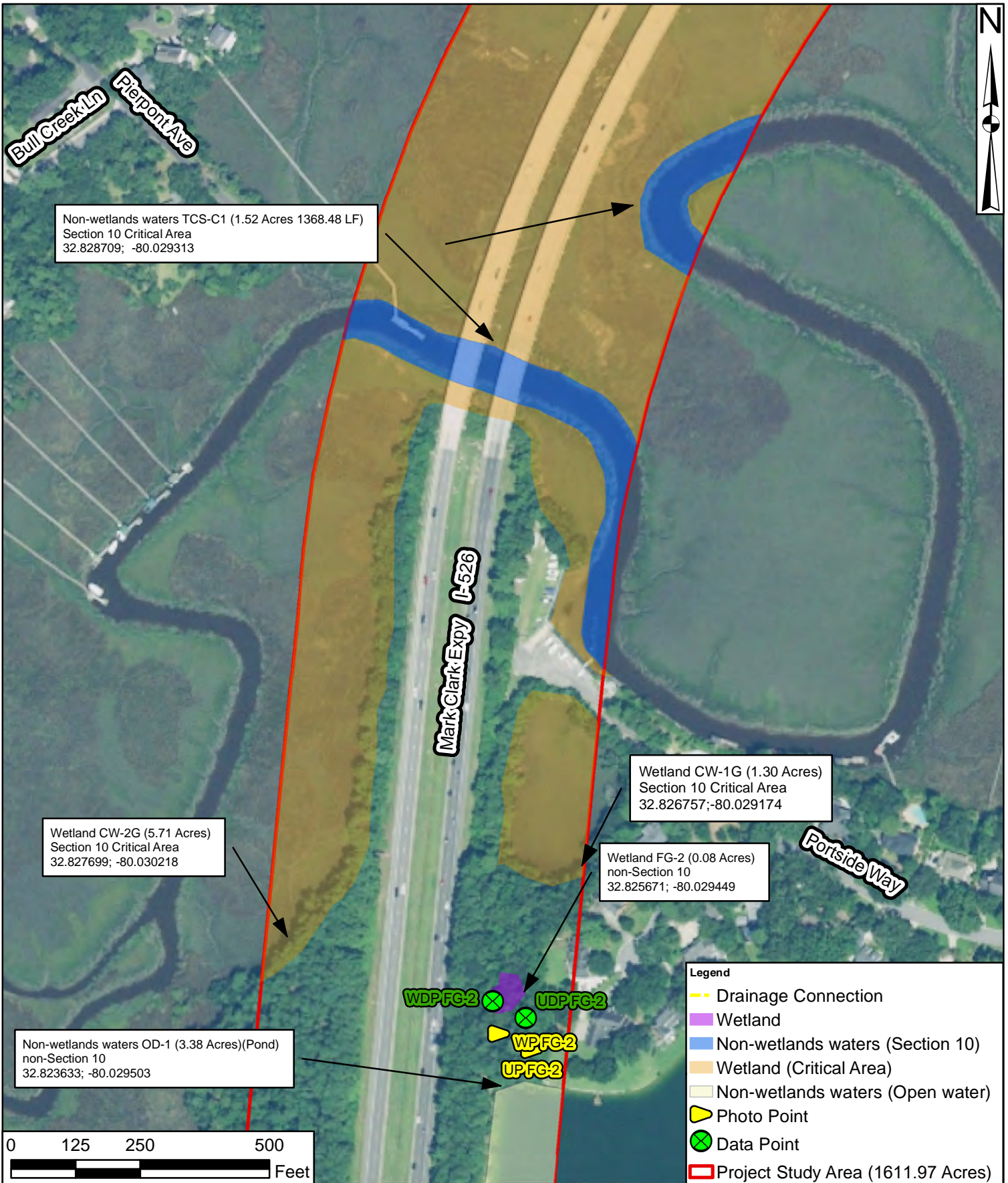
Wetland CW-2C (3.00 Acres)  
Section 10 Critical Area  
32.820415; -80.030133

Non-wetlands waters TCS-A2 (0.35 Acres 237.85 LF)  
Section 10 Critical Area  
32.820628; -80.030018

Wetland FH-2 (0.42 Acres)  
non-Section 10  
32.82014; -80.030219

- Legend**
- Non-Aquatic Linear Feature
  - - - Drainage Connection
  - Wetland
  - Wetland (Critical Area)
  - Non-wetlands waters (Open Water)
  - Non-wetlands waters (Section 10)
  - Photo Point
  - Data Point
  - Project Study Area (1611.97 Acres)





Non-wetlands waters TCS-C1 (1.52 Acres 1368.48 LF)  
 Section 10 Critical Area  
 32.828709; -80.029313

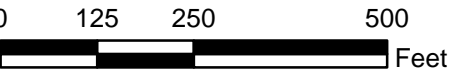
Wetland CW-2G (5.71 Acres)  
 Section 10 Critical Area  
 32.827699; -80.030218

Wetland CW-1G (1.30 Acres)  
 Section 10 Critical Area  
 32.826757; -80.029174

Wetland FG-2 (0.08 Acres)  
 non-Section 10  
 32.825671; -80.029449

Non-wetlands waters OD-1 (3.38 Acres)(Pond)  
 non-Section 10  
 32.823633; -80.029503

- Legend**
- Drainage Connection
  - Wetland
  - Non-wetlands waters (Section 10)
  - Wetland (Critical Area)
  - Non-wetlands waters (Open water)
  - ▶ Photo Point
  - ⊗ Data Point
  - Project Study Area (1611.97 Acres)



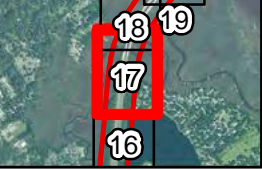
Source:  
 NRCS NAIP Aerial  
 2017

Drawn By: RHH  
 QA/QC: KLM

**I-526 Lowcountry Corridor West**  
 Charleston County  
 SCDOT P032102  
 October 31 2019

Aquatic Resources

Sheet 17 of 85







Non-wetlands waters TCS-E1 (21.08 Acres 604.40 LF)  
Section 10 Critical Area  
32.835725; -80.02419

Wetland CW-2H (16.43 Acres)  
Section 10 Critical Area  
32.832757; -80.026918

Non-wetlands waters TCS-D1 (0.78 Acres 966.12 LF)  
Section 10 Critical Area  
32.831419; -80.028144

**I-526**  
**Mark Clark Expy**

**Virginia Oak Ct**

Wetland CW-1H (11.88 Acres)  
Section 10 Critical Area  
32.830243; -80.028896

Non-wetlands waters TCS-C1 (1.52 Acres 1368.48 LF)  
Section 10 Critical Area  
32.828709; -80.029313

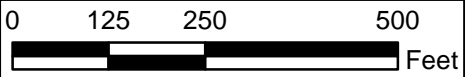
**Bull Creek Ln**  
**Pierpont Ave**

Non-wetlands waters TCS-C1 (1.52 Acres 1368.48 LF)  
Section 10 Critical Area  
32.828709; -80.029313

Wetland CW-2G (5.71 Acres)  
Section 10 Critical Area  
32.827699; -80.030218

**Legend**

- Non-wetlands waters (Section 10)
- Wetland (Critical Area)
- Project Study Area (1611.97 Acres)



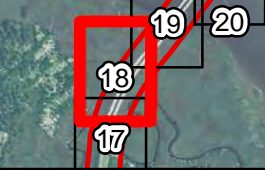
Source:  
NRCS NAIP Aerial  
2017

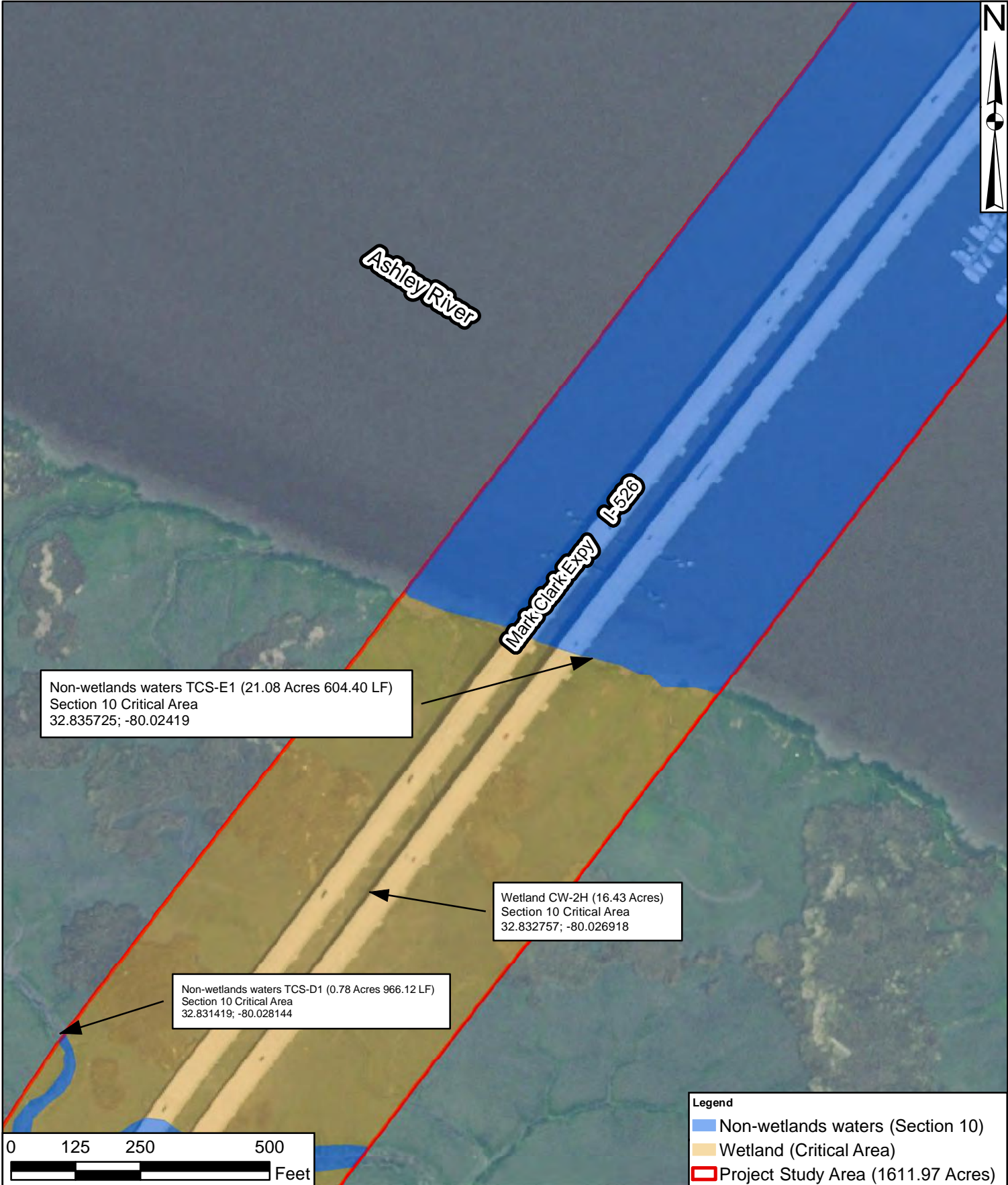
Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**October 31 2019**

Aquatic Resources

Sheet 18 of 85





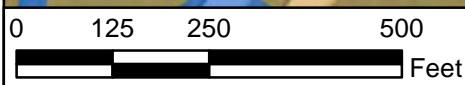
Ashley River

I-526  
Mark Clark Expy

Non-wetlands waters TCS-E1 (21.08 Acres 604.40 LF)  
Section 10 Critical Area  
32.835725; -80.02419

Wetland CW-2H (16.43 Acres)  
Section 10 Critical Area  
32.832757; -80.026918

Non-wetlands waters TCS-D1 (0.78 Acres 966.12 LF)  
Section 10 Critical Area  
32.831419; -80.028144



Legend	
<span style="color: blue;">■</span>	Non-wetlands waters (Section 10)
<span style="color: orange;">■</span>	Wetland (Critical Area)
<span style="border: 2px solid red; display: inline-block; width: 10px; height: 10px;"></span>	Project Study Area (1611.97 Acres)

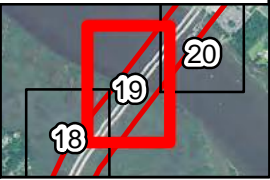
Source:  
NRCS NAIP Aerial  
2017

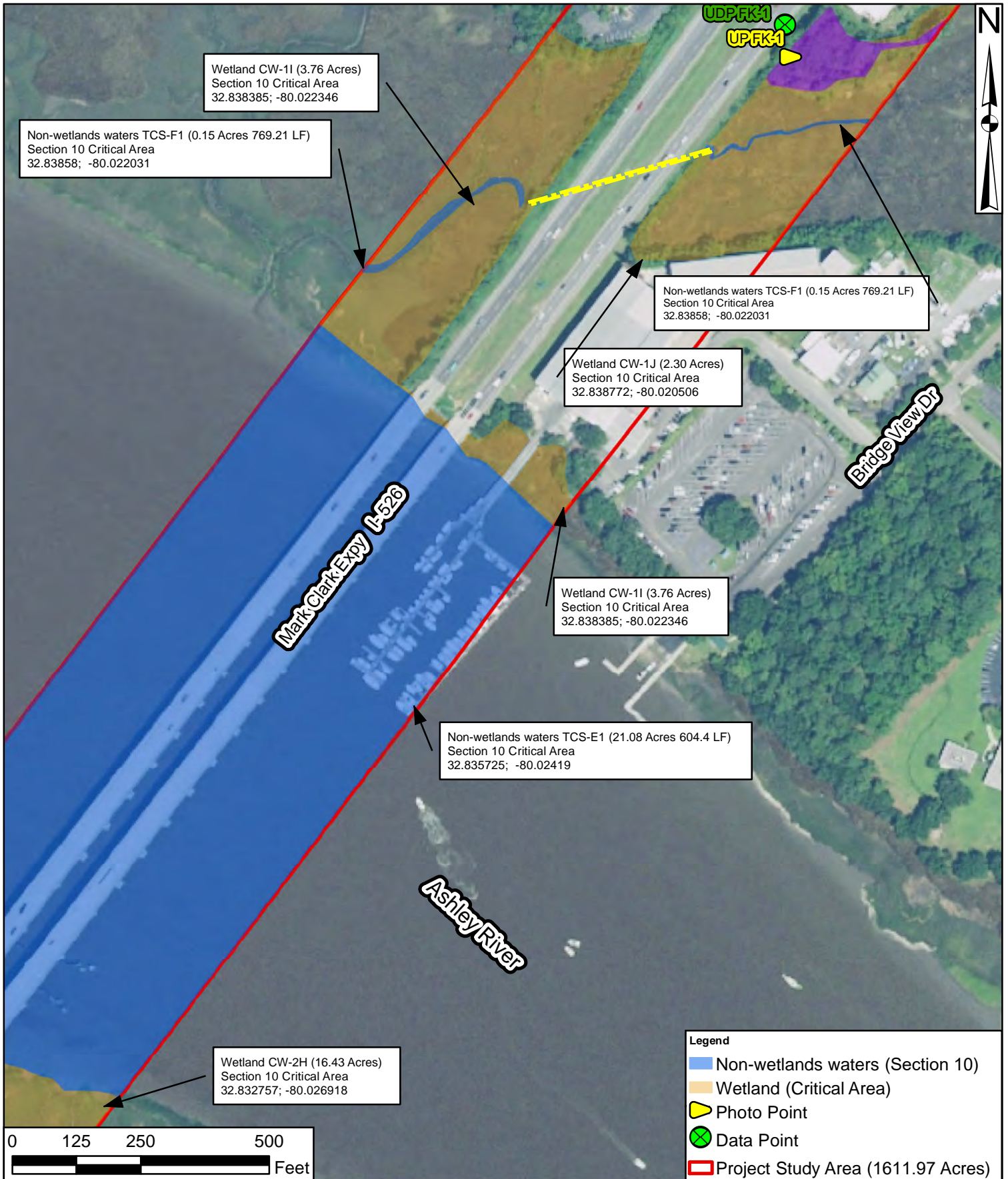
Drawn By: RHH  
QA/QC: KLM

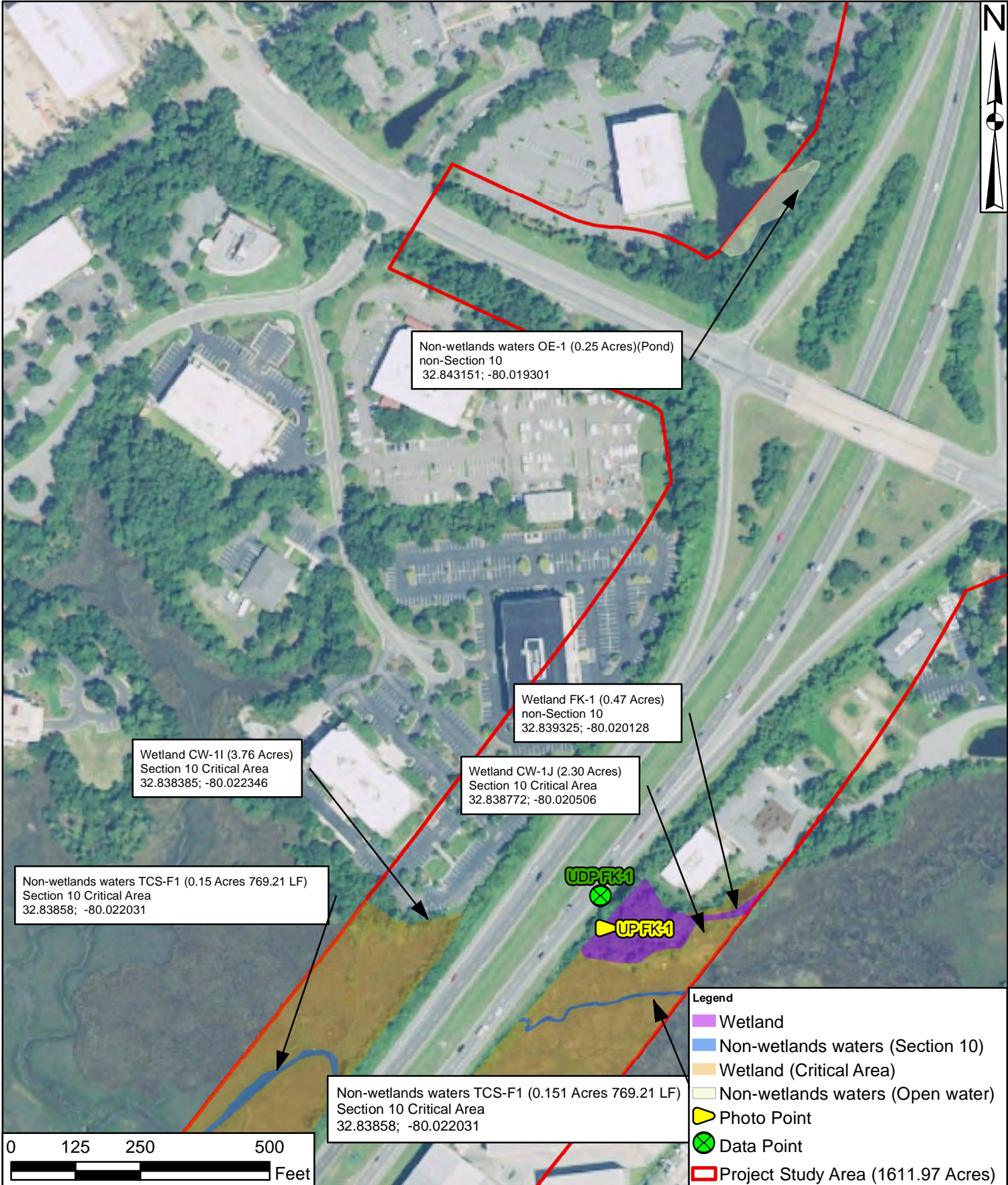
**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 19 of 85







Non-wetlands waters OE-1 (0.25 Acres)(Pond)  
non-Section 10  
32.843151; -80.019301

Wetland FK-1 (0.47 Acres)  
non-Section 10  
32.839325; -80.020128

Wetland CW-1I (3.76 Acres)  
Section 10 Critical Area  
32.838385; -80.022346

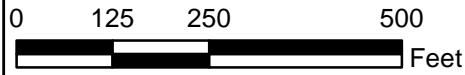
Wetland CW-1J (2.30 Acres)  
Section 10 Critical Area  
32.838772; -80.020506

Non-wetlands waters TCS-F1 (0.15 Acres 769.21 LF)  
Section 10 Critical Area  
32.83858; -80.022031

Non-wetlands waters TCS-F1 (0.151 Acres 769.21 LF)  
Section 10 Critical Area  
32.83858; -80.022031

UDPK41

UPFK41



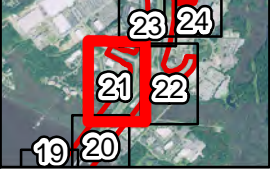
Source:  
NRCS NAIP Aerial  
2017

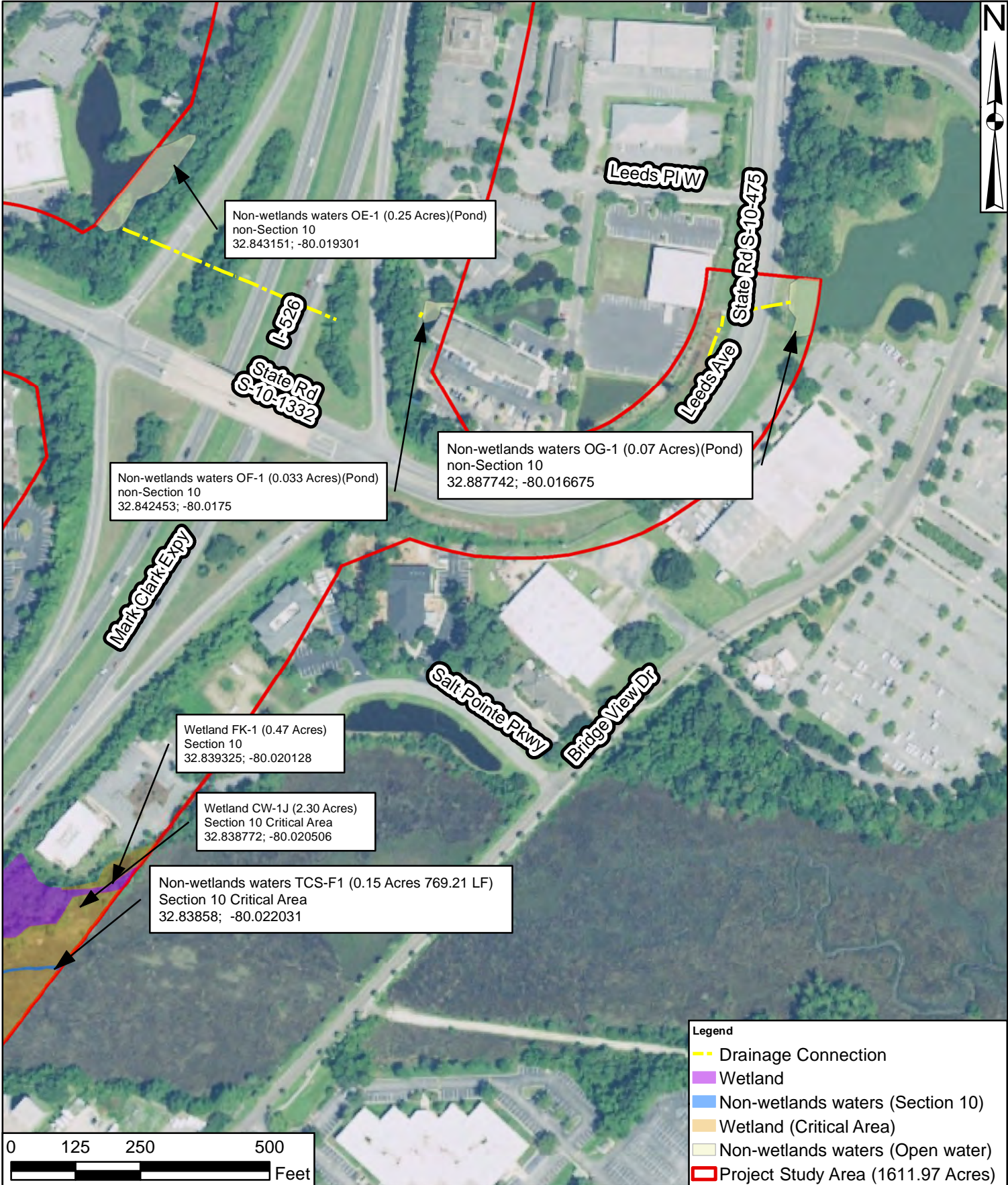
Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 21 of 85





Non-wetlands waters OE-1 (0.25 Acres)(Pond)  
non-Section 10  
32.843151; -80.019301

Non-wetlands waters OF-1 (0.033 Acres)(Pond)  
non-Section 10  
32.842453; -80.0175

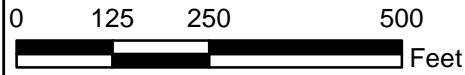
Non-wetlands waters OG-1 (0.07 Acres)(Pond)  
non-Section 10  
32.887742; -80.016675

Wetland FK-1 (0.47 Acres)  
Section 10  
32.839325; -80.020128

Wetland CW-1J (2.30 Acres)  
Section 10 Critical Area  
32.838772; -80.020506

Non-wetlands waters TCS-F1 (0.15 Acres 769.21 LF)  
Section 10 Critical Area  
32.83858; -80.022031

- Legend**
- Drainage Connection
  - Wetland
  - Non-wetlands waters (Section 10)
  - Wetland (Critical Area)
  - Non-wetlands waters (Open water)
  - Project Study Area (1611.97 Acres)



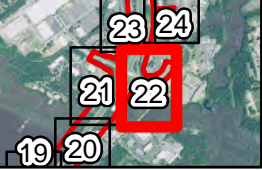
Source:  
NRCS NAIP Aerial  
2017

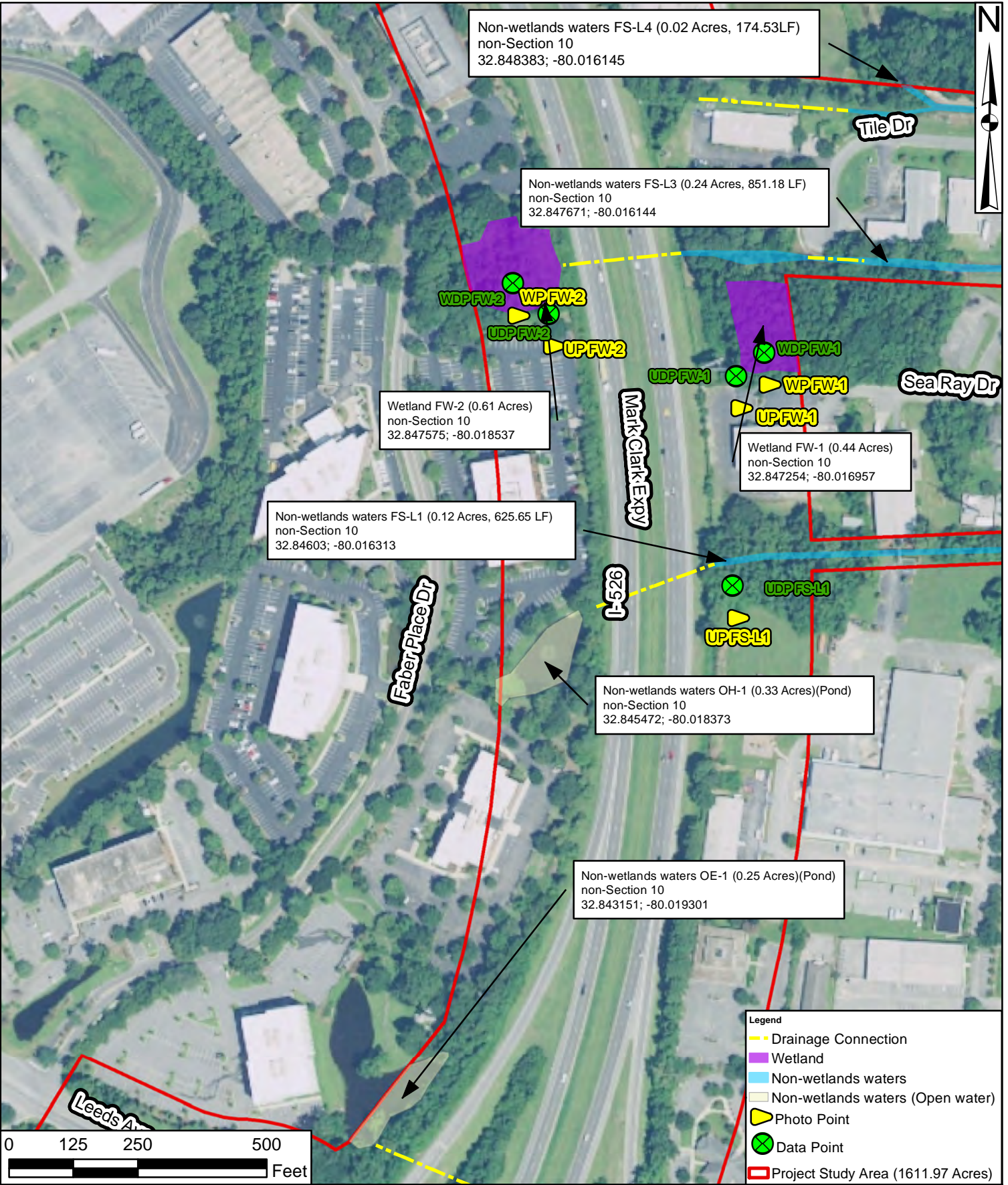
Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 22 of 85







Non-wetlands waters FS-L4 (0.02 Acres, 174.53LF)  
non-Section 10  
32.848383; -80.016145

Non-wetlands waters FS-L2 (0.14 Acres, 764.18 LF)  
non-Section 10  
32.848389; -80.015042

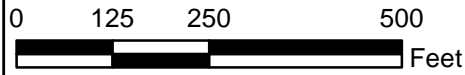
Non-wetlands waters FS-L3 (0.24 Acres, 851.18 LF)  
non-Section 10  
32.847671; -80.016144

Wetland FW-2 (0.61 Acres)  
non-Section 10  
32.847575; -80.018537

Wetland FW-1 (0.44 Acres)  
non-Section 10  
32.847254; -80.016957

Non-wetlands waters FS-L1 (0.12 Acres, 625.65 LF)  
non-Section 10  
32.84603; -80.016313

Non-wetlands waters OH-1 (0.33 Acres)(Pond)  
non-Section 10  
32.845472; -80.018373



- Legend**
- Drainage Connection
  - Wetland
  - Non-wetlands waters
  - Non-wetlands waters (Open water)
  - Photo Point
  - Data Point
  - Project Study Area (1611.97 Acres)



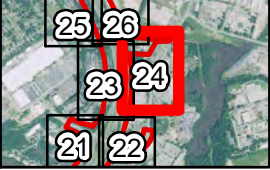
Source:  
NRCS NAIP Aerial  
2017

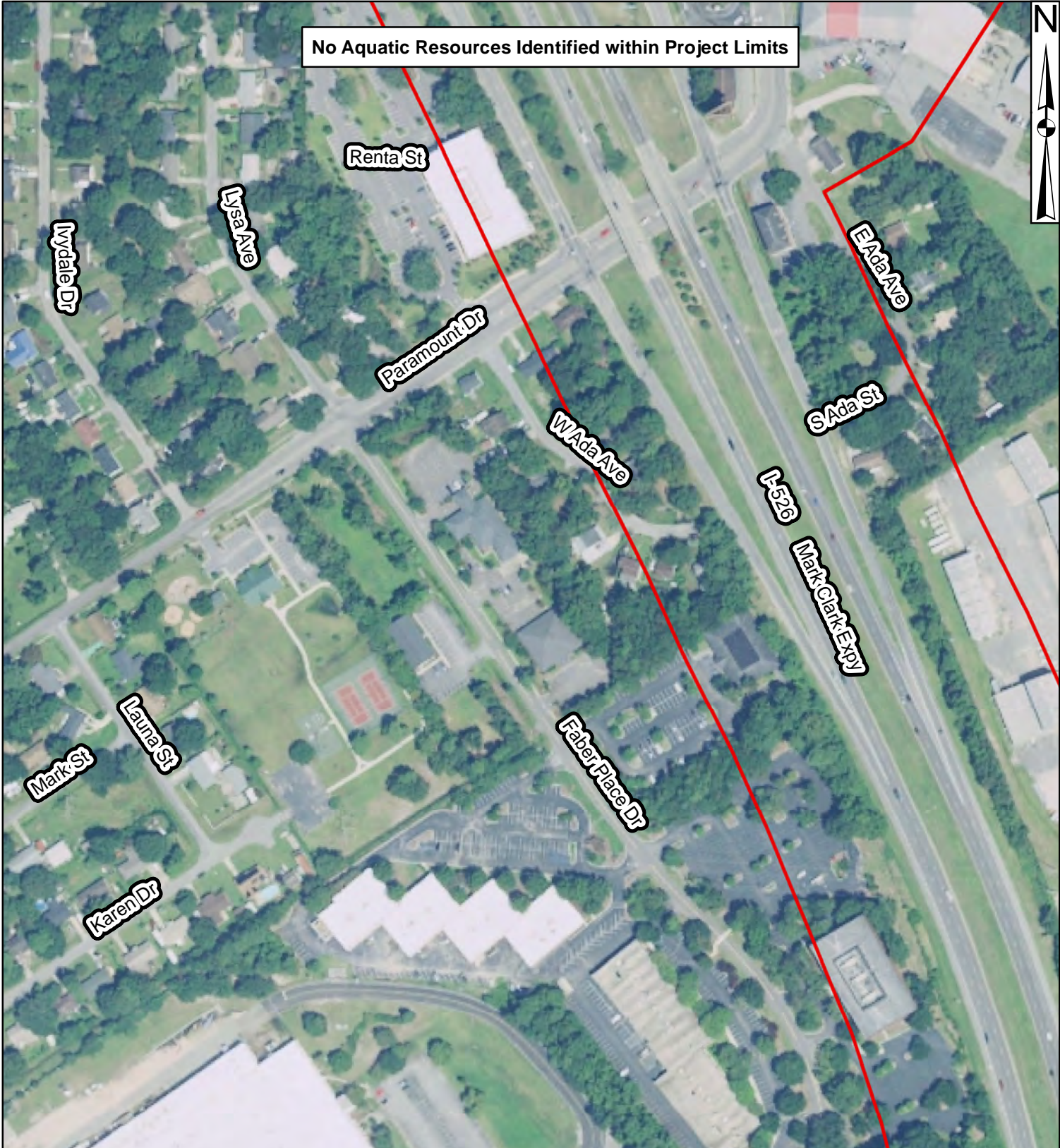
Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

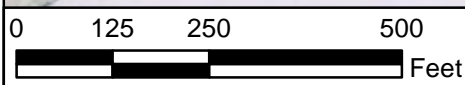
Aquatic Resources

Sheet 24 of 85





No Aquatic Resources Identified within Project Limits



**Legend**

- Drainage Connection
- Project Study Area (1611.97 Acres)

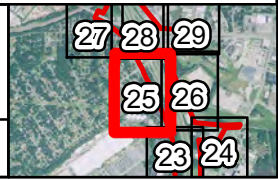
Source:  
NRCS NAIP Aerial  
2017

Drawn By: RHH  
QA/QC: KLM

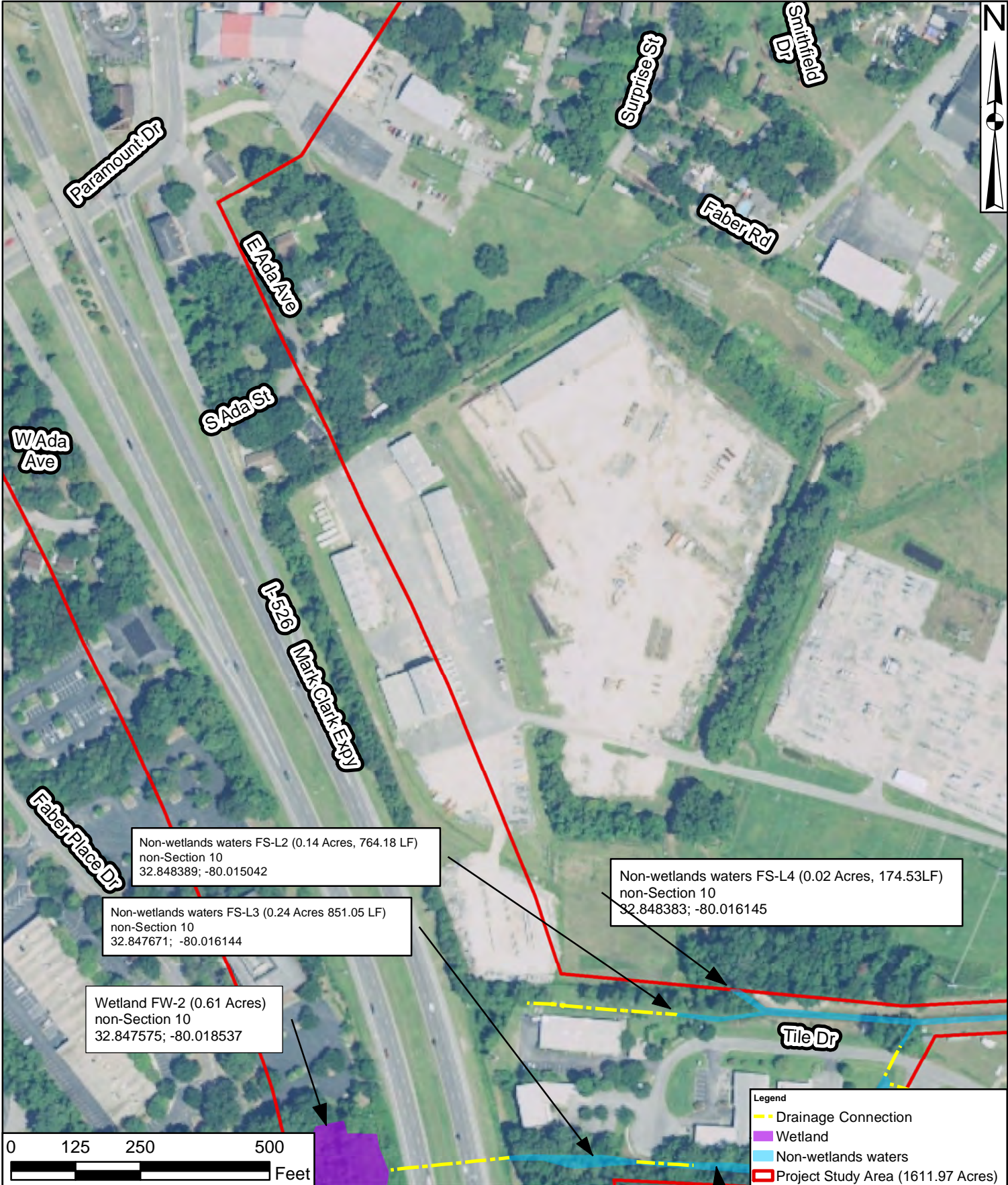
I-526 Lowcountry Corridor West  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 25 of 85





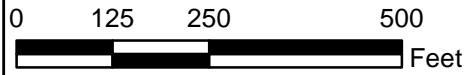


Non-wetlands waters FS-L2 (0.14 Acres, 764.18 LF)  
non-Section 10  
32.848389; -80.015042

Non-wetlands waters FS-L3 (0.24 Acres 851.05 LF)  
non-Section 10  
32.847671; -80.016144

Wetland FW-2 (0.61 Acres)  
non-Section 10  
32.847575; -80.018537

Non-wetlands waters FS-L4 (0.02 Acres, 174.53LF)  
non-Section 10  
32.848383; -80.016145



**Legend**

- Drainage Connection
- Wetland
- Non-wetlands waters
- Project Study Area (1611.97 Acres)

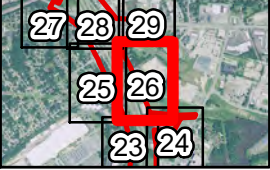
Source:  
NRCS NAIP Aerial  
2017

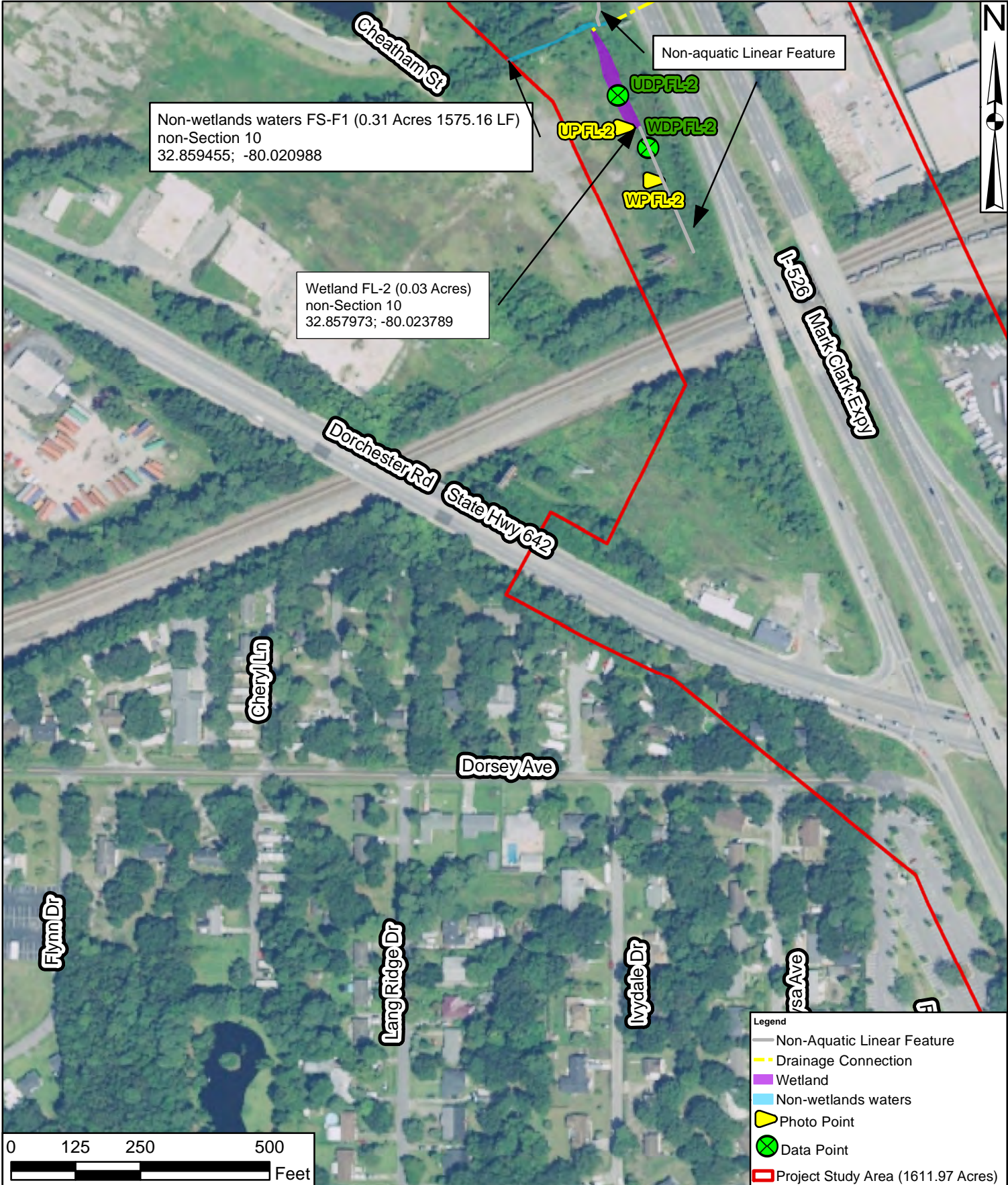
Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 26 of 85

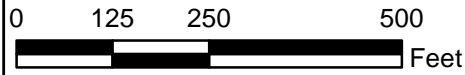




Non-wetlands waters FS-F1 (0.31 Acres 1575.16 LF)  
non-Section 10  
32.859455; -80.020988

Wetland FL-2 (0.03 Acres)  
non-Section 10  
32.857973; -80.023789

- Legend
- Non-Aquatic Linear Feature
  - - - Drainage Connection
  - Wetland
  - Non-wetlands waters
  - ▲ Photo Point
  - ⊗ Data Point
  - ▭ Project Study Area (1611.97 Acres)



Source:  
NRCS NAIP Aerial  
2017

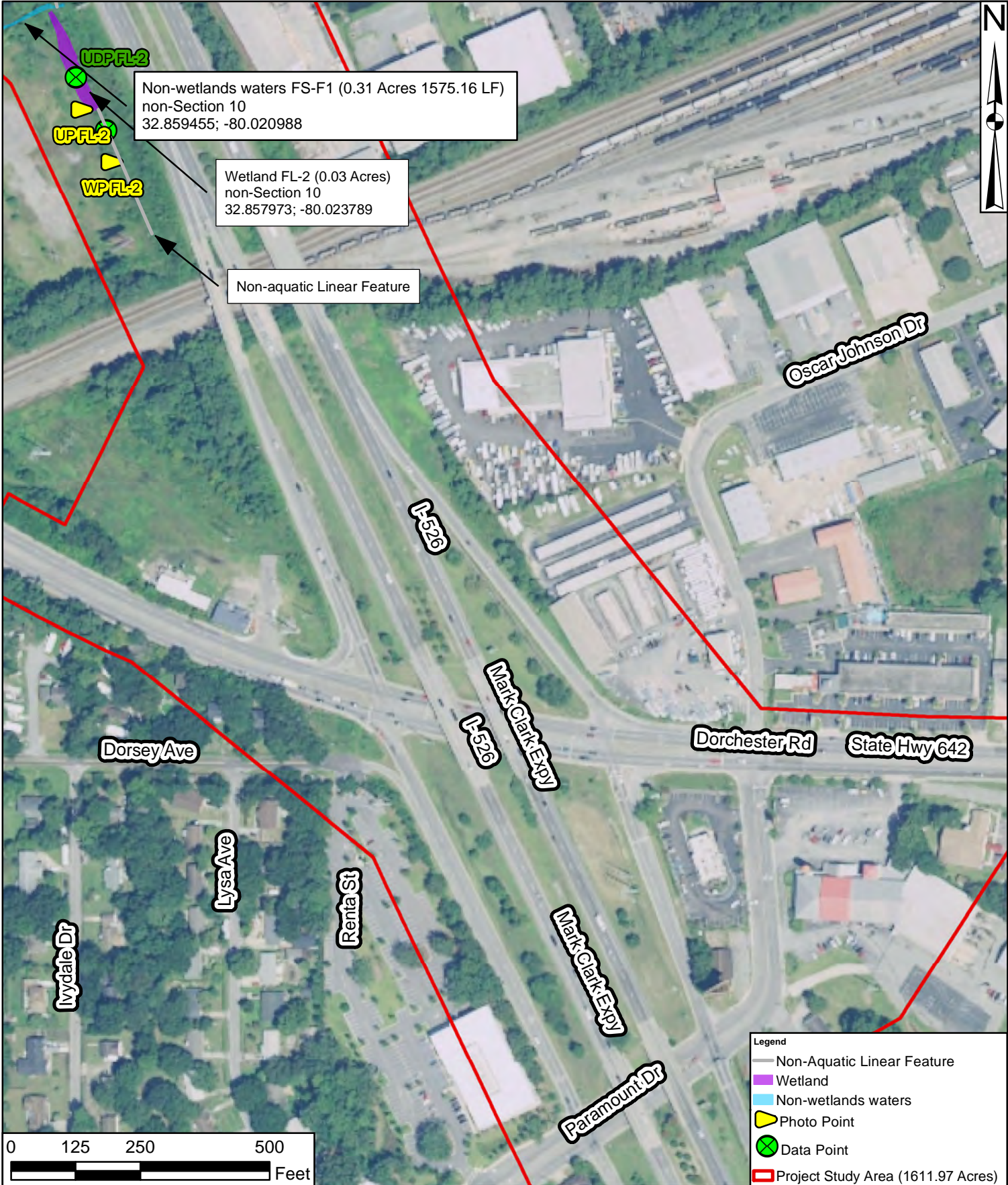
Drawn By: RHH  
QA/QC: KLM

I-526 Lowcountry Corridor West  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 27 of 85





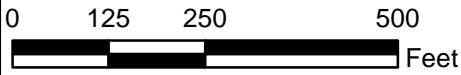
Non-wetlands waters FS-F1 (0.31 Acres 1575.16 LF)  
non-Section 10  
32.859455; -80.020988

Wetland FL-2 (0.03 Acres)  
non-Section 10  
32.857973; -80.023789

Non-aquatic Linear Feature

**Legend**

- Non-Aquatic Linear Feature
- Wetland
- Non-wetlands waters
- Photo Point
- Data Point
- Project Study Area (1611.97 Acres)



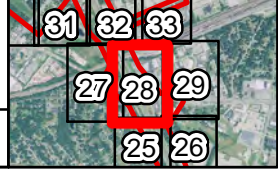
Source:  
NRCS NAIP Aerial  
2017

Drawn By: RHH  
QA/QC: KLM

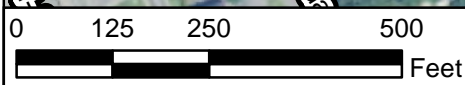
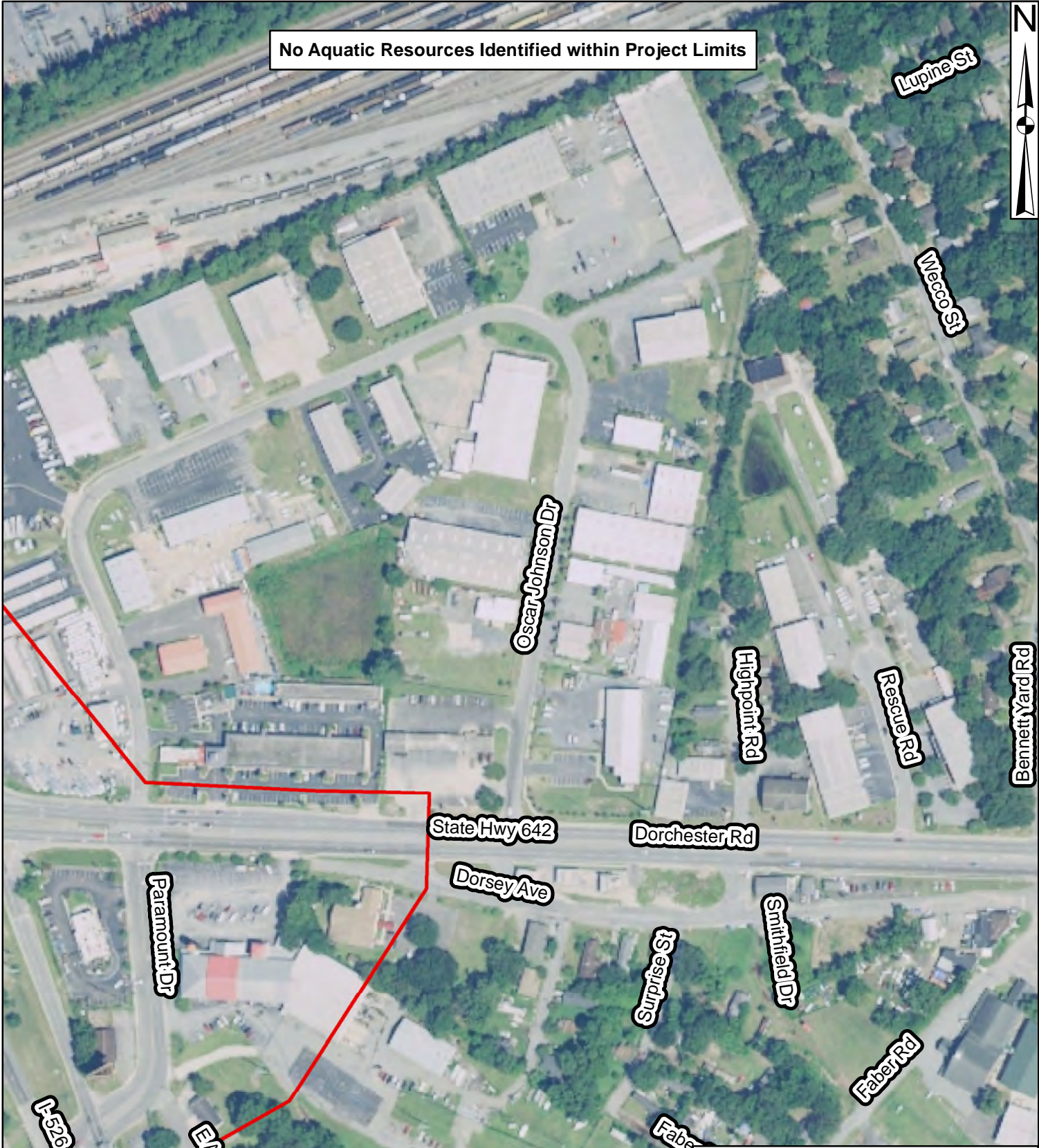
**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 28 of 85



No Aquatic Resources Identified within Project Limits



Legend

- - - Drainage Connection
- ▭ Project Study Area (1611.97 Acres)



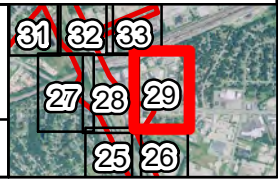
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2017

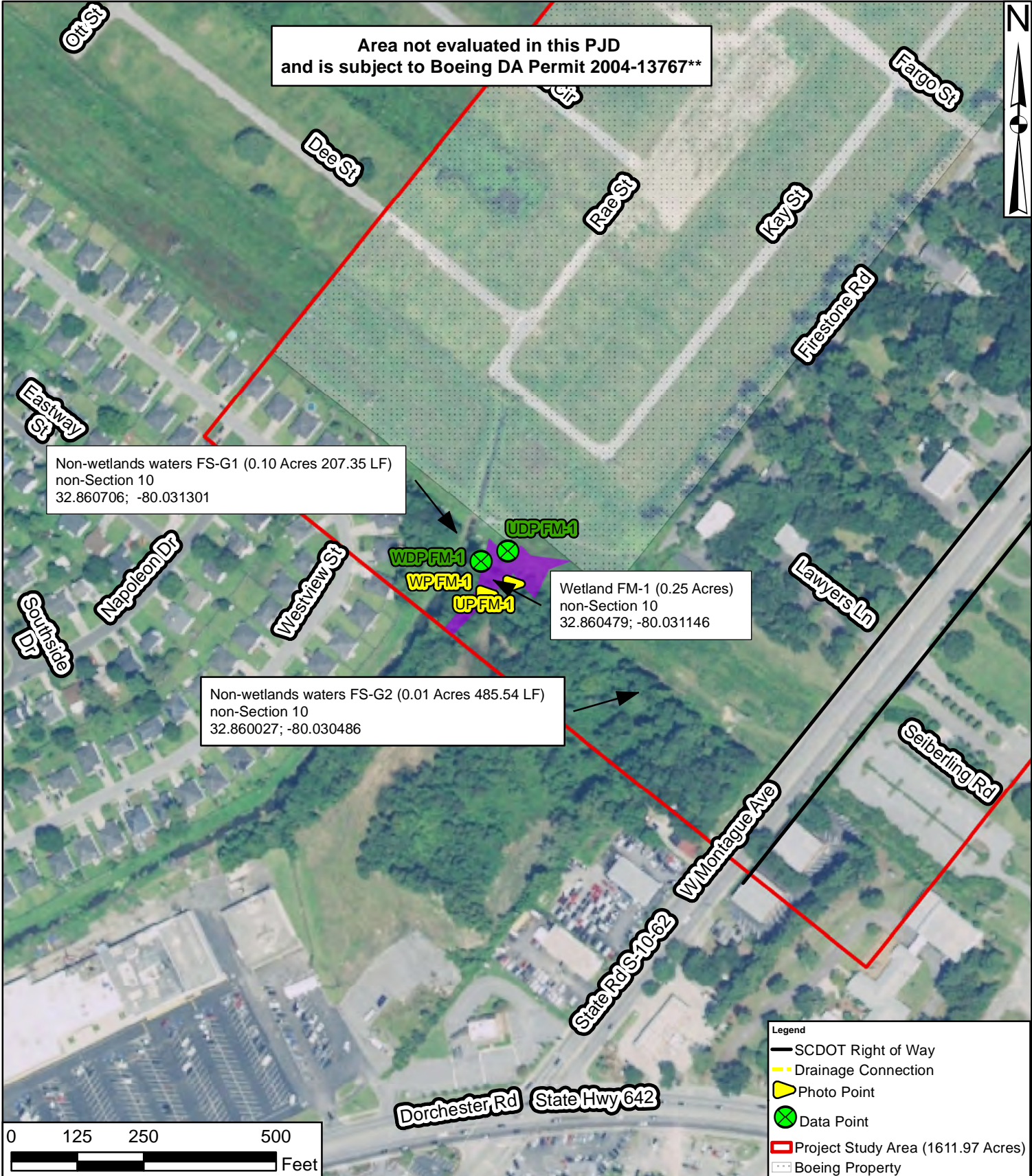
Drawn By: RHH  
QA/QC: KLM

I-526 Lowcountry Corridor West  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 29 of 85





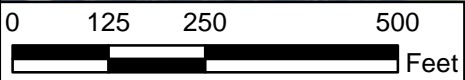
Area not evaluated in this PJD  
and is subject to Boeing DA Permit 2004-13767\*\*

Non-wetlands waters FS-G1 (0.10 Acres 207.35 LF)  
non-Section 10  
32.860706; -80.031301

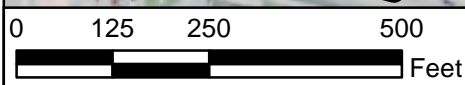
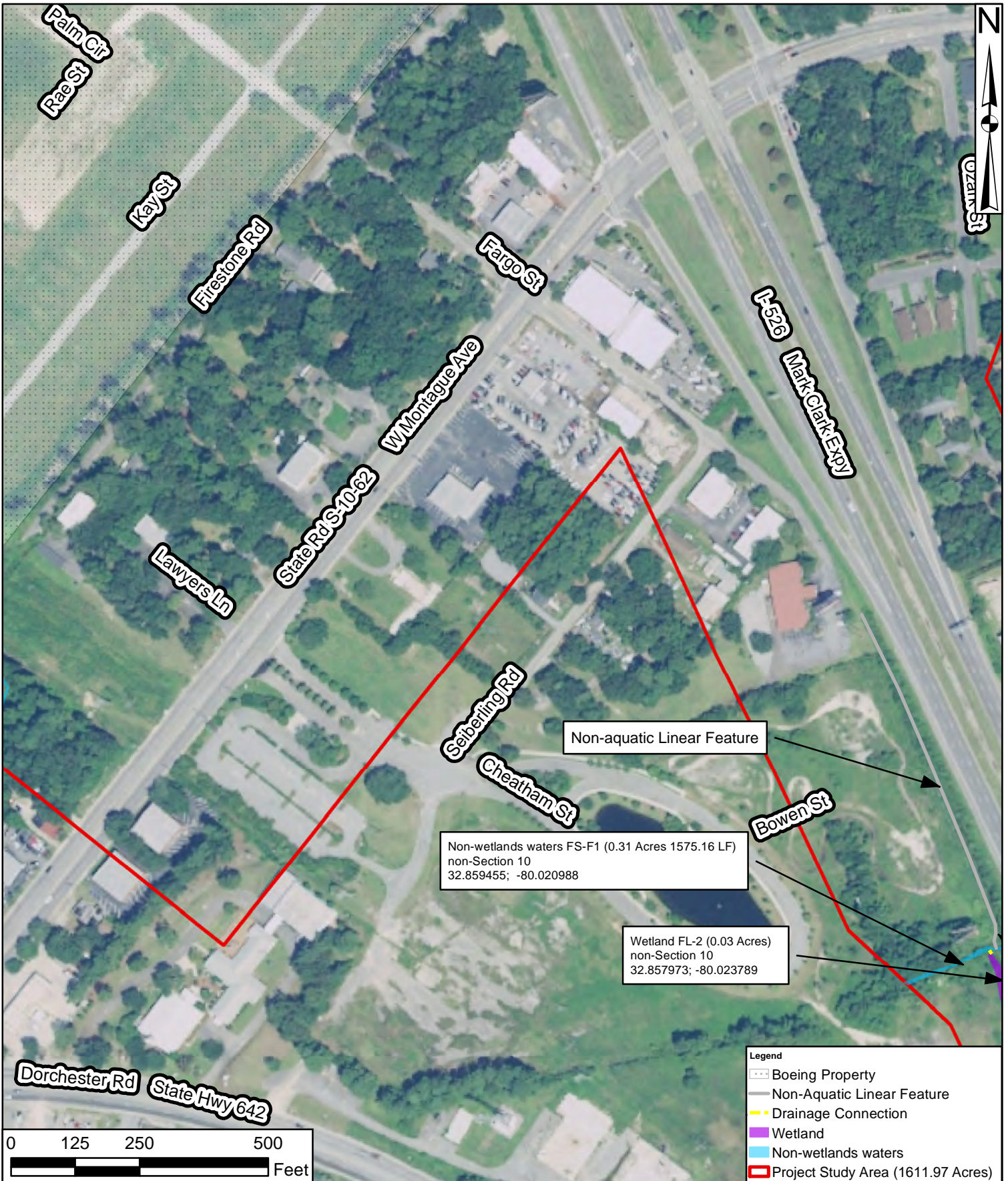
Wetland FM-1 (0.25 Acres)  
non-Section 10  
32.860479; -80.031146

Non-wetlands waters FS-G2 (0.01 Acres 485.54 LF)  
non-Section 10  
32.860027; -80.030486

- Legend
- SCDOT Right of Way
  - Drainage Connection
  - ▶ Photo Point
  - ⊗ Data Point
  - ▭ Project Study Area (1611.97 Acres)
  - ▭ Boeing Property



\*\*Please note that this Boeing SAC 2004-13767 area is subject to change. Existing conditions must be used for an analysis of these areas\*\*



Source:  
NRCS NAIP Aerial  
2017

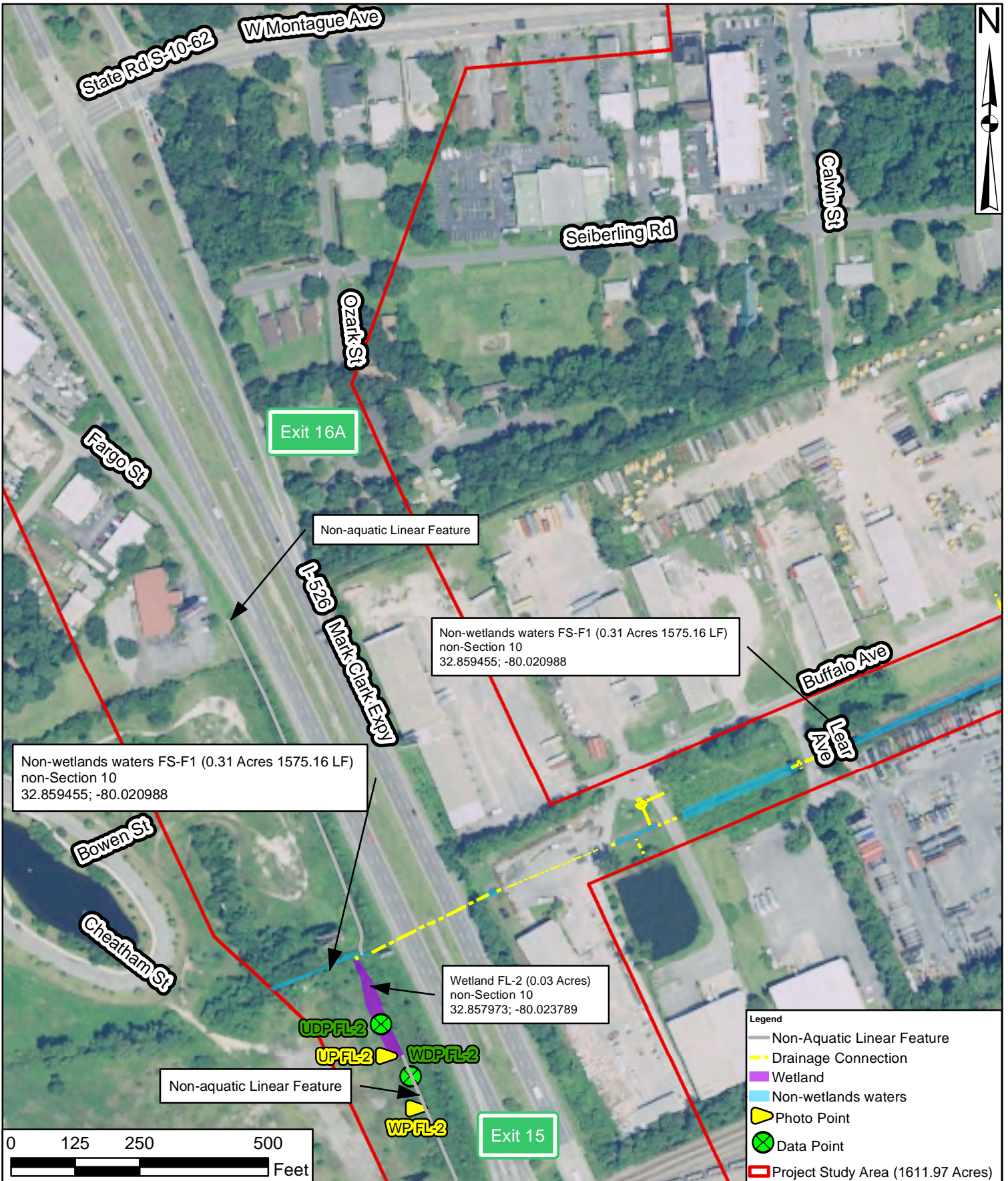
Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 31 of 85



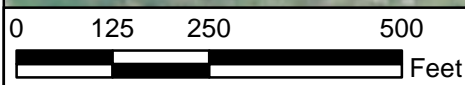


Non-wetlands waters FS-F1 (0.31 Acres 1575.16 LF)  
non-Section 10  
32.859455; -80.020988

Non-wetlands waters FS-F1 (0.31 Acres 1575.16 LF)  
non-Section 10  
32.859455; -80.020988

Wetland FL-2 (0.03 Acres)  
non-Section 10  
32.857973; -80.023789

- Legend**
- Non-Aquatic Linear Feature
  - - - Drainage Connection
  - Wetland
  - Non-wetlands waters
  - ▲ Photo Point
  - ⊗ Data Point
  - ▭ Project Study Area (1611.97 Acres)



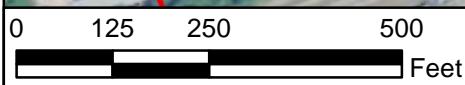
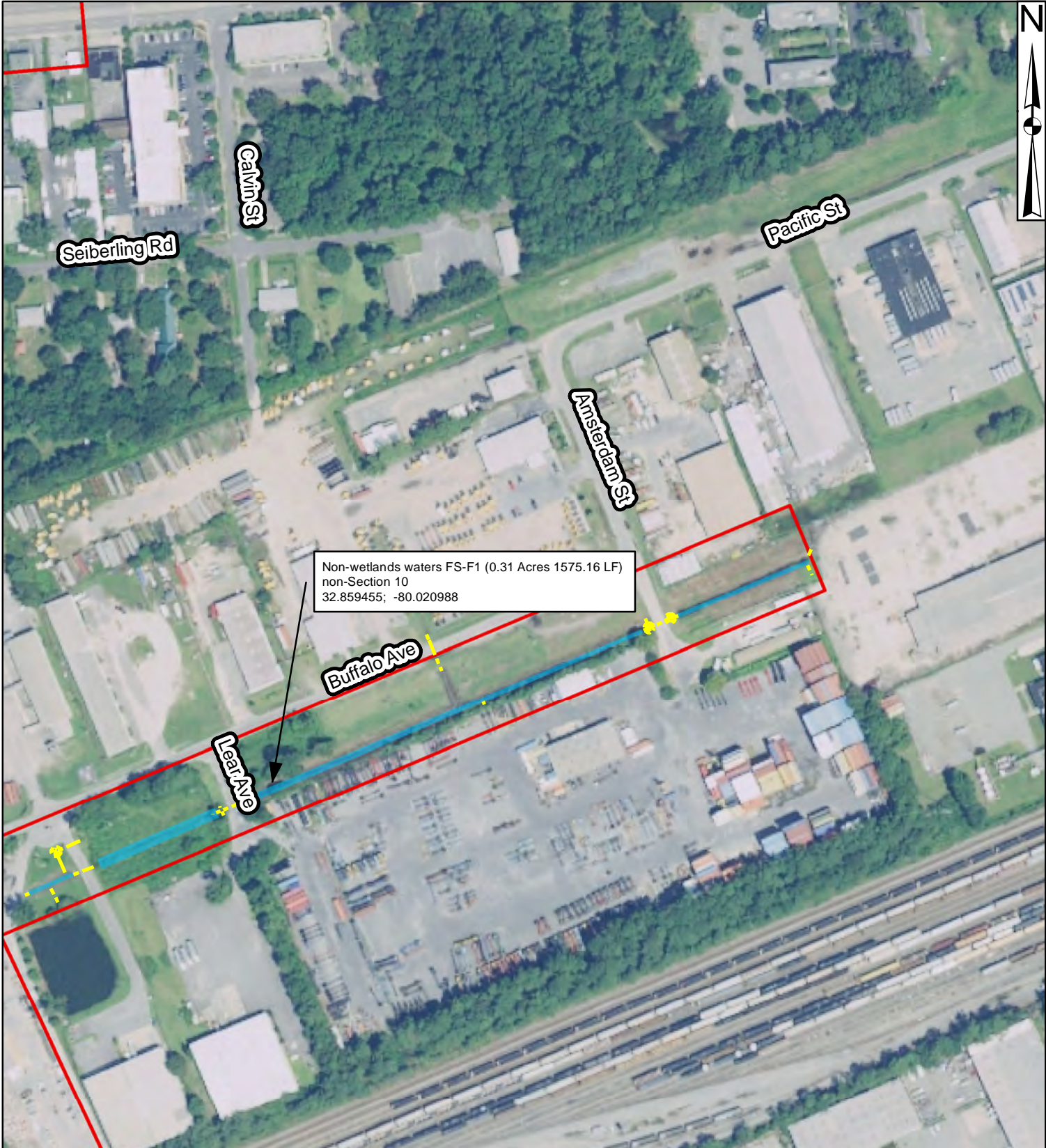
Source:  
NRCS NAIP Aerial  
2017

Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources      Sheet 32 of 85





- Legend**
- Drainage Connection
  - Non-wetlands waters
  - Project Study Area (1611.97 Acres)



Source:  
NRCS NAIP Aerial  
2017

Drawn By: RHH  
QA/QC: KLM

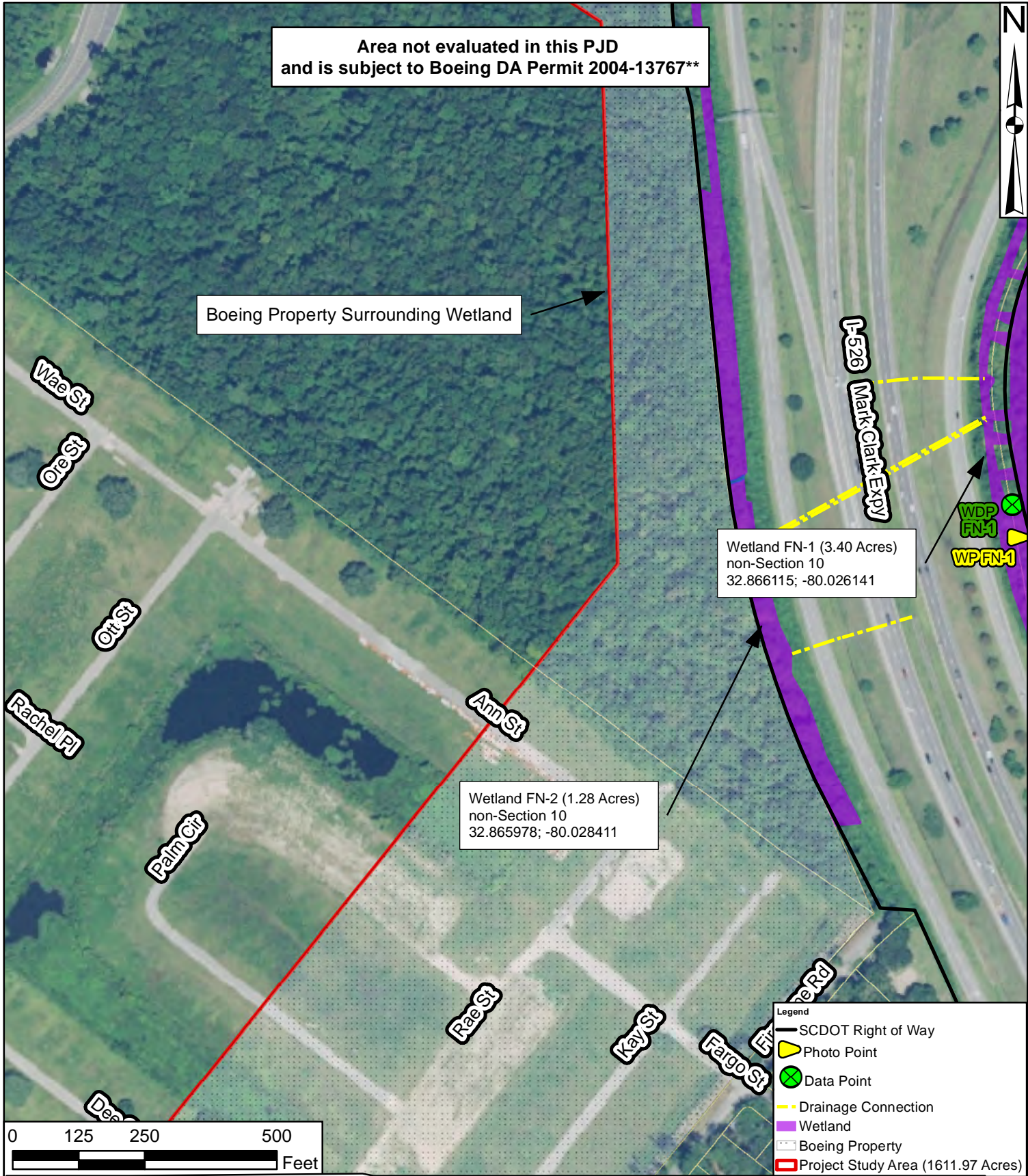
**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**October 31 2019**

Aquatic Resources

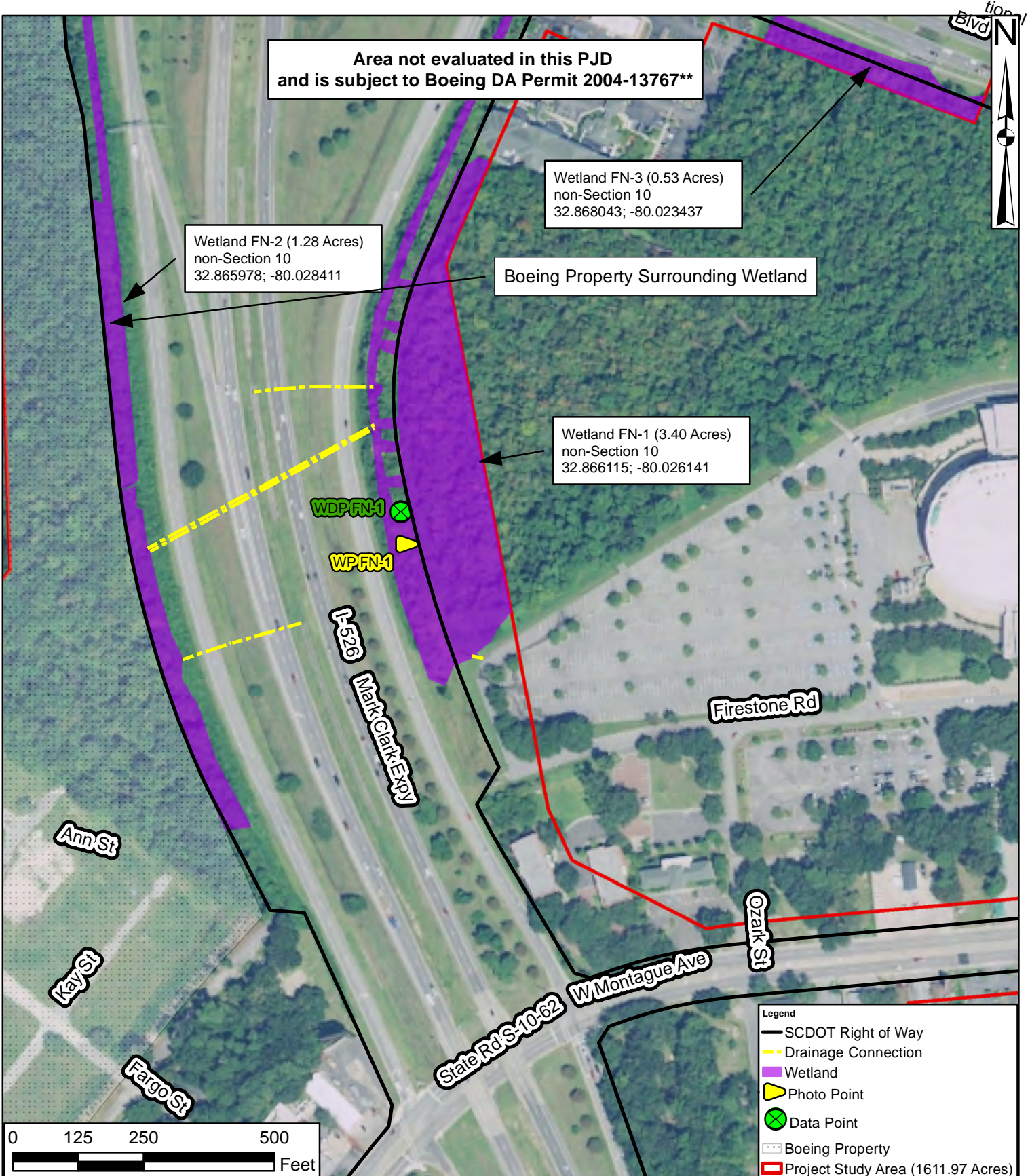
Sheet 33 of 85







**\*\*Please note that this Boeing SAC 2004-13767 area is subject to change. Existing conditions must be used for an analysis of these areas\*\***



Area not evaluated in this PJD  
and is subject to Boeing DA Permit 2004-13767\*\*

Wetland FN-2 (1.28 Acres)  
non-Section 10  
32.865978; -80.028411

Wetland FN-3 (0.53 Acres)  
non-Section 10  
32.868043; -80.023437

Boeing Property Surrounding Wetland

Wetland FN-1 (3.40 Acres)  
non-Section 10  
32.866115; -80.026141

WDPFN-1

WPFN-1

I-526  
Mark Clark Expwy

Firestone Rd

Ann St

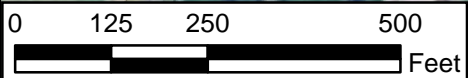
Key St

Fargo St

State Rd S-10-62  
W Montague Ave

Ozark St

- Legend
- SCDOT Right of Way
  - - - Drainage Connection
  - Wetland
  - ▲ Photo Point
  - ⊗ Data Point
  - ▨ Boeing Property
  - ▭ Project Study Area (1611.97 Acres)



\*\*Please note that this Boeing SAC 2004-13767 area is subject to change. Existing conditions must be used for an analysis of these areas\*\*

Source:  
NRCS NAIP Aerial  
2017

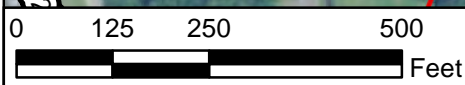
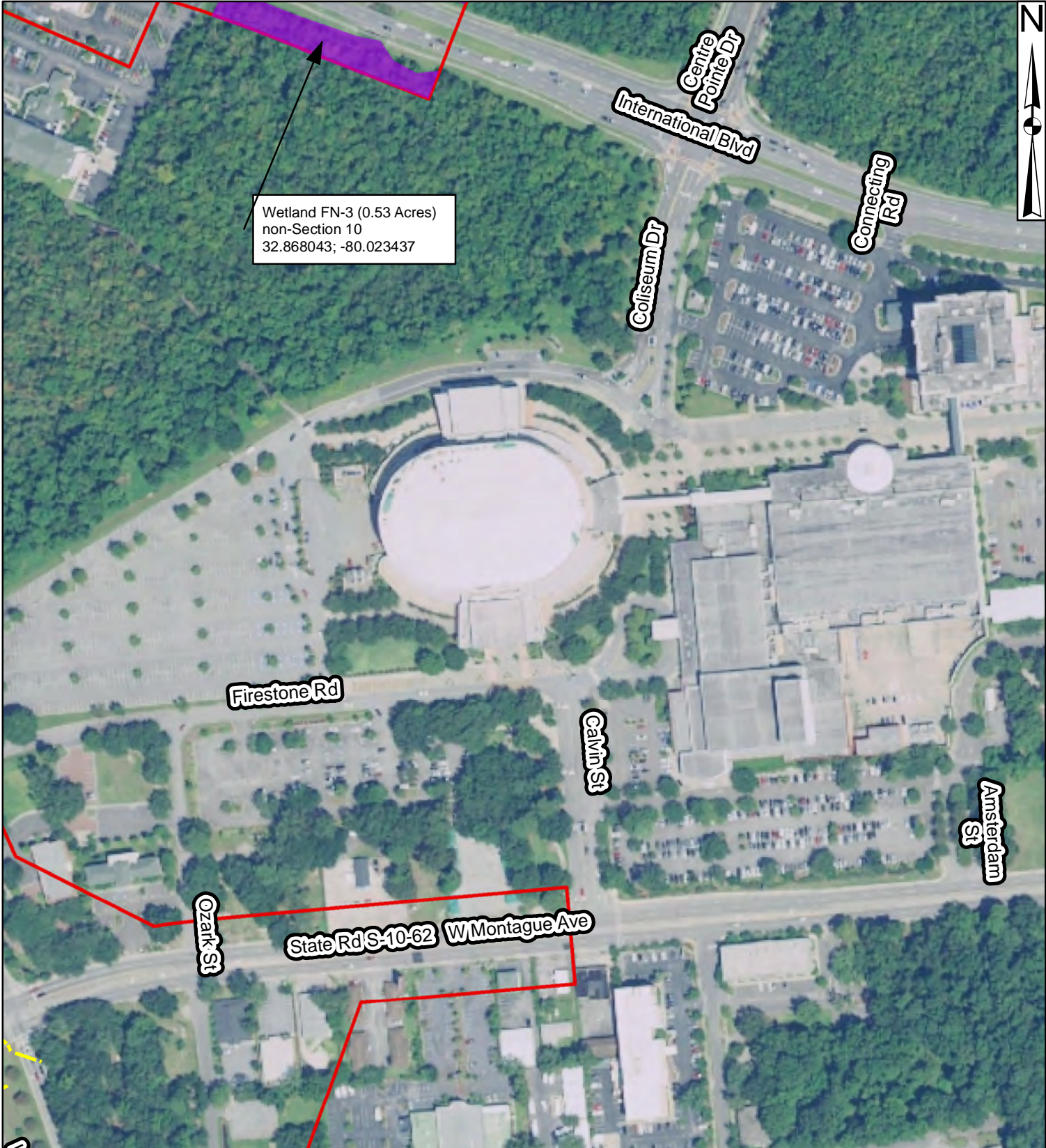
Drawn By: RHH  
QA/QC: KLM

I-526 Lowcountry Corridor West  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 35 of 85





- Legend**
- Drainage Connection
  - Wetland
  - Project Study Area (1611.97 Acres)



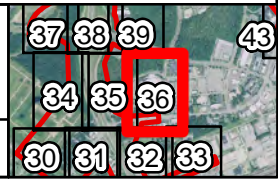
Source:  
NRCS NAIP Aerial  
2017

Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 36 of 85



Area not evaluated in this PJD  
and is subject to Boeing DA Permit 2004-13767\*\*

Wetland FO-1 (2.33 Acres)  
non-Section 10  
32.873366; -80.027386

Aviation Blvd

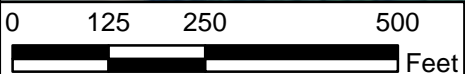
Mark Clark Expy I-526

Exit 16B

International Blvd

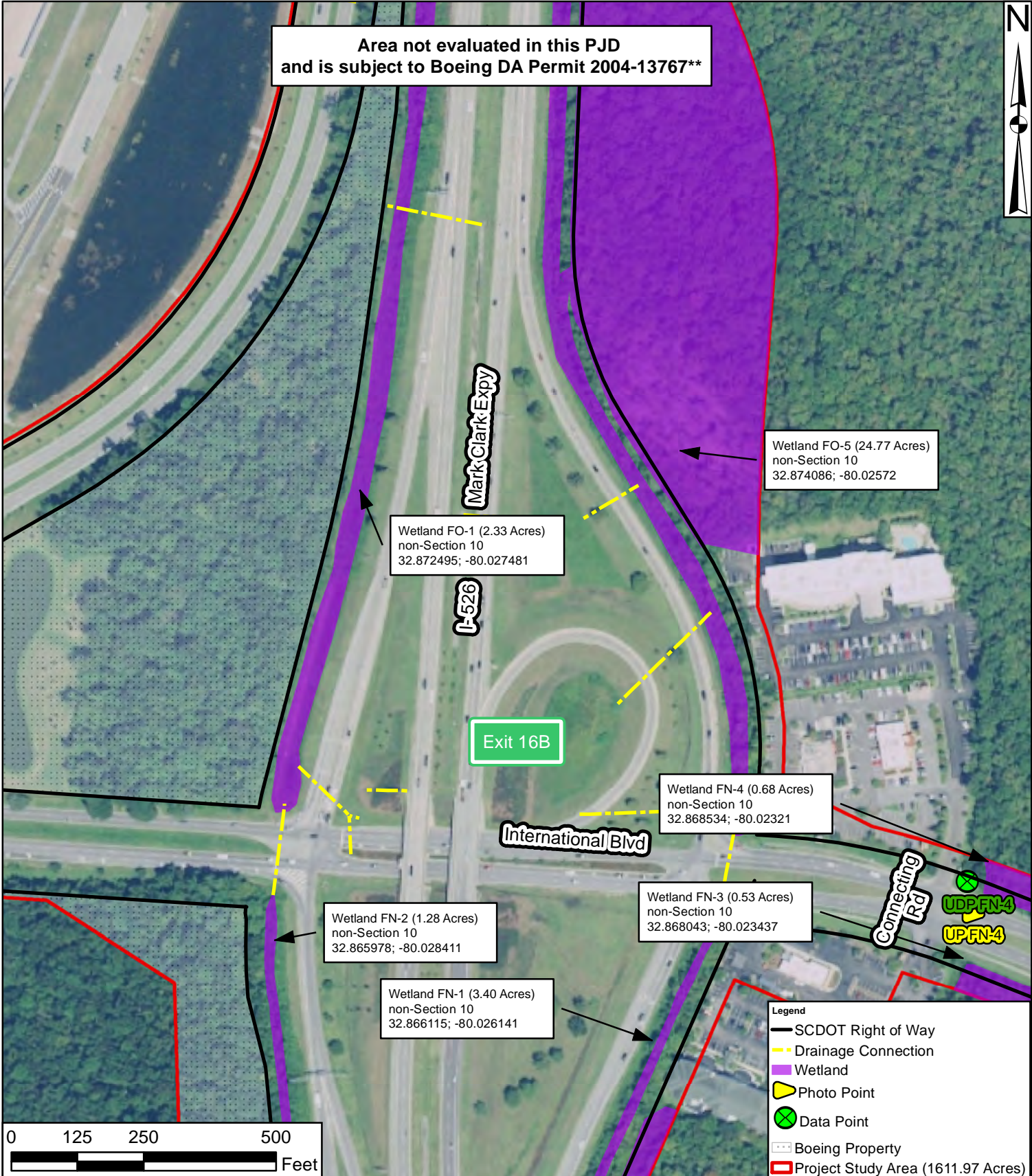
Wetland FN-2 (1.28 Acres)  
non-Section 10  
32.865978; -80.028411

- Legend
- SCDOT Right of Way
  - - - Drainage Connection
  - Wetland
  - Boeing Property
  - Project Study Area (1611.97 acres)



\*\*Please note that this Boeing SAC 2004-13767 area is subject to change. Existing conditions must be used for an analysis of these areas\*\*

	Source: NRCS NAIP Aerial 2017	I-526 Lowcountry Corridor West Charleston County SCDOT P032102 October 31 2019		
	Drawn By: RHH QA/QC: KLM	Aquatic Resources	Sheet 37 of 85	



Area not evaluated in this PJD  
and is subject to Boeing DA Permit 2004-13767\*\*

Wetland FO-5 (24.77 Acres)  
non-Section 10  
32.874086; -80.02572

Wetland FO-1 (2.33 Acres)  
non-Section 10  
32.872495; -80.027481

Exit 16B

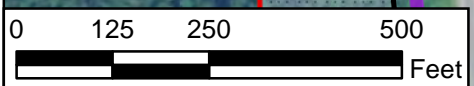
Wetland FN-4 (0.68 Acres)  
non-Section 10  
32.868534; -80.02321

Wetland FN-2 (1.28 Acres)  
non-Section 10  
32.865978; -80.028411

Wetland FN-3 (0.53 Acres)  
non-Section 10  
32.868043; -80.023437

Wetland FN-1 (3.40 Acres)  
non-Section 10  
32.866115; -80.026141

- Legend**
- SCDOT Right of Way
  - - - Drainage Connection
  - Wetland
  - Photo Point
  - Data Point
  - Boeing Property
  - Project Study Area (1611.97 Acres)



\*\*Please note that this Boeing SAC 2004-13767 area is subject to change. Existing conditions must be used for an analysis of these areas\*\*

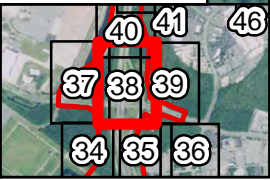
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NRCS NAIP Aerial  
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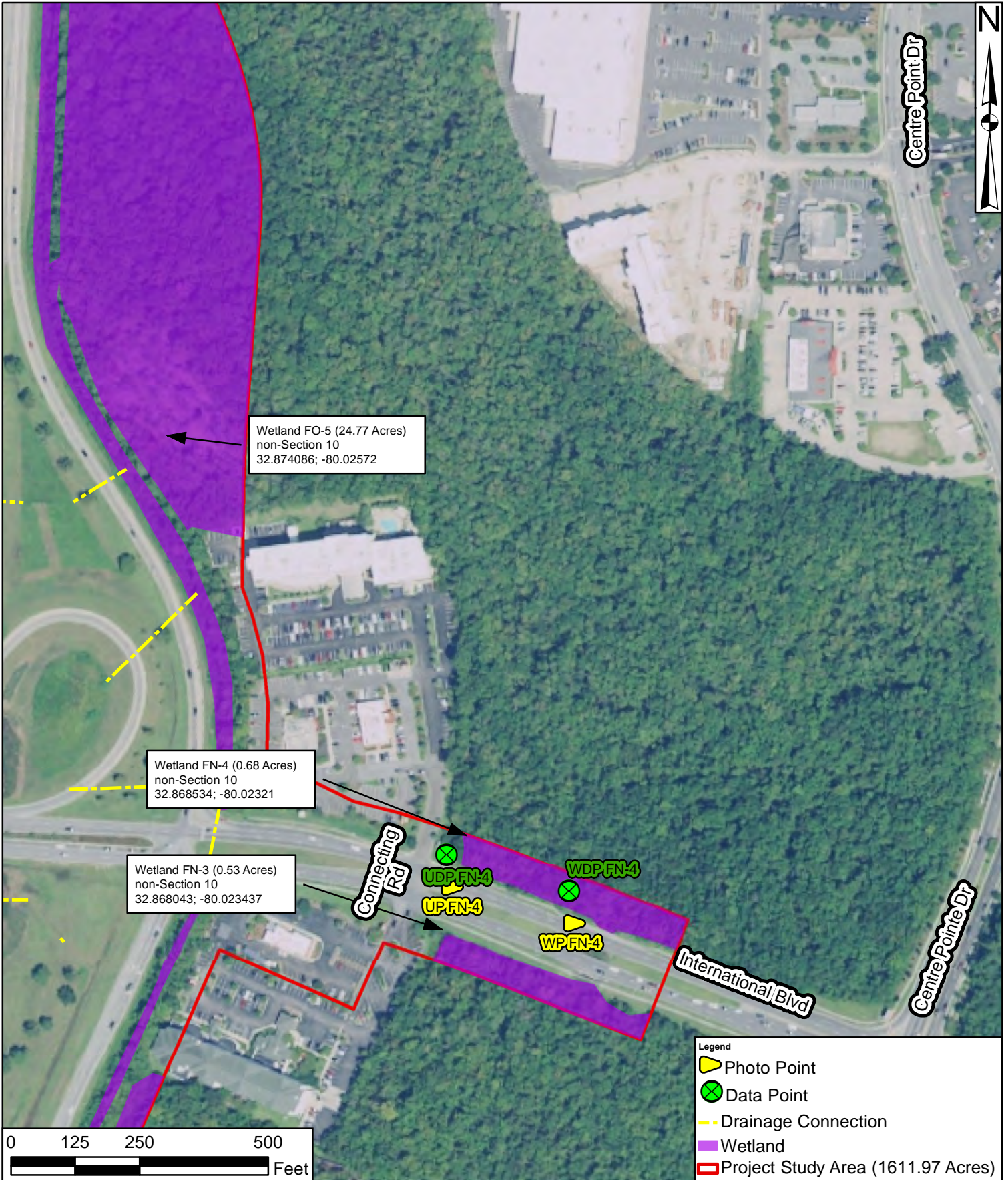
Drawn By: RHH  
QA/QC: KLM

I-526 Lowcountry Corridor West  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 38 of 85



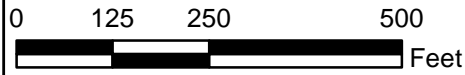


Wetland FO-5 (24.77 Acres)  
non-Section 10  
32.874086; -80.02572

Wetland FN-4 (0.68 Acres)  
non-Section 10  
32.868534; -80.02321

Wetland FN-3 (0.53 Acres)  
non-Section 10  
32.868043; -80.023437

- Legend
- Photo Point
  - Data Point
  - Drainage Connection
  - Wetland
  - Project Study Area (1611.97 Acres)



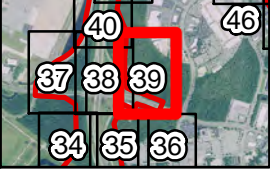
Source:  
NRCS NAIP Aerial  
2017

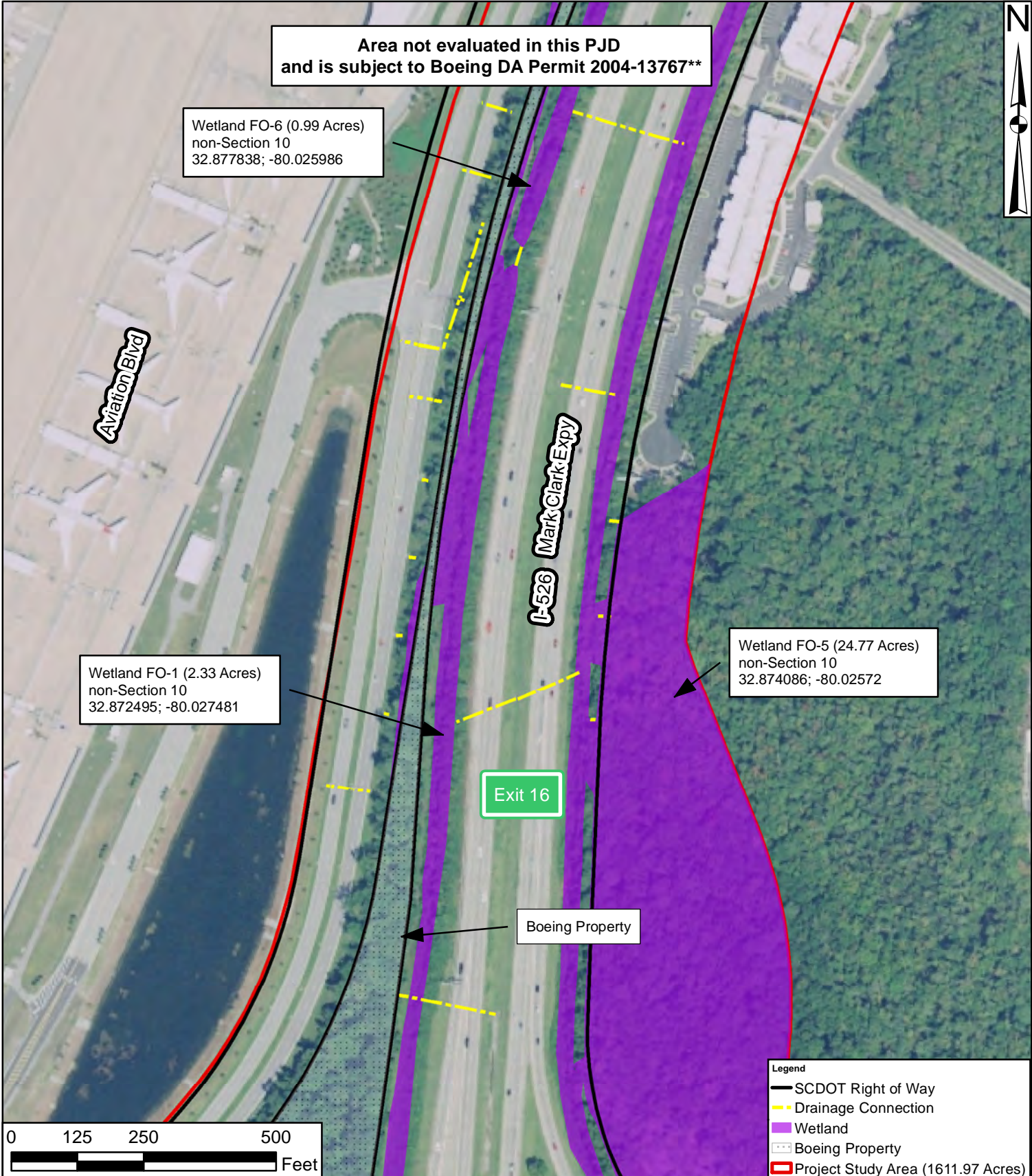
Drawn By: RHH  
QA/QC: KLM

I-526 Lowcountry Corridor West  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 39 of 85





Area not evaluated in this PJD  
and is subject to Boeing DA Permit 2004-13767\*\*

Wetland FO-6 (0.99 Acres)  
non-Section 10  
32.877838; -80.025986

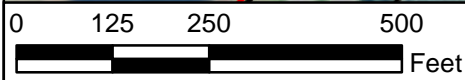
Wetland FO-1 (2.33 Acres)  
non-Section 10  
32.872495; -80.027481

Wetland FO-5 (24.77 Acres)  
non-Section 10  
32.874086; -80.02572

Exit 16

Boeing Property

- Legend
- SCDOT Right of Way
  - - - Drainage Connection
  - Wetland
  - ▨ Boeing Property
  - Project Study Area (1611.97 Acres)



\*\*Please note that this Boeing SAC 2004-13767 area is subject to change. Existing conditions must be used for an analysis of these areas\*\*

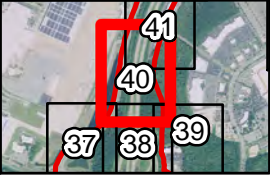
Source:  
NRCS NAIP Aerial  
2017

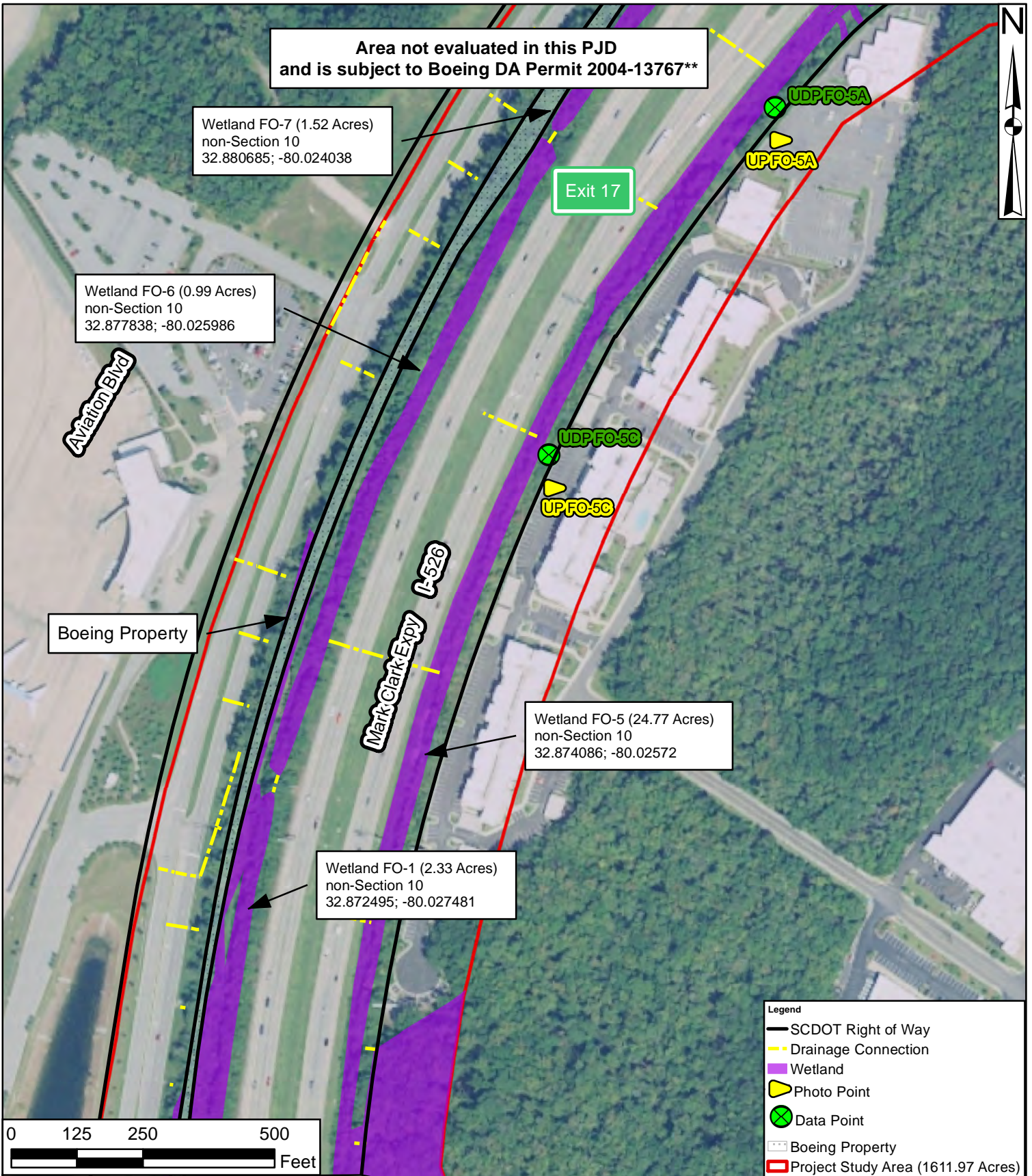
Drawn By: RHH  
QA/QC: KLM

I-526 Lowcountry Corridor West  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 40 of 85





**\*\*Please note that this Boeing SAC 2004-13767 area is subject to change. Existing conditions must be used for an analysis of these areas\*\***



Source:  
NRCS NAIP Aerial  
2017

I-526 Lowcountry Corridor West  
Charleston County  
SCDOT P032102  
October 31 2019

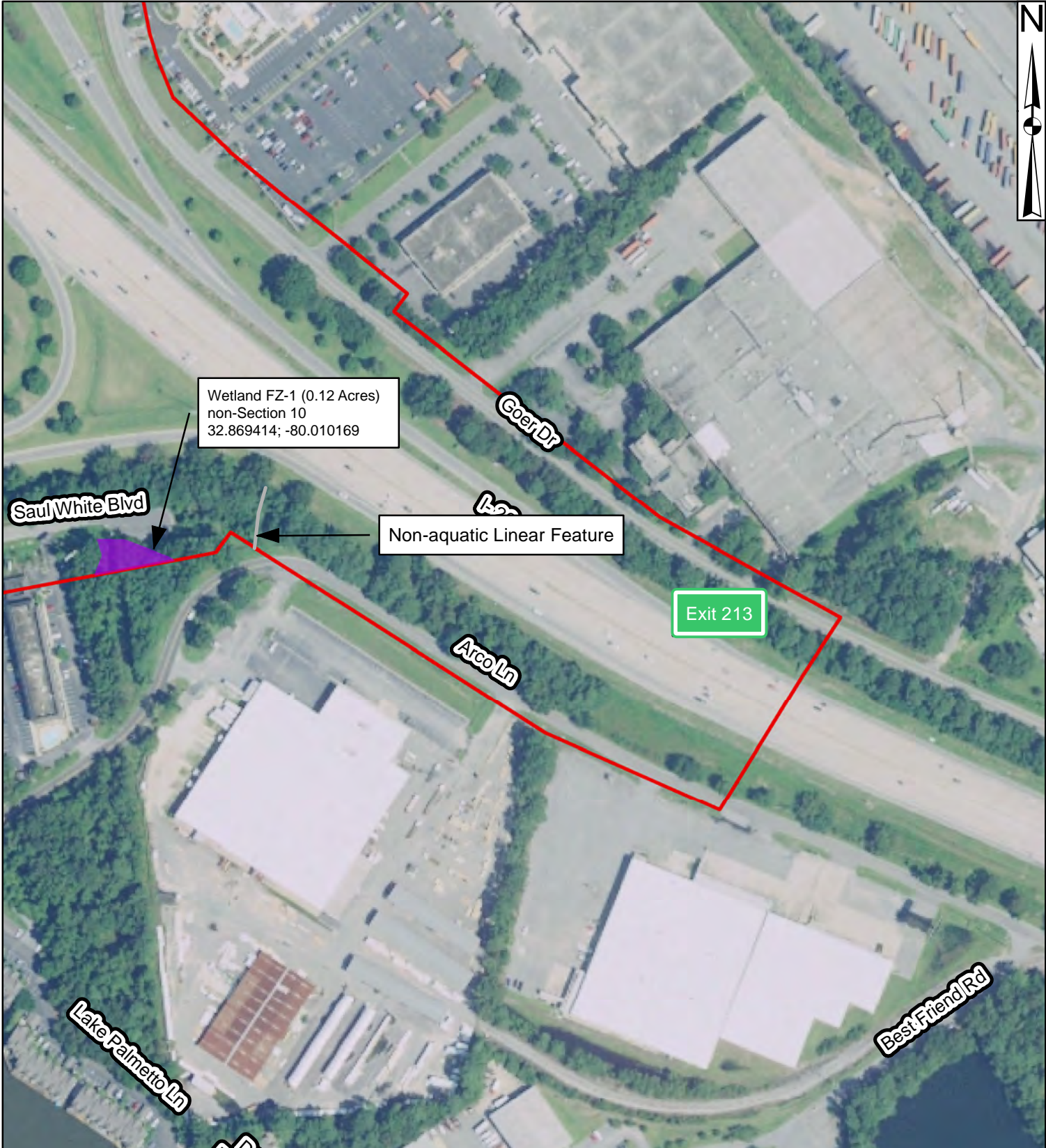
Drawn By: RHH  
QA/QC: KLM

Aquatic Resources

Sheet 41 of 85



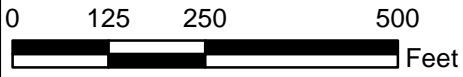




Wetland FZ-1 (0.12 Acres)  
 non-Section 10  
 32.869414; -80.010169

Non-aquatic Linear Feature

Exit 213



- Legend**
- Non-Aquatic Linear Feature
  - Wetland
  - Project Study Area (1611.97 Acres)



Source:  
 NRCS NAIP Aerial  
 2017

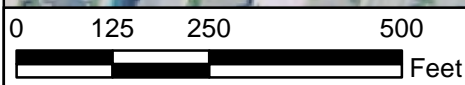
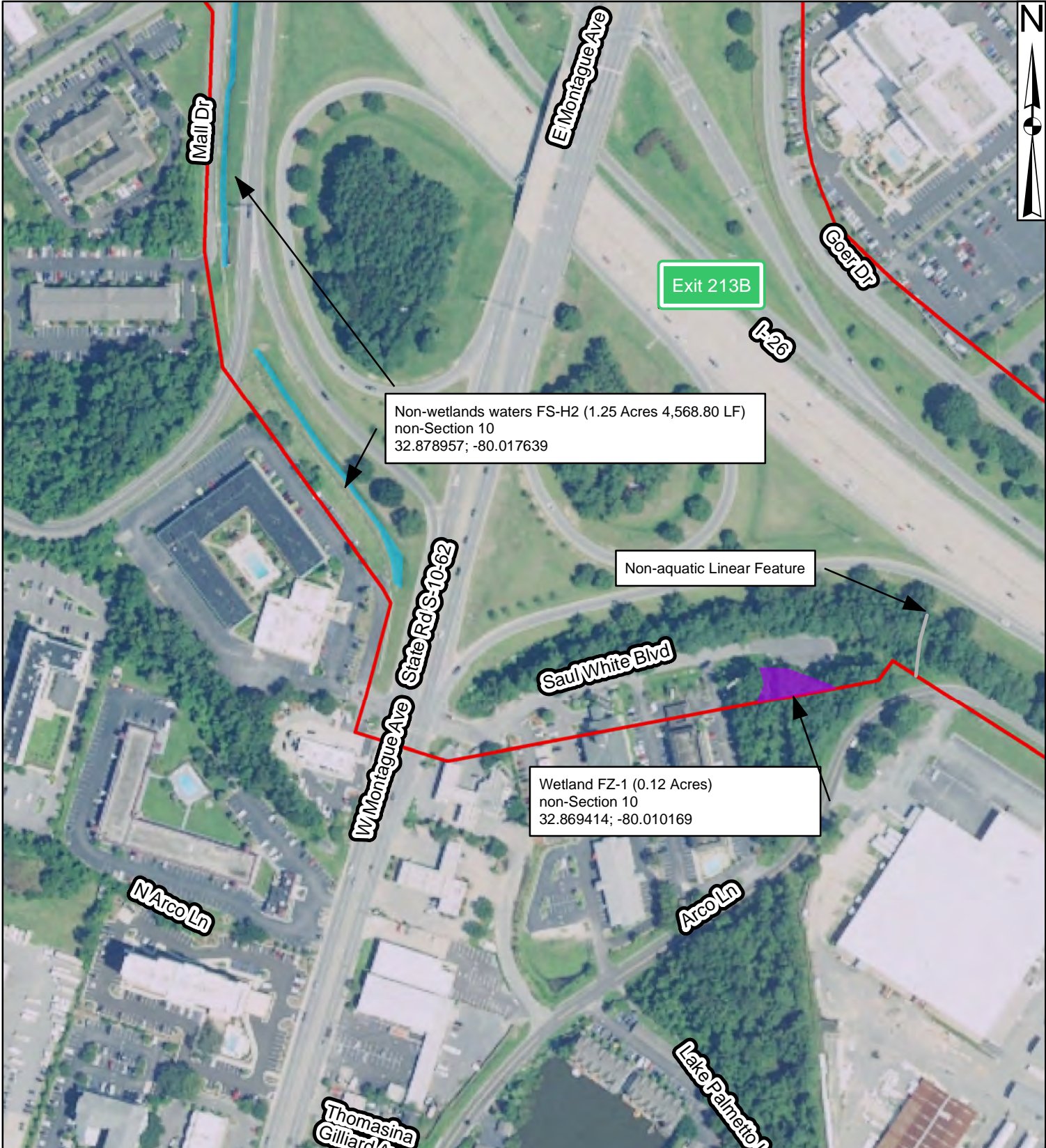
Drawn By: RHH  
 QA/QC: KLM

**I-526 Lowcountry Corridor West**  
 Charleston County  
 SCDOT P032102  
 October 31 2019

Aquatic Resources

Sheet 42 of 85





Legend	
	Non-Aquatic Linear Feature
	Wetland
	Project Study Area (1611.97 Acres)



Source:  
NRCS NAIP Aerial  
2017

Drawn By: RHH  
QA/QC: KLM

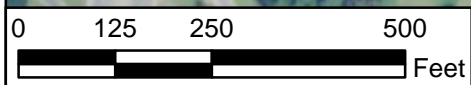
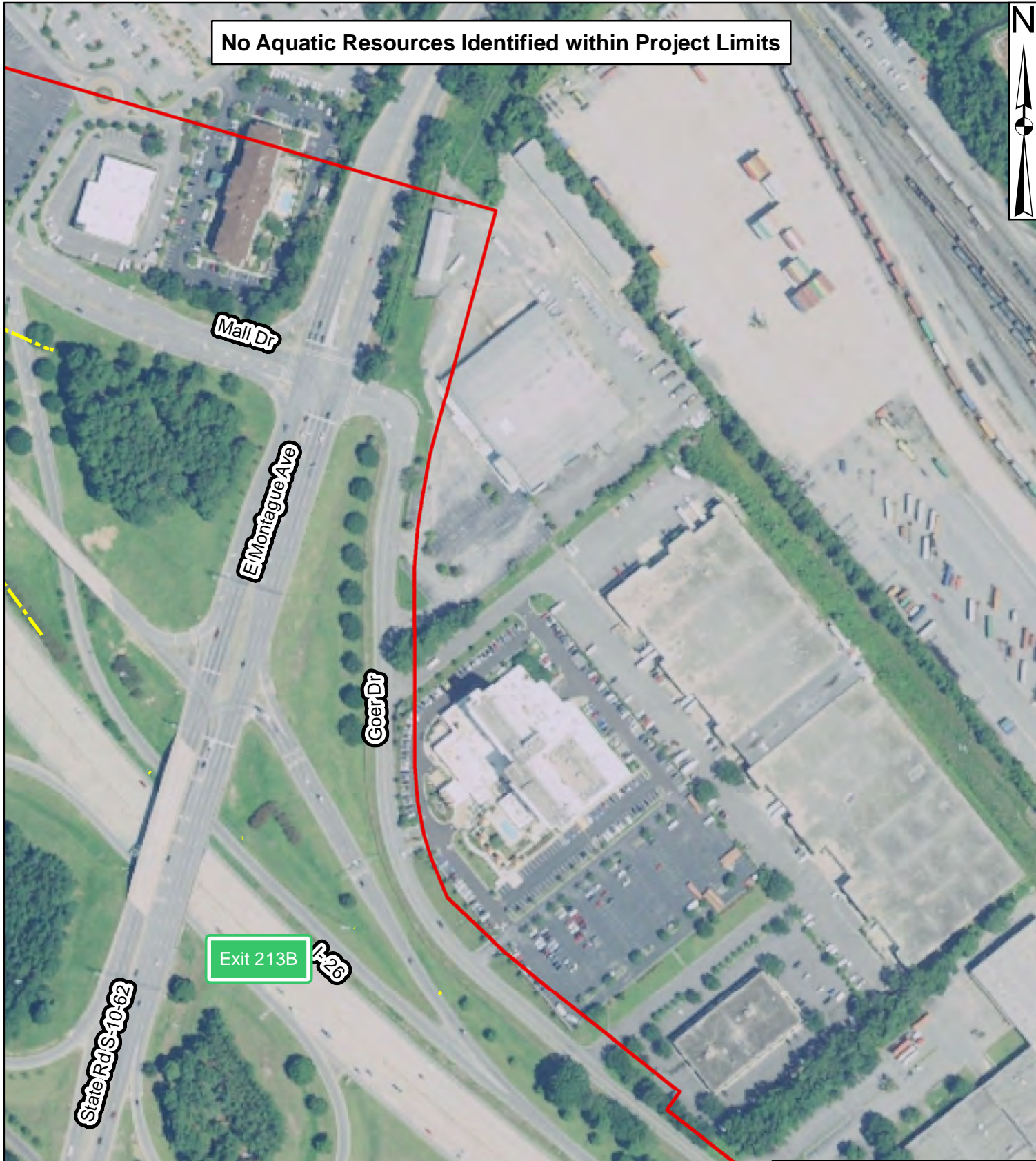
I-526 Lowcountry Corridor West  
Charleston County  
SCDOT P032102  
October 31 2019



Aquatic Resources

Sheet 43 of 85



No Aquatic Resources Identified within Project Limits



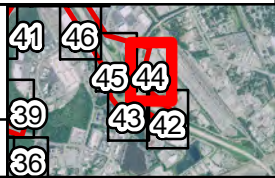
Legend  
 Drainage Connection  
 Project Study Area (1611.97 Acres)

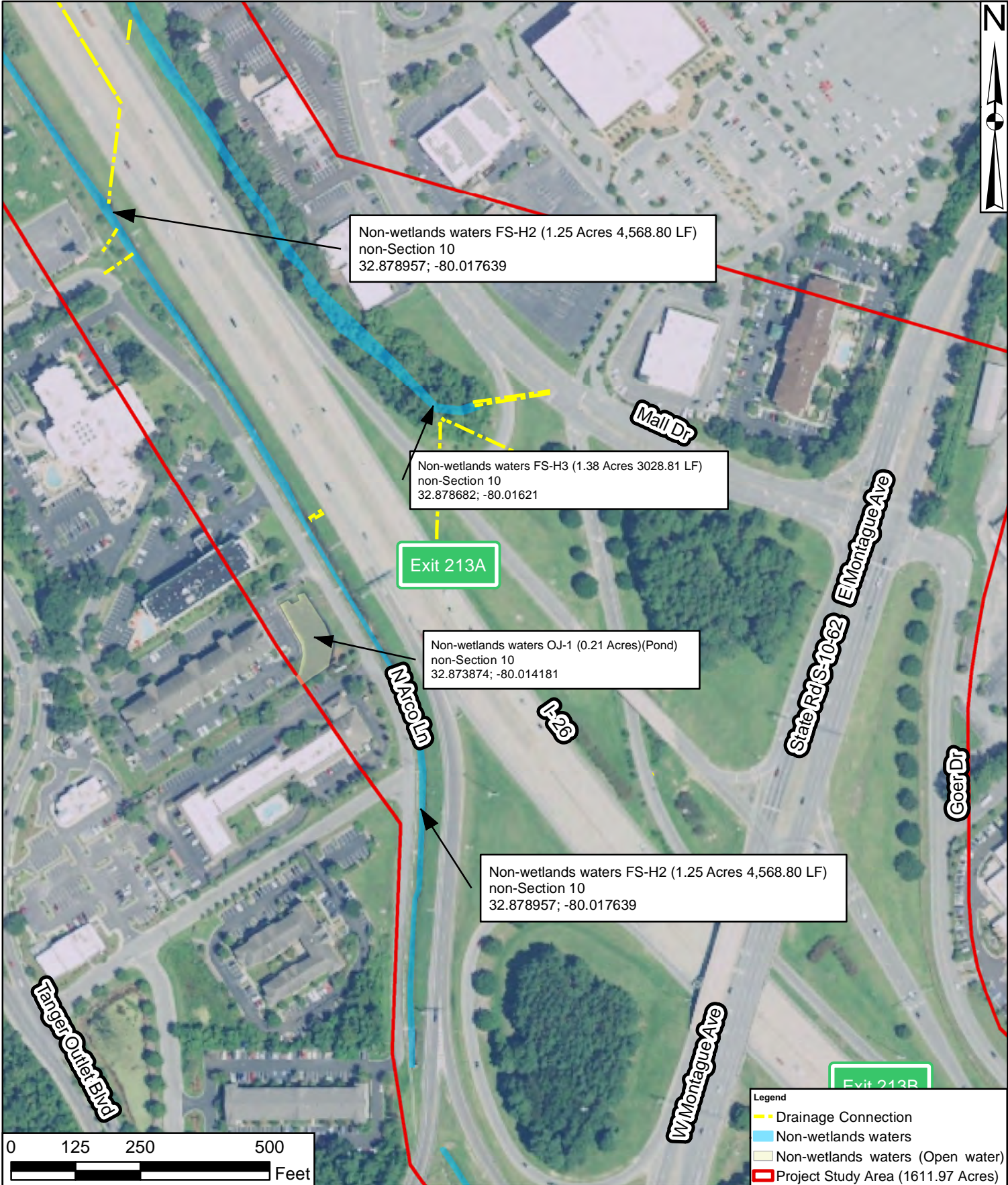


Source:  
NRCS NAIP Aerial  
2017  
  
Drawn By: RHH  
QA/QC: KLM

I-526 Lowcountry Corridor West  
Charleston County  
SCDOT P032102  
October 31 2019  
  
Aquatic Resources

Sheet 44 of 85





Non-wetlands waters FS-H2 (1.25 Acres 4,568.80 LF)  
non-Section 10  
32.878957; -80.017639

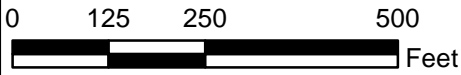
Non-wetlands waters FS-H3 (1.38 Acres 3028.81 LF)  
non-Section 10  
32.878682; -80.01621

Exit 213A

Non-wetlands waters OJ-1 (0.21 Acres)(Pond)  
non-Section 10  
32.873874; -80.014181

Non-wetlands waters FS-H2 (1.25 Acres 4,568.80 LF)  
non-Section 10  
32.878957; -80.017639

- Legend**
- - - Drainage Connection
  - Non-wetlands waters
  - Non-wetlands waters (Open water)
  - Project Study Area (1611.97 Acres)



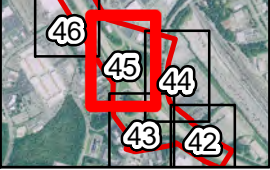
Source:  
NRCS NAIP Aerial  
2017

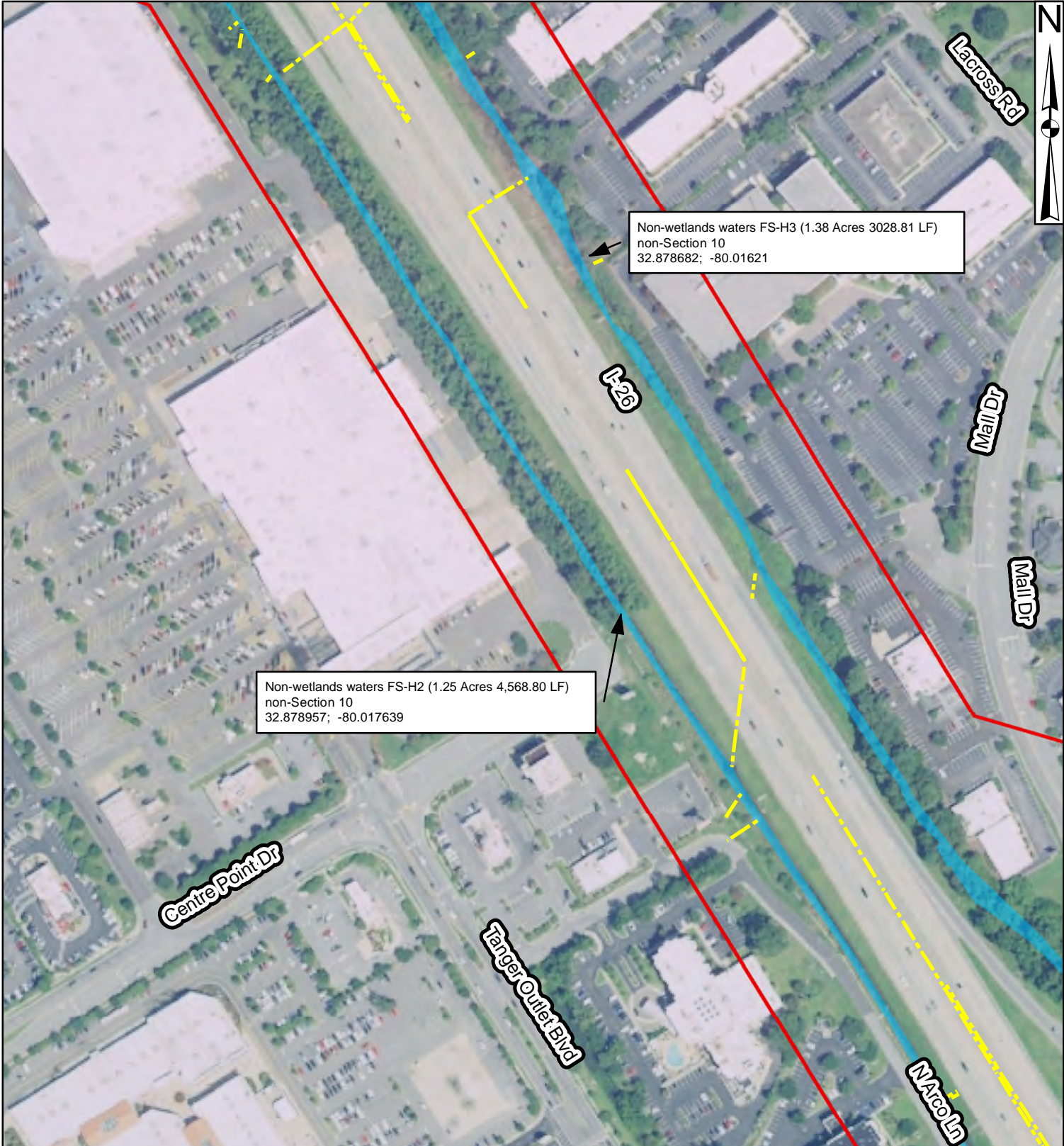
Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 45 of 85





Centre Point Dr

Tanger Outlet Blvd

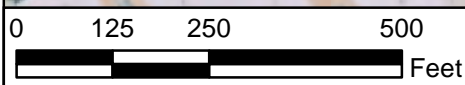
Lacross Rd

Mall Dr

Mall Dr

I-26

Narco Ln



- Legend**
- - - Drainage Connection
  - Non-wetlands waters
  - Data Point
  - Project Study Area (1611.97 Acres)



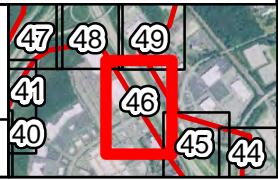
Source:  
NRCS NAIP Aerial  
2017

Drawn By: RHH  
QA/QC: KLM

**I-26 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 46 of 85



Area not evaluated in this PJD  
and is subject to Boeing DA Permit 2004-13767\*\*



Exit  
17A

Wetland FO-5 (24.77 Acres)  
non-Section 10  
32.881743; -80.020805

WDPFO-5  
WPFO-5

Wetland FO-7 (1.52 Acres)  
non-Section 10  
32.880685; -80.024038

Aviation Blvd

I-526 Mark Clark Expy

WDPFO-5D  
WPFO-5D

Non-wetlands waters FS-H1A (4.14 Acres 8831.15 LF)  
non-Section 10  
32.887423; -80.01475

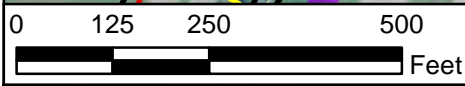
Boeing Property

Wetland FO-6 (0.99 Acres)  
non-Section 10  
32.877838; -80.025986

Exit 17

UDPFO-5A  
UPFO-5A

Wetland FO-5 (24.77 Acres)  
non-Section 20  
32.874086; -80.02572

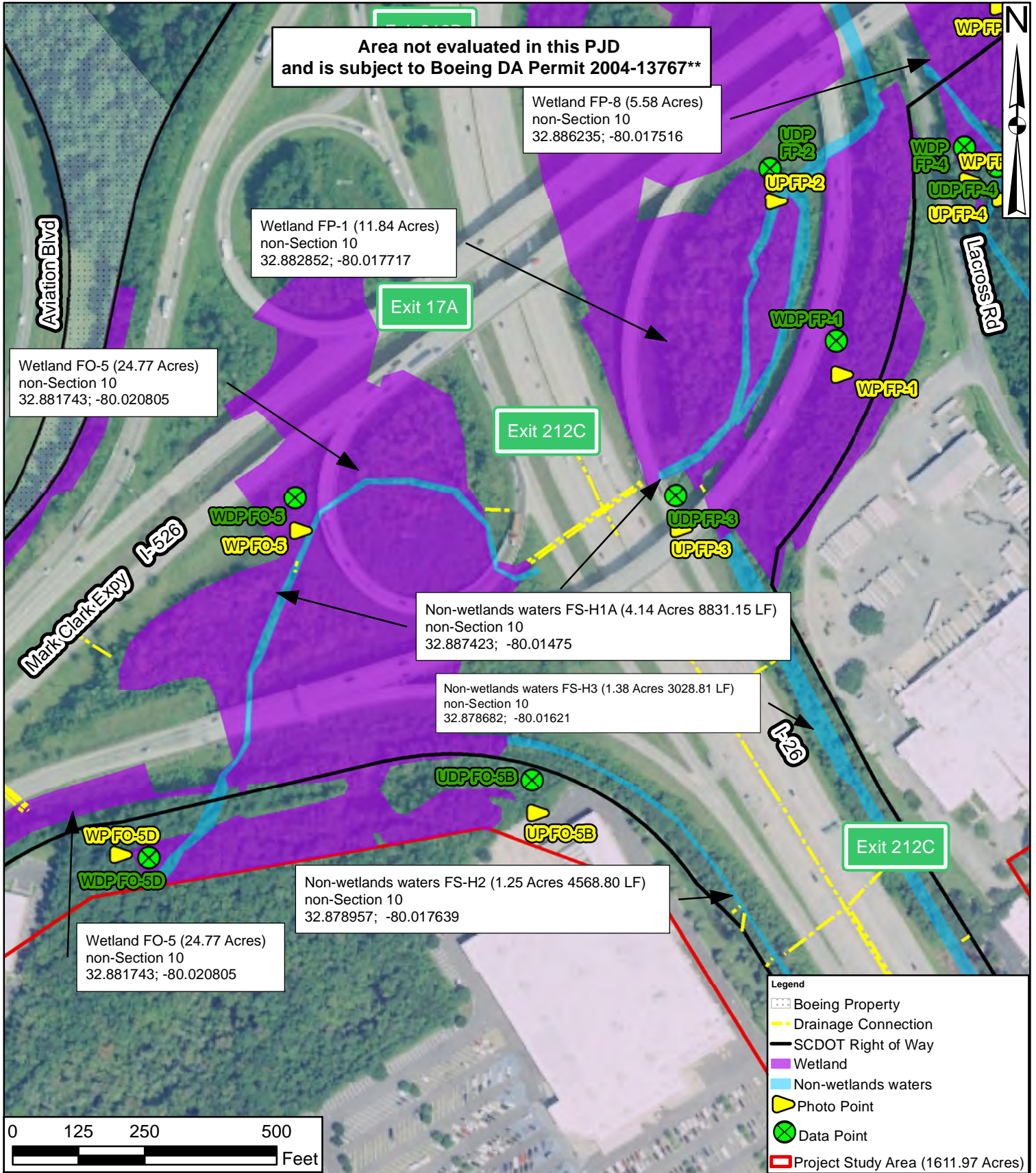


**Legend**

- SCDOT Right of Way
- Drainage Connection
- Non-wetlands waters
- Wetland
- Photo Point
- Data Point
- Boeing Property
- Project Study Area (1611.97 Acres)

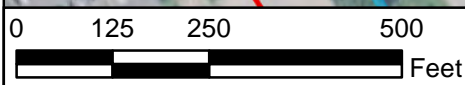
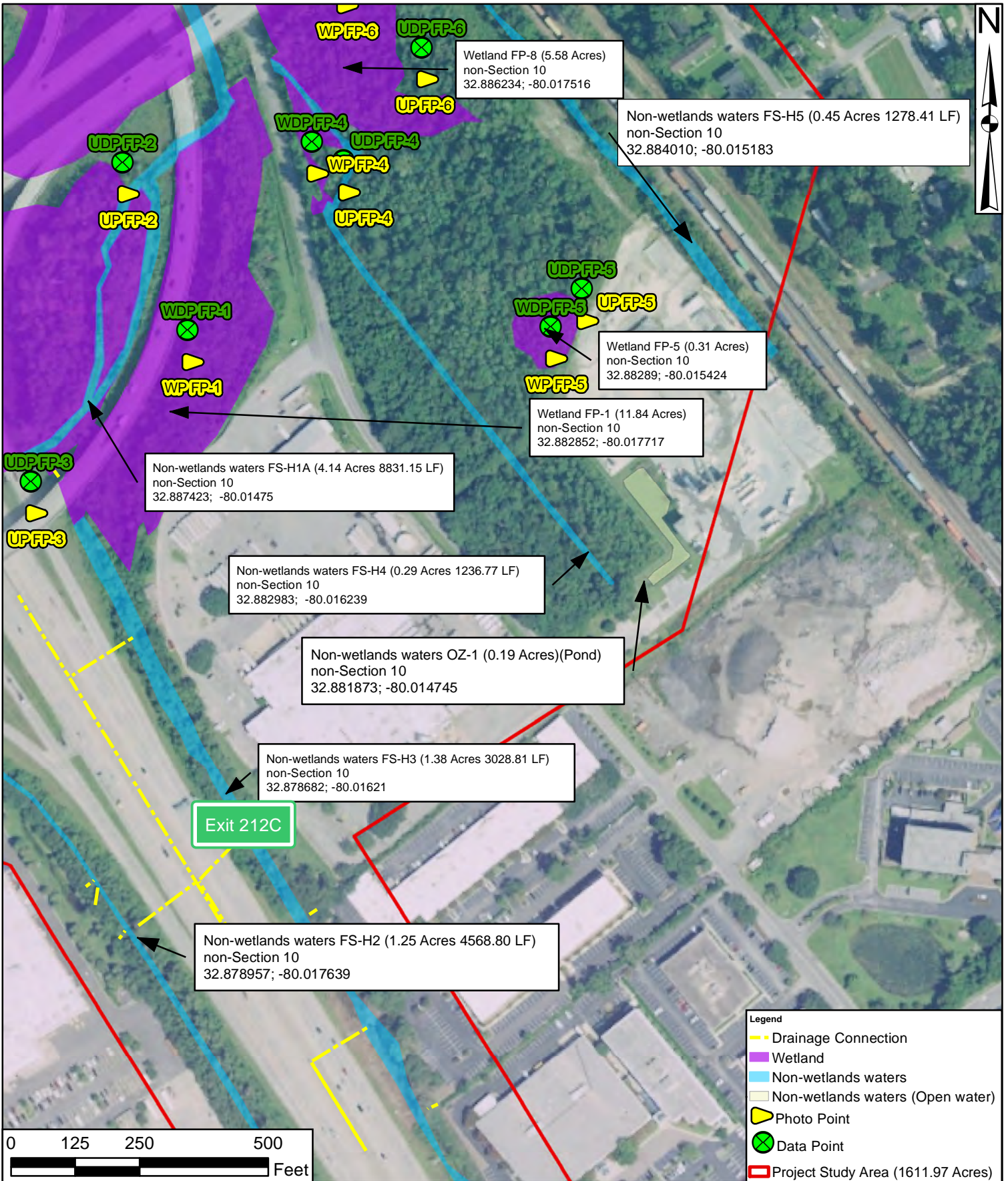
\*\*Please note that this Boeing SAC 2004-13767 area is subject to change. Existing conditions must be used for an analysis of these areas\*\*

	Source: NRCS NAIP Aerial 2017	I-526 Lowcountry Corridor West Charleston County SCDOT P032102 October 31 2019		
	Drawn By: RHH QA/QC: KLM	Aquatic Resources	Sheet 47 of 85	



**\*\*Please note that this Boeing SAC 2004-13767 area is subject to change. Existing conditions must be used for an analysis of these areas\*\***

 South Carolina Department of Transportation	 WEST 526 LOWCOUNTRY CORRIDOR	Source: NRCS NAIP Aerial 2017	I-526 Lowcountry Corridor West Charleston County SCDOT P032102 October 31 2019		
		Drawn By: RHH QA/QC: KLM	Aquatic Resources	Sheet 48 of 85	



- Legend**
- Drainage Connection
  - Wetland
  - Non-wetlands waters
  - Non-wetlands waters (Open water)
  - ▶ Photo Point
  - ⊗ Data Point
  - Project Study Area (1611.97 Acres)



Source:  
NRCS NAIP Aerial  
2017

Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 49 of 85

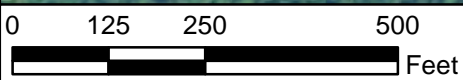




Area not evaluated in this PJD  
and is subject to Boeing DA Permit 2004-13767\*\*



Boeing Property



- Legend
- SCDOT Right of Way
  - Boeing Property
  - Project Study Area (1611.97 Acres)

\*\*Please note that this Boeing SAC 2004-13767 area is subject to change. Existing conditions must be used for an analysis of these areas\*\*



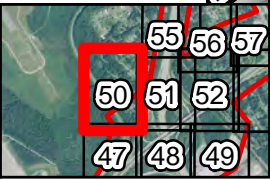
Source:  
NRCS NAIP Aerial  
2017

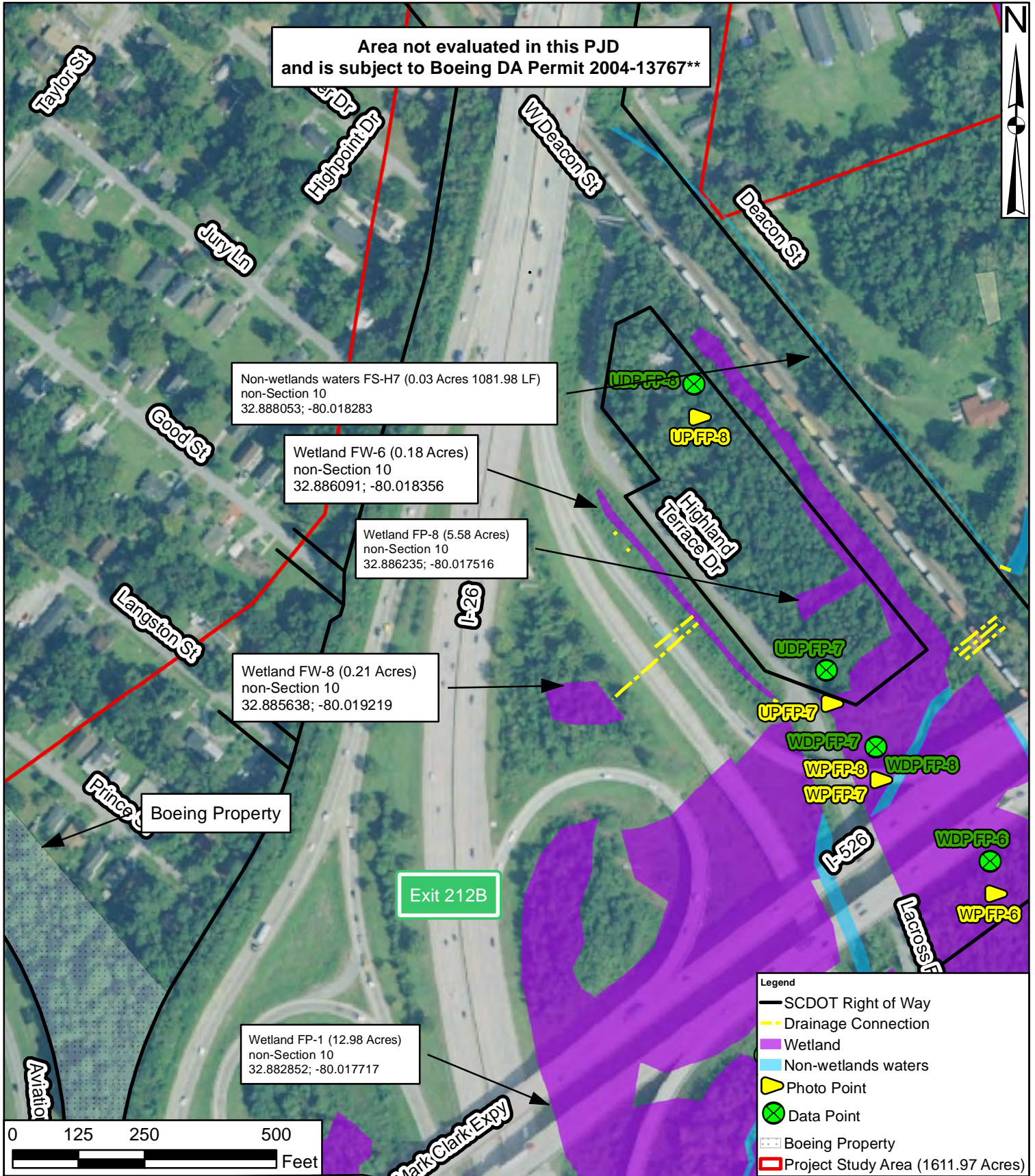
I-526 Lowcountry Corridor West  
Charleston County  
SCDOT P032102  
October 31 2019

Drawn By: RHH  
QA/QC: KLM

Aquatic Resources

Sheet 50 of 85





Area not evaluated in this PJD  
and is subject to Boeing DA Permit 2004-13767\*\*

Non-wetlands waters FS-H7 (0.03 Acres 1081.98 LF)  
non-Section 10  
32.888053; -80.018283

Wetland FW-6 (0.18 Acres)  
non-Section 10  
32.886091; -80.018356

Wetland FP-8 (5.58 Acres)  
non-Section 10  
32.886235; -80.017516

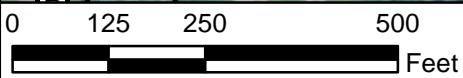
Wetland FW-8 (0.21 Acres)  
non-Section 10  
32.885638; -80.019219

Boeing Property

Exit 212B

Wetland FP-1 (12.98 Acres)  
non-Section 10  
32.882852; -80.017717

- Legend
- SCDOT Right of Way
  - - - Drainage Connection
  - Wetland
  - Non-wetlands waters
  - Photo Point
  - Data Point
  - Boeing Property
  - Project Study Area (1611.97 Acres)



\*\*Please note that this Boeing SAC 2004-13767 area is subject to change. Existing conditions must be used for an analysis of these areas\*\*

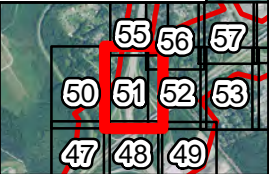
Source:  
NRCS NAIP Aerial  
2017

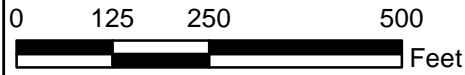
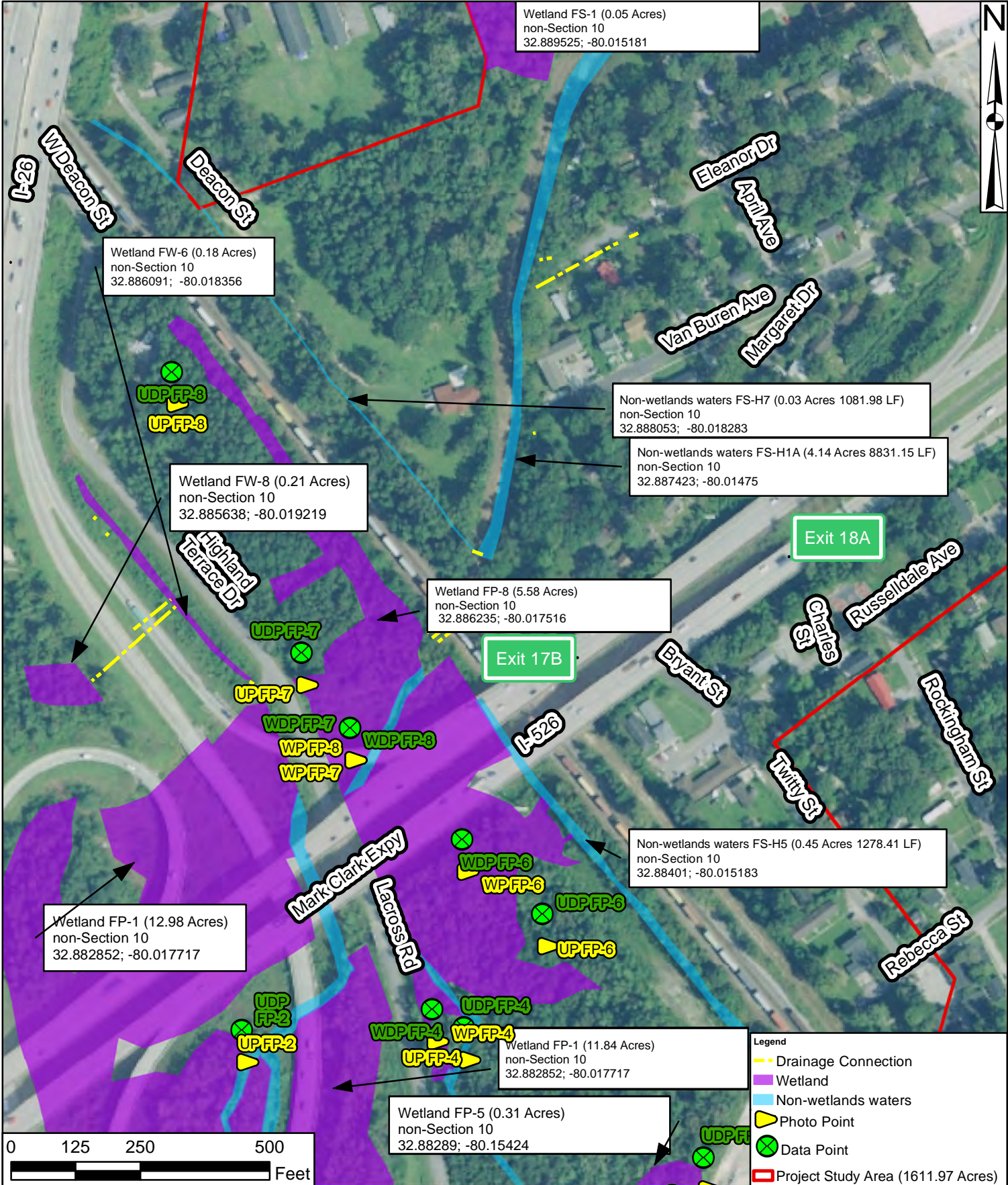
Drawn By: RHH  
QA/QC: KLM

I-526 Lowcountry Corridor West  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 51 of 85





Source:  
NRCS NAIP Aerial  
2017

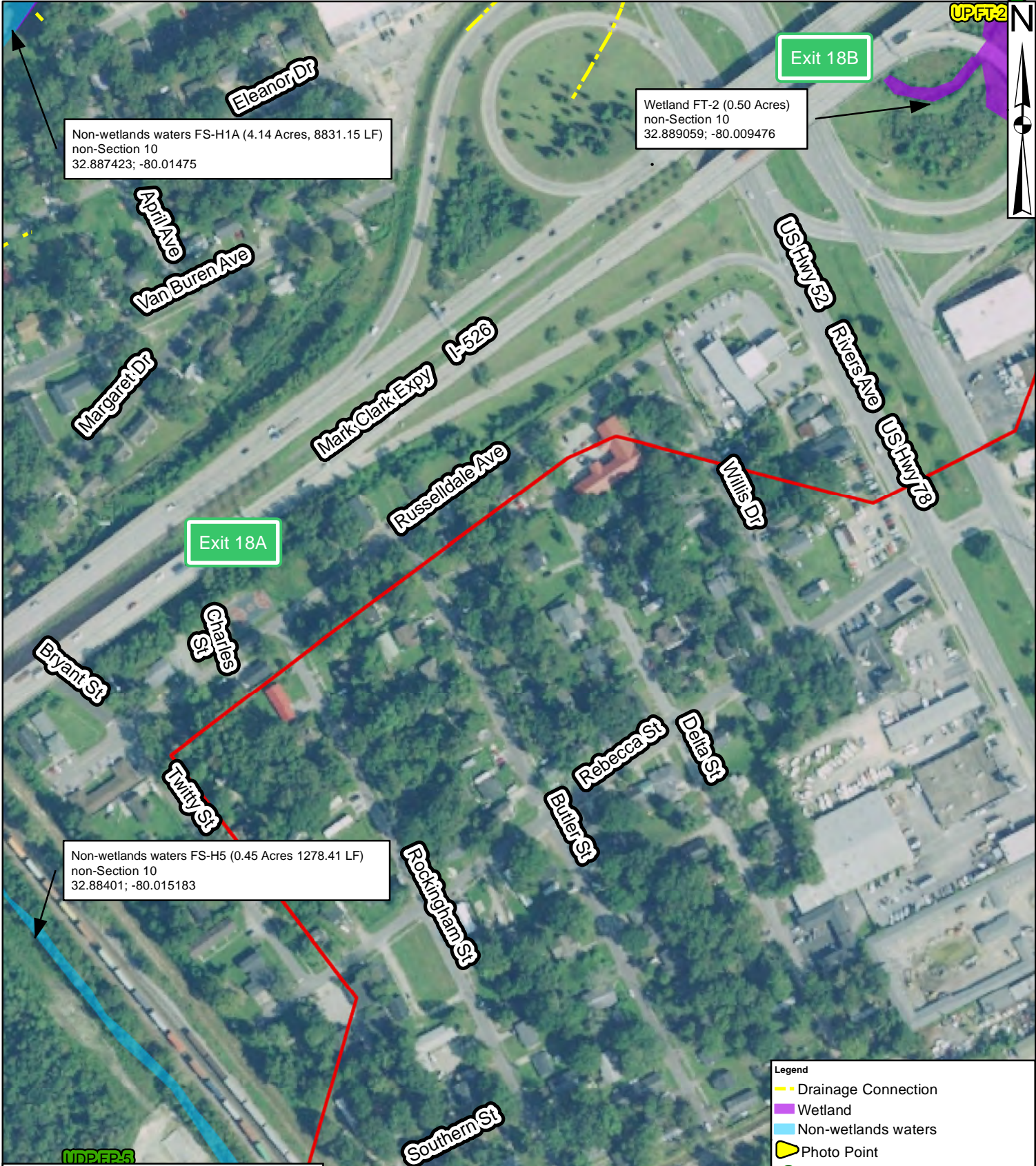
Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 52 of 85



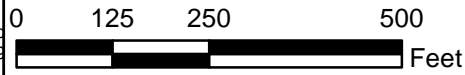


Non-wetlands waters FS-H1A (4.14 Acres, 8831.15 LF)  
non-Section 10  
32.887423; -80.01475

Wetland FT-2 (0.50 Acres)  
non-Section 10  
32.889059; -80.009476

Non-wetlands waters FS-H5 (0.45 Acres 1278.41 LF)  
non-Section 10  
32.88401; -80.015183

- Legend**
- Drainage Connection
  - Wetland
  - Non-wetlands waters
  - ▶ Photo Point
  - ⊗ Data Point
  - Project Study Area (1611.97 Acres)



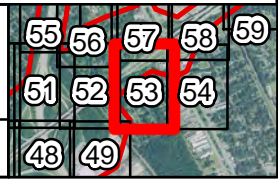
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NRCS NAIP Aerial  
2017

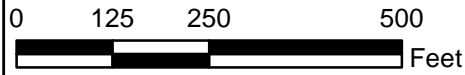
Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 53 of 85





- Legend**
- Drainage Connection
  - Wetland
  - ▲ Photo Point
  - Project Study Area (1611.97 Acres)



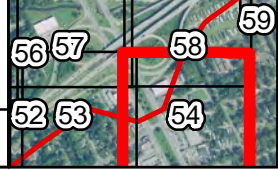
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2017

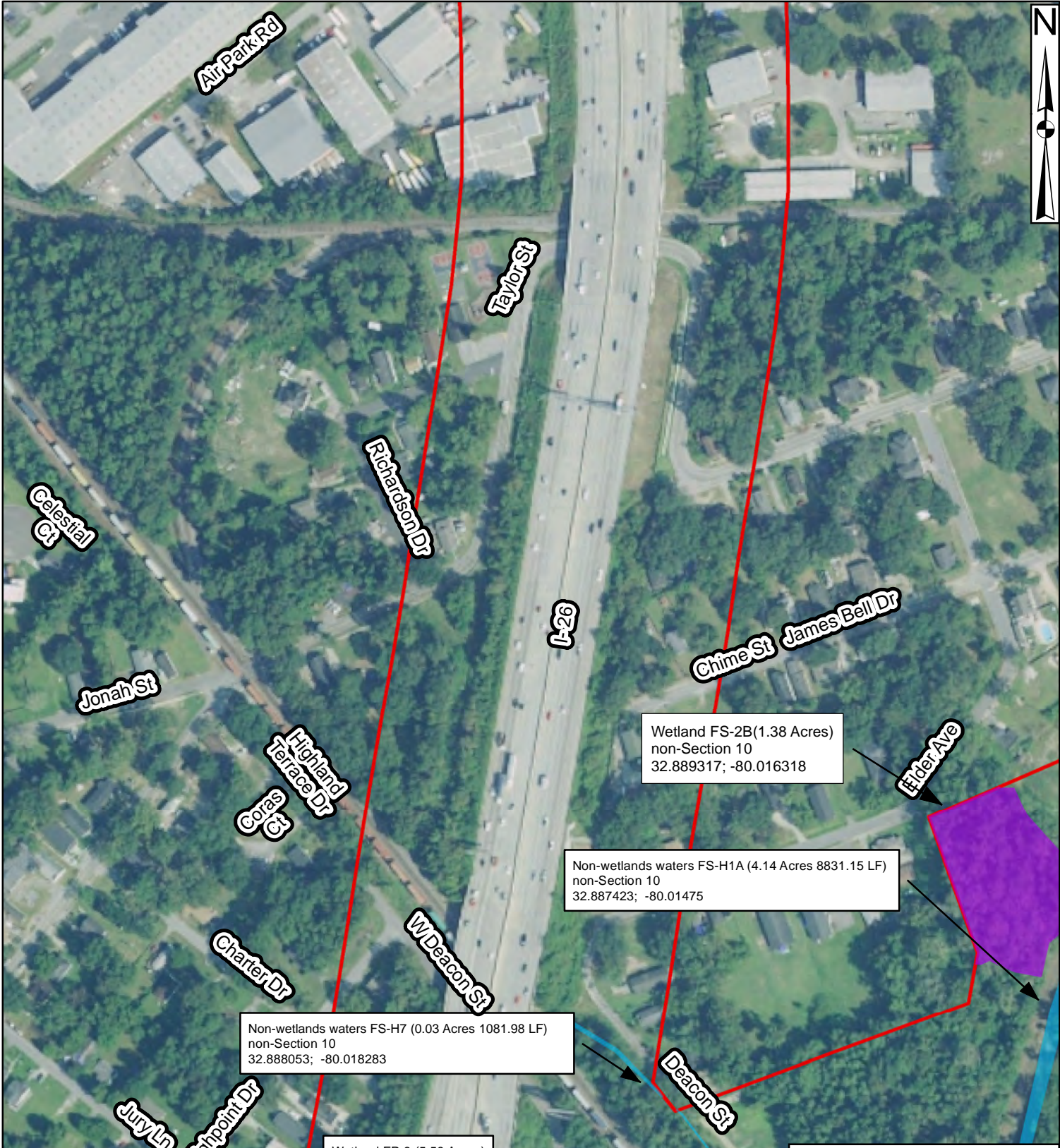
Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 54 of 85





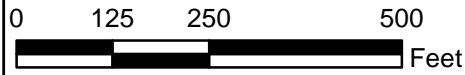
Wetland FS-2B (1.38 Acres)  
non-Section 10  
32.889317; -80.016318

Non-wetlands waters FS-H1A (4.14 Acres 8831.15 LF)  
non-Section 10  
32.887423; -80.01475

Non-wetlands waters FS-H7 (0.03 Acres 1081.98 LF)  
non-Section 10  
32.888053; -80.018283

Wetland FP-8 (5.58 Acres)  
non-Section 10  
32.886235; -80.017516

- Legend**
- Drainage Connection
  - Wetland
  - Non-wetlands waters
  - Project Study Area (1611.97 Acres)

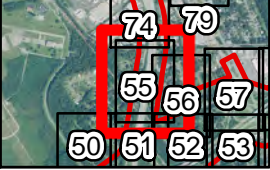


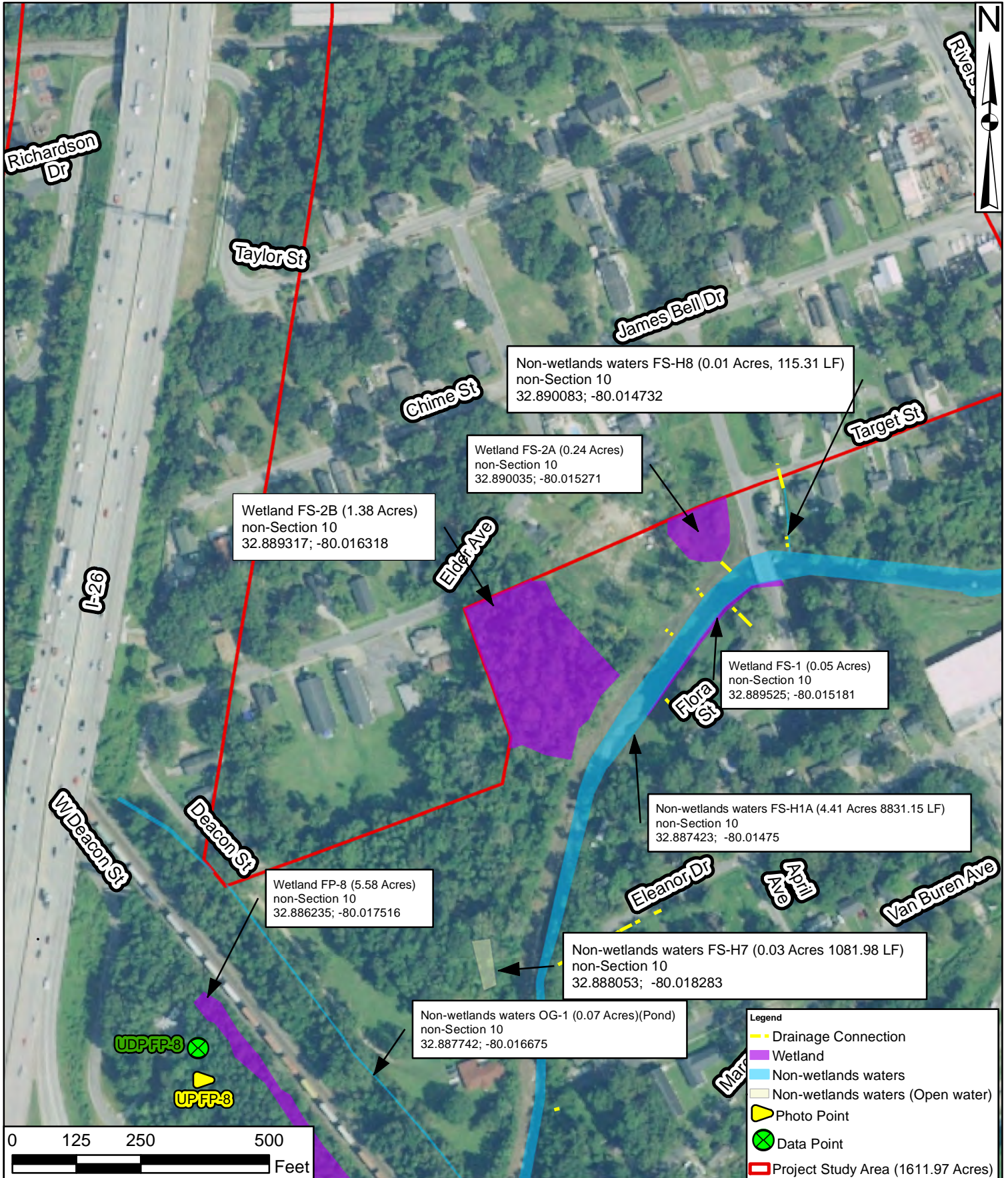
Source:  
NRCS NAIP Aerial  
2017

Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources      Sheet 55 of 85





Non-wetlands waters FS-H8 (0.01 Acres, 115.31 LF)  
non-Section 10  
32.890083; -80.014732

Wetland FS-2A (0.24 Acres)  
non-Section 10  
32.890035; -80.015271

Wetland FS-2B (1.38 Acres)  
non-Section 10  
32.889317; -80.016318

Elder Ave

Wetland FS-1 (0.05 Acres)  
non-Section 10  
32.889525; -80.015181

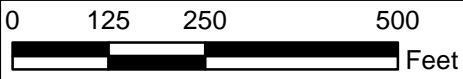
Non-wetlands waters FS-H1A (4.41 Acres 8831.15 LF)  
non-Section 10  
32.887423; -80.01475

Wetland FP-8 (5.58 Acres)  
non-Section 10  
32.886235; -80.017516

Non-wetlands waters FS-H7 (0.03 Acres 1081.98 LF)  
non-Section 10  
32.888053; -80.018283

Non-wetlands waters OG-1 (0.07 Acres)(Pond)  
non-Section 10  
32.887742; -80.016675

- Legend**
- Drainage Connection
  - Wetland
  - Non-wetlands waters
  - Non-wetlands waters (Open water)
  - Photo Point
  - Data Point
  - Project Study Area (1611.97 Acres)



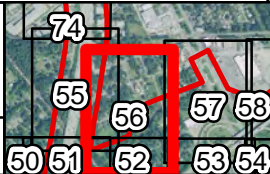
Source:  
NRCS NAIP Aerial  
2017

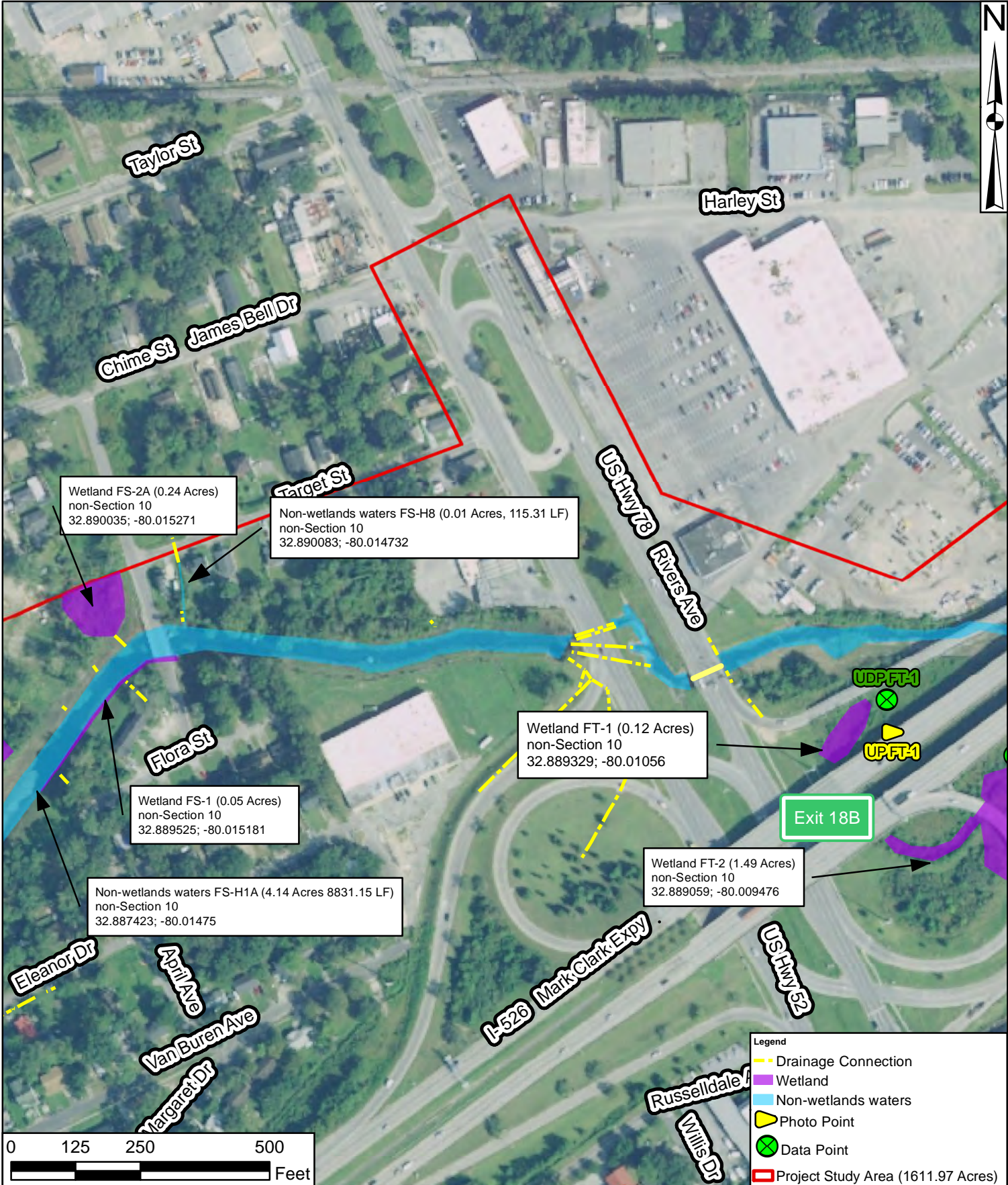
Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 56 of 85





Wetland FS-2A (0.24 Acres)  
non-Section 10  
32.890035; -80.015271

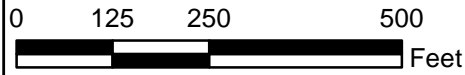
Non-wetlands waters FS-H8 (0.01 Acres, 115.31 LF)  
non-Section 10  
32.890083; -80.014732

Wetland FT-1 (0.12 Acres)  
non-Section 10  
32.889329; -80.01056

Wetland FS-1 (0.05 Acres)  
non-Section 10  
32.889525; -80.015181

Non-wetlands waters FS-H1A (4.14 Acres 8831.15 LF)  
non-Section 10  
32.887423; -80.01475

Wetland FT-2 (1.49 Acres)  
non-Section 10  
32.889059; -80.009476



- Legend**
- Drainage Connection
  - █ Wetland
  - █ Non-wetlands waters
  - ▶ Photo Point
  - ⊗ Data Point
  - █ Project Study Area (1611.97 Acres)

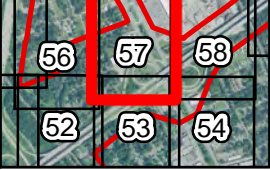
Source:  
NRCS NAIP Aerial  
2017

Drawn By: RHH  
QA/QC: KLM

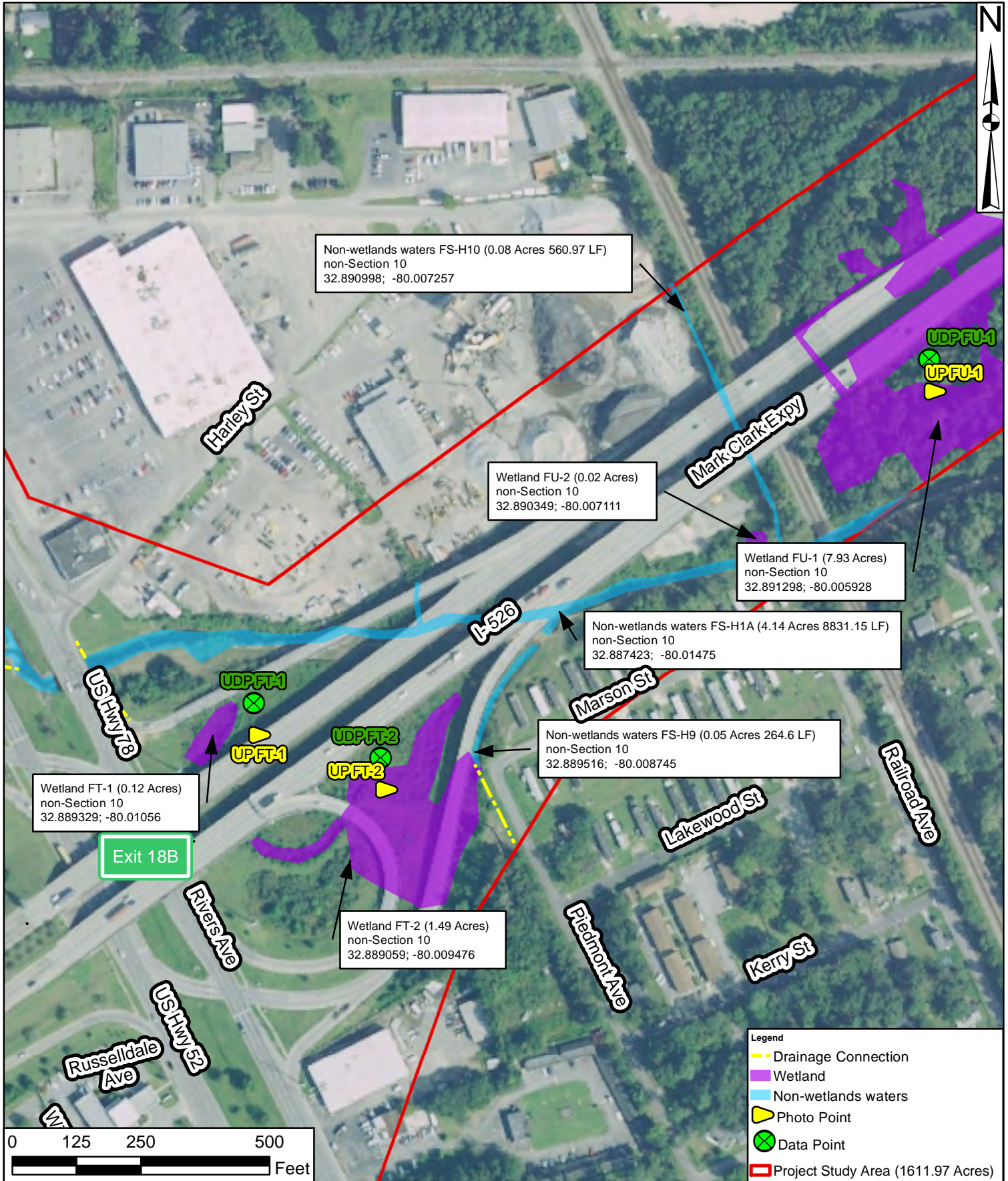
**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 57 of 85







Non-wetlands waters FS-H10 (0.08 Acres 560.97 LF)  
non-Section 10  
32.890998; -80.007257

Wetland FU-2 (0.02 Acres)  
non-Section 10  
32.890349; -80.007111

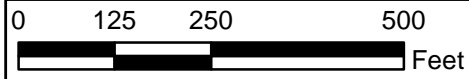
Wetland FU-1 (7.93 Acres)  
non-Section 10  
32.891298; -80.005928

Non-wetlands waters FS-H1A (4.14 Acres 8831.15 LF)  
non-Section 10  
32.887423; -80.01475

Non-wetlands waters FS-H9 (0.05 Acres 264.6 LF)  
non-Section 10  
32.889516; -80.008745

Wetland FT-1 (0.12 Acres)  
non-Section 10  
32.889329; -80.01056

Wetland FT-2 (1.49 Acres)  
non-Section 10  
32.889059; -80.009476



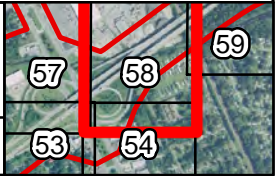
Source:  
NRCS NAIP Aerial  
2017

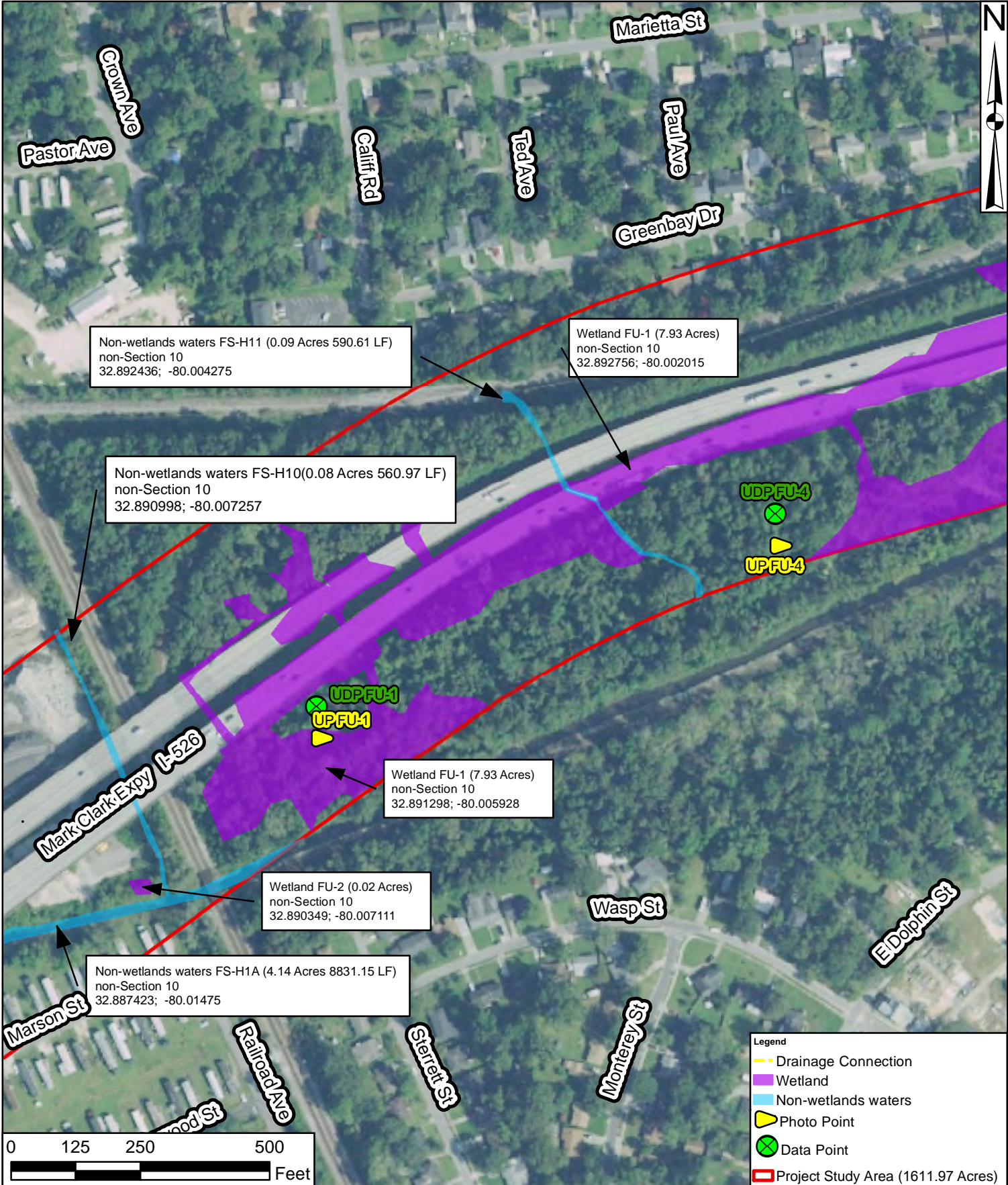
Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 58 of 85





Non-wetlands waters FS-H11 (0.09 Acres 590.61 LF)  
non-Section 10  
32.892436; -80.004275

Wetland FU-1 (7.93 Acres)  
non-Section 10  
32.892756; -80.002015

Non-wetlands waters FS-H10(0.08 Acres 560.97 LF)  
non-Section 10  
32.890998; -80.007257

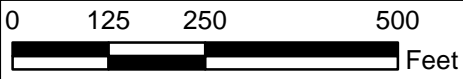
UDPFU-4  
UPFU-4

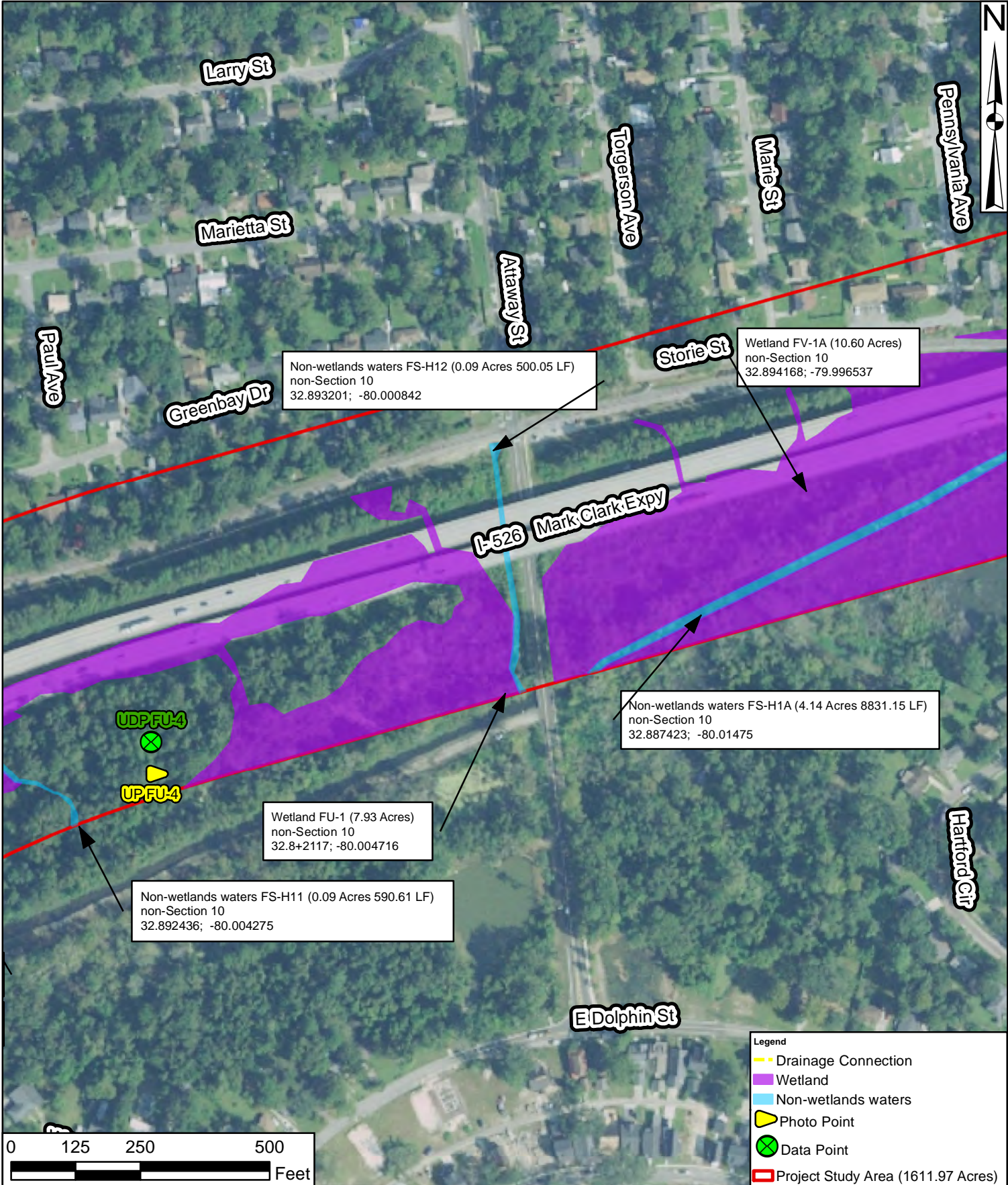
Wetland FU-1 (7.93 Acres)  
non-Section 10  
32.891298; -80.005928

Wetland FU-2 (0.02 Acres)  
non-Section 10  
32.890349; -80.007111

Non-wetlands waters FS-H1A (4.14 Acres 8831.15 LF)  
non-Section 10  
32.887423; -80.01475

- Legend
- Drainage Connection
  - Wetland
  - Non-wetlands waters
  - Photo Point
  - Data Point
  - Project Study Area (1611.97 Acres)





Non-wetlands waters FS-H12 (0.09 Acres 500.05 LF)  
non-Section 10  
32.893201; -80.000842

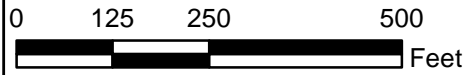
Wetland FV-1A (10.60 Acres)  
non-Section 10  
32.894168; -79.996537

Non-wetlands waters FS-H1A (4.14 Acres 8831.15 LF)  
non-Section 10  
32.887423; -80.01475

Wetland FU-1 (7.93 Acres)  
non-Section 10  
32.8+2117; -80.004716

Non-wetlands waters FS-H11 (0.09 Acres 590.61 LF)  
non-Section 10  
32.892436; -80.004275

- Legend**
- Drainage Connection
  - Wetland
  - Non-wetlands waters
  - Photo Point
  - Data Point
  - Project Study Area (1611.97 Acres)



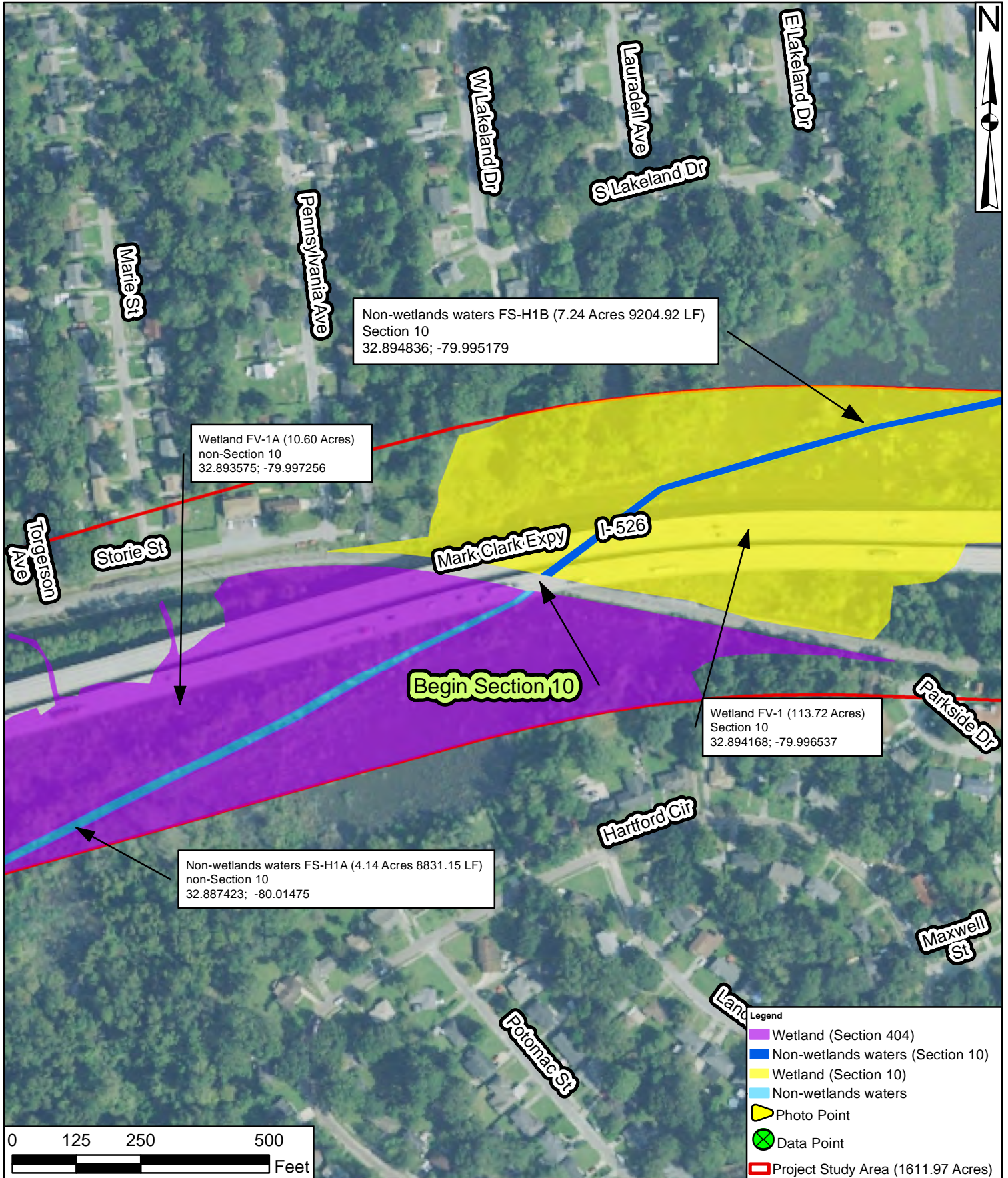
Source:  
NRCS NAIP Aerial  
2017

Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources      Sheet 60 of 85





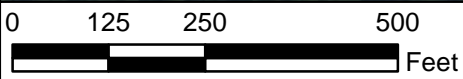
Non-wetlands waters FS-H1B (7.24 Acres 9204.92 LF)  
Section 10  
32.894836; -79.995179

Wetland FV-1A (10.60 Acres)  
non-Section 10  
32.893575; -79.997256

Wetland FV-1 (113.72 Acres)  
Section 10  
32.894168; -79.996537

Non-wetlands waters FS-H1A (4.14 Acres 8831.15 LF)  
non-Section 10  
32.887423; -80.01475

**Begin Section 10**



- Legend
- Wetland (Section 404)
  - Non-wetlands waters (Section 10)
  - Wetland (Section 10)
  - Non-wetlands waters
  - Photo Point
  - Data Point
  - Project Study Area (1611.97 Acres)



Source:  
NRCS NAIP Aerial  
2017

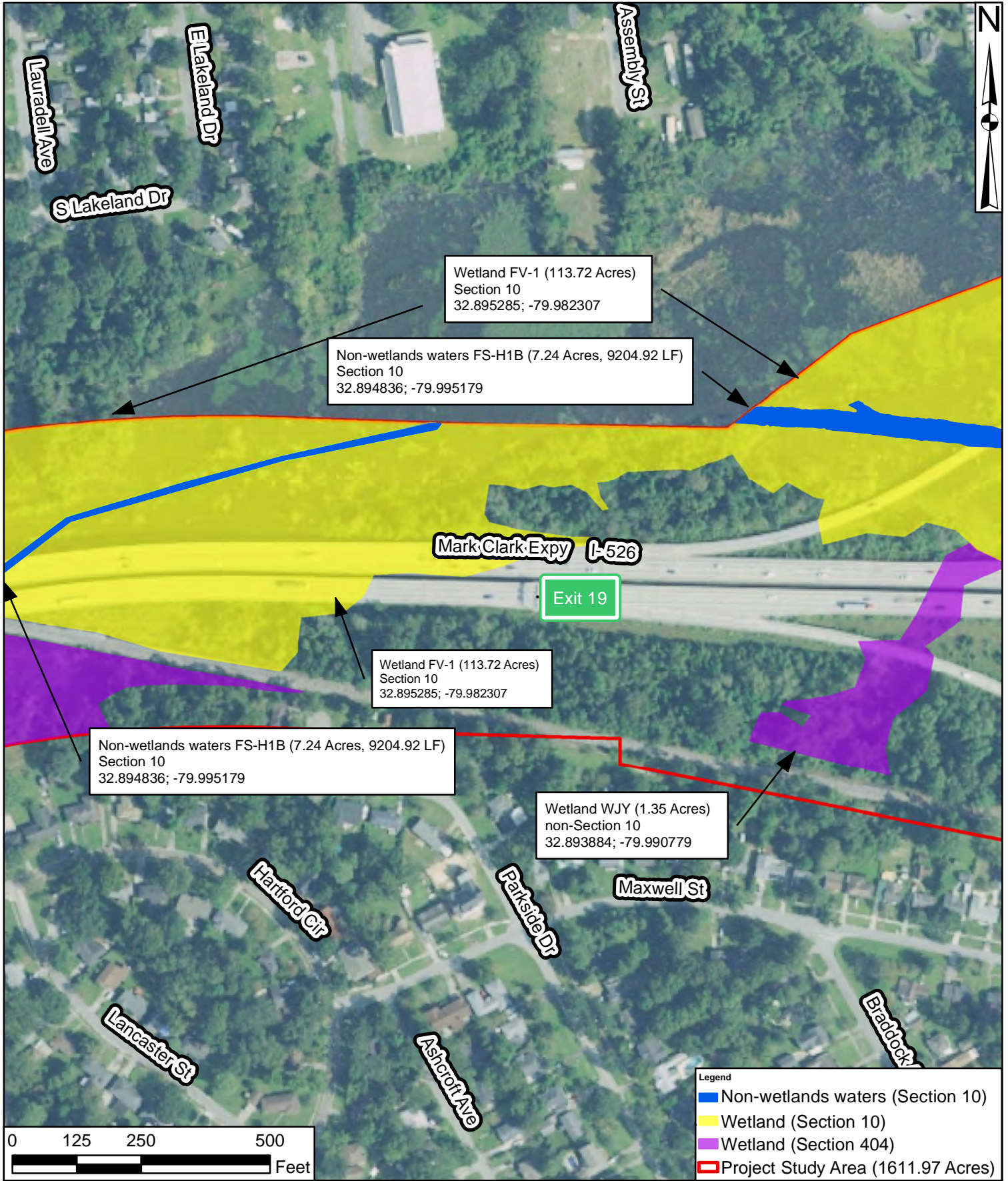
Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 61 of 85





Source:  
NRCS NAIP Aerial  
2017

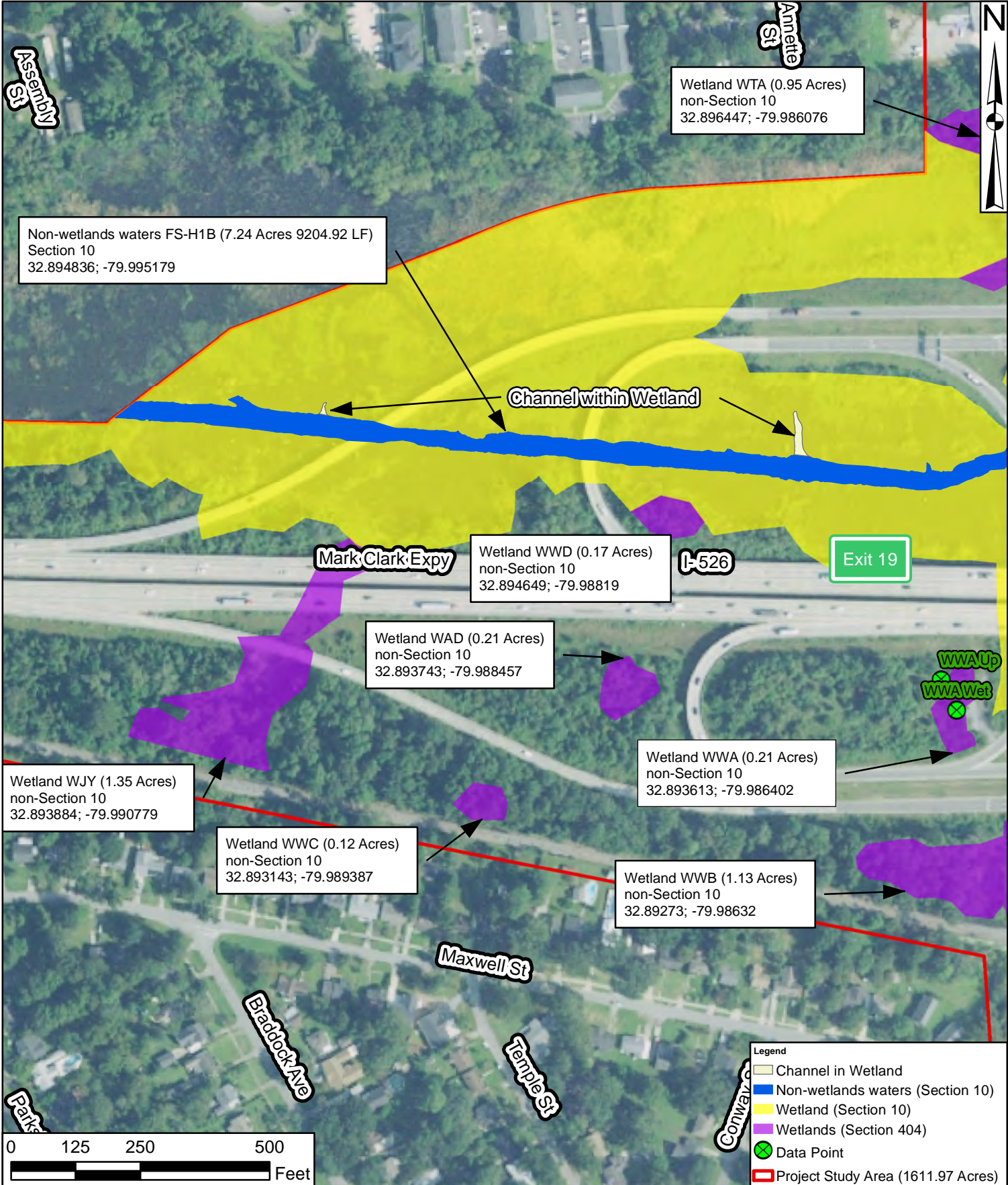
Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 62 of 85





Wetland WTA (0.95 Acres)  
non-Section 10  
32.896447; -79.986076

Non-wetlands waters FS-H1B (7.24 Acres 9204.92 LF)  
Section 10  
32.894836; -79.995179

Wetland WWD (0.17 Acres)  
non-Section 10  
32.894649; -79.98819

Wetland WAD (0.21 Acres)  
non-Section 10  
32.893743; -79.988457

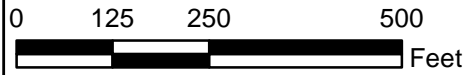
Wetland WWA (0.21 Acres)  
non-Section 10  
32.893613; -79.986402

Wetland WJY (1.35 Acres)  
non-Section 10  
32.893884; -79.990779

Wetland WWC (0.12 Acres)  
non-Section 10  
32.893143; -79.989387

Wetland WWB (1.13 Acres)  
non-Section 10  
32.89273; -79.98632

- Legend**
- Channel in Wetland
  - Non-wetlands waters (Section 10)
  - Wetland (Section 10)
  - Wetlands (Section 404)
  - Data Point
  - Project Study Area (1611.97 Acres)

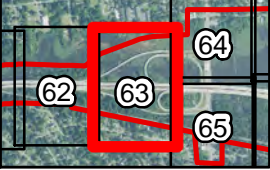


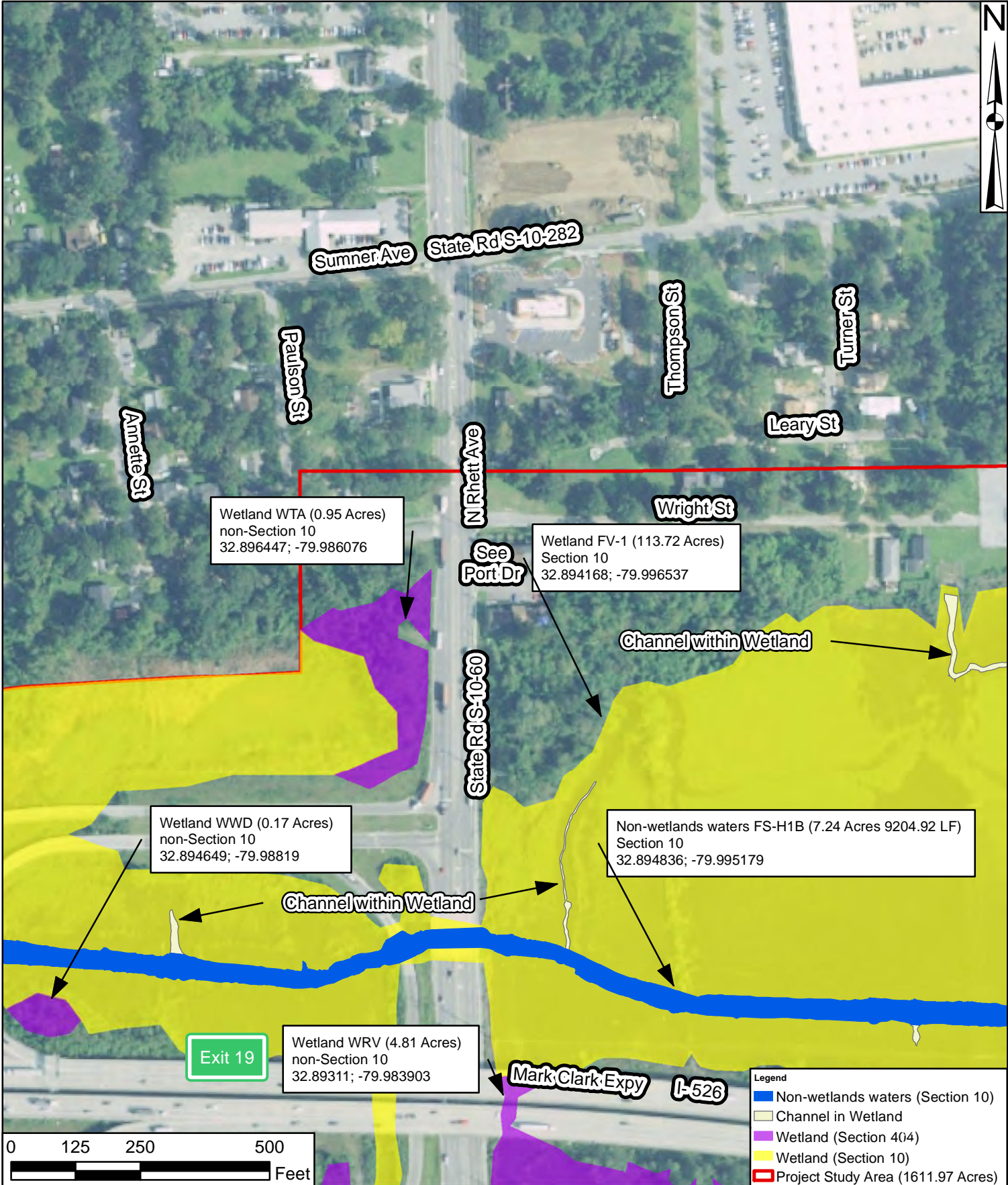
Source:  
NRCS NAIP Aerial  
2017

Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources      Sheet 63 of 85





Wetland WTA (0.95 Acres)  
non-Section 10  
32.896447; -79.986076

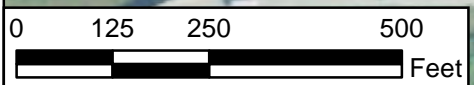
Wetland FV-1 (113.72 Acres)  
Section 10  
32.894168; -79.996537

Wetland WWD (0.17 Acres)  
non-Section 10  
32.894649; -79.98819

Non-wetlands waters FS-H1B (7.24 Acres 9204.92 LF)  
Section 10  
32.894836; -79.995179

Wetland WRV (4.81 Acres)  
non-Section 10  
32.89311; -79.983903

- Legend**
- Non-wetlands waters (Section 10)
  - Channel in Wetland
  - Wetland (Section 404)
  - Wetland (Section 10)
  - Project Study Area (1611.97 Acres)



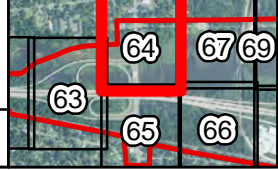
Source:  
NRCS NAIP Aerial  
2017

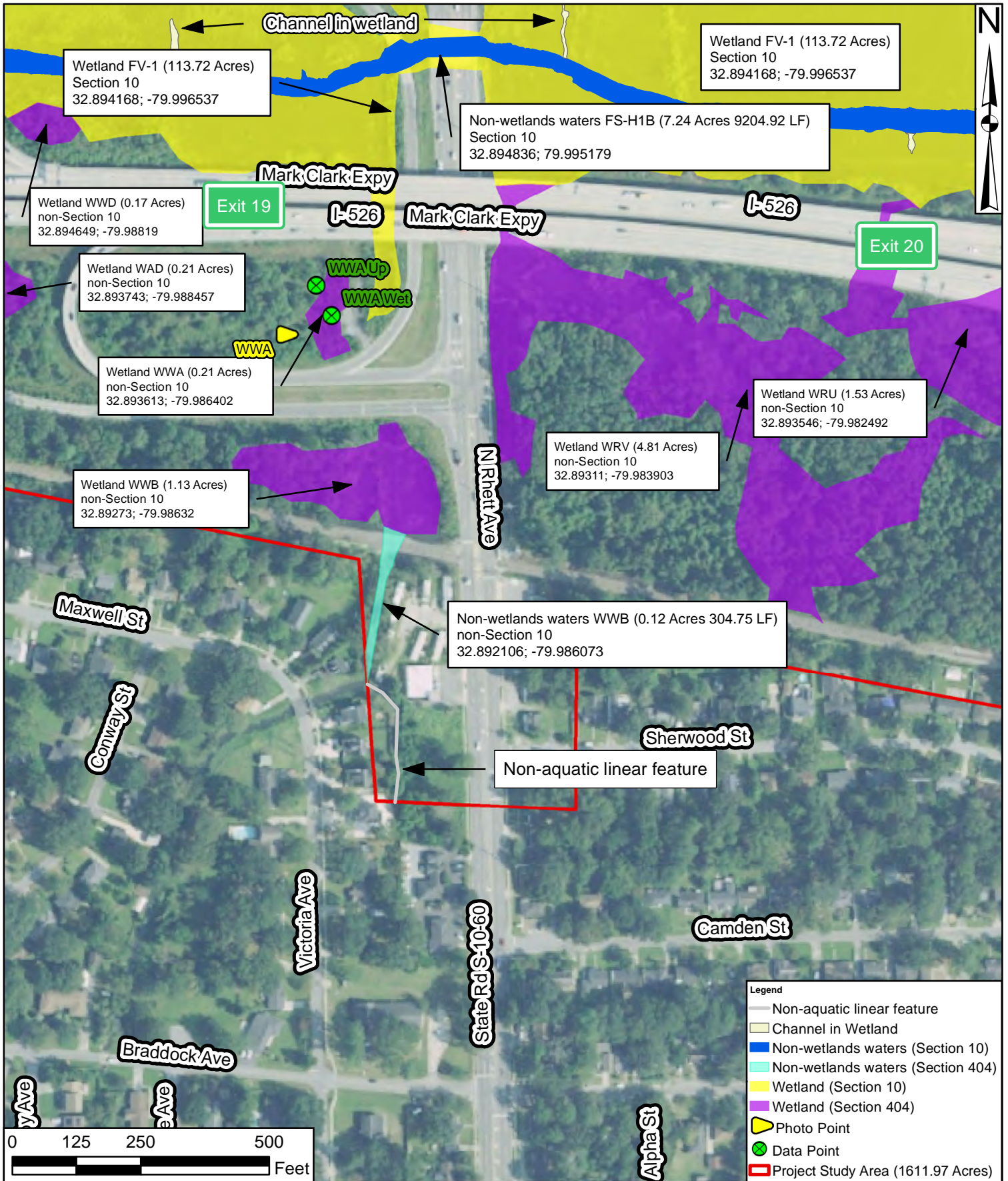
Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

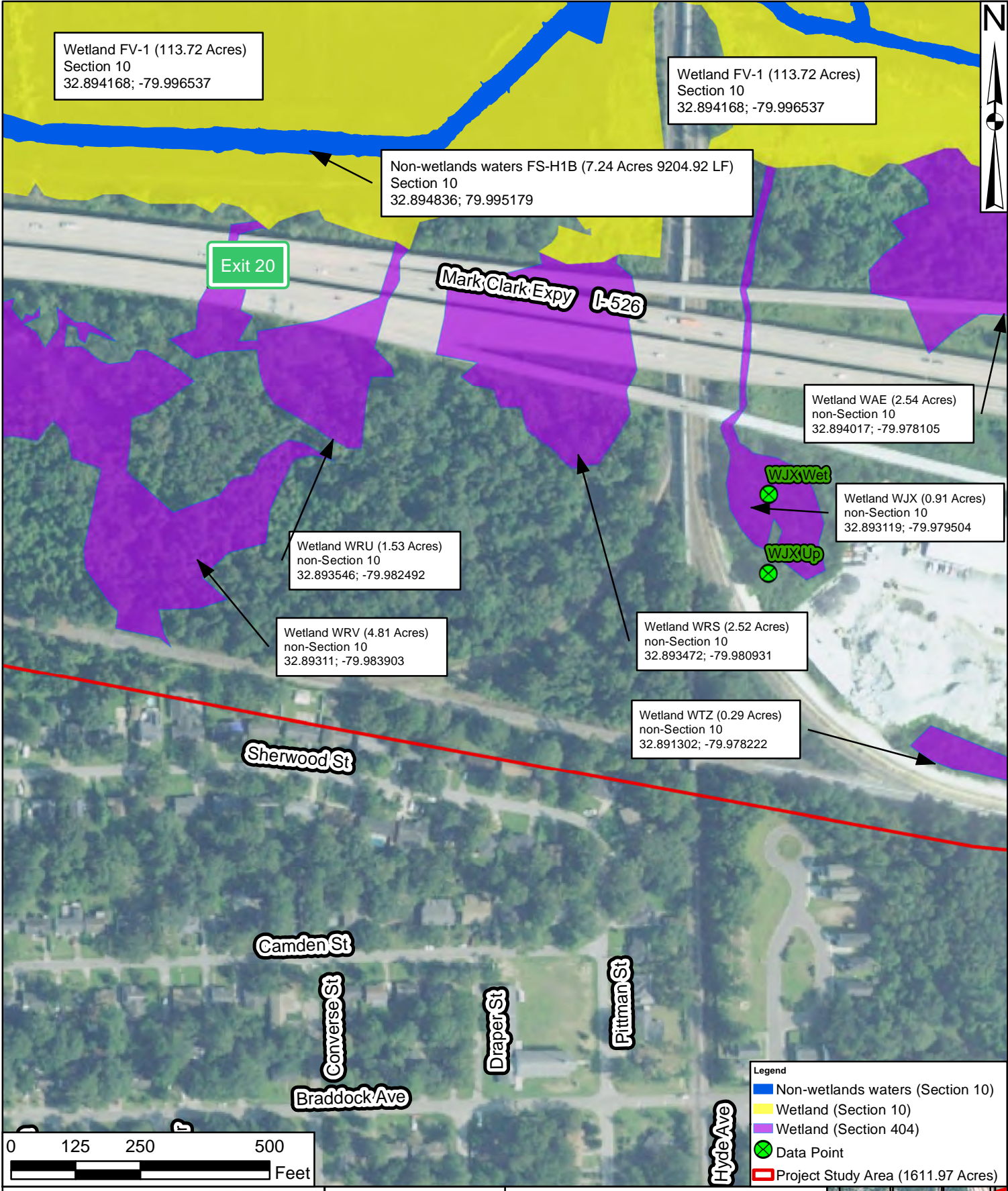
Aquatic Resources

Sheet 64 of 85









Wetland FV-1 (113.72 Acres)  
Section 10  
32.894168; -79.996537

Wetland FV-1 (113.72 Acres)  
Section 10  
32.894168; -79.996537

Non-wetlands waters FS-H1B (7.24 Acres 9204.92 LF)  
Section 10  
32.894836; 79.995179

Exit 20

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Wetland WAE (2.54 Acres)  
non-Section 10  
32.894017; -79.978105

Wetland WJX (0.91 Acres)  
non-Section 10  
32.893119; -79.979504

Wetland WRU (1.53 Acres)  
non-Section 10  
32.893546; -79.982492

WJXWet  
WJXUp

Wetland WRV (4.81 Acres)  
non-Section 10  
32.89311; -79.983903

Wetland WRS (2.52 Acres)  
non-Section 10  
32.893472; -79.980931

Wetland WTZ (0.29 Acres)  
non-Section 10  
32.891302; -79.978222

Sherwood St

Camden St

Converse St

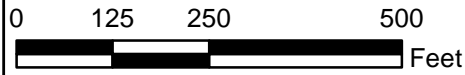
Braddock Ave

Draper St

Pittman St

Hyde Ave

- Legend
- Non-wetlands waters (Section 10)
  - Wetland (Section 10)
  - Wetland (Section 404)
  - ⊗ Data Point
  - Project Study Area (1611.97 Acres)



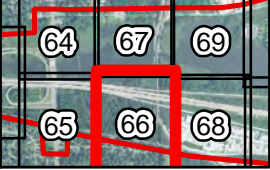
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NRCS NAIP Aerial  
2017

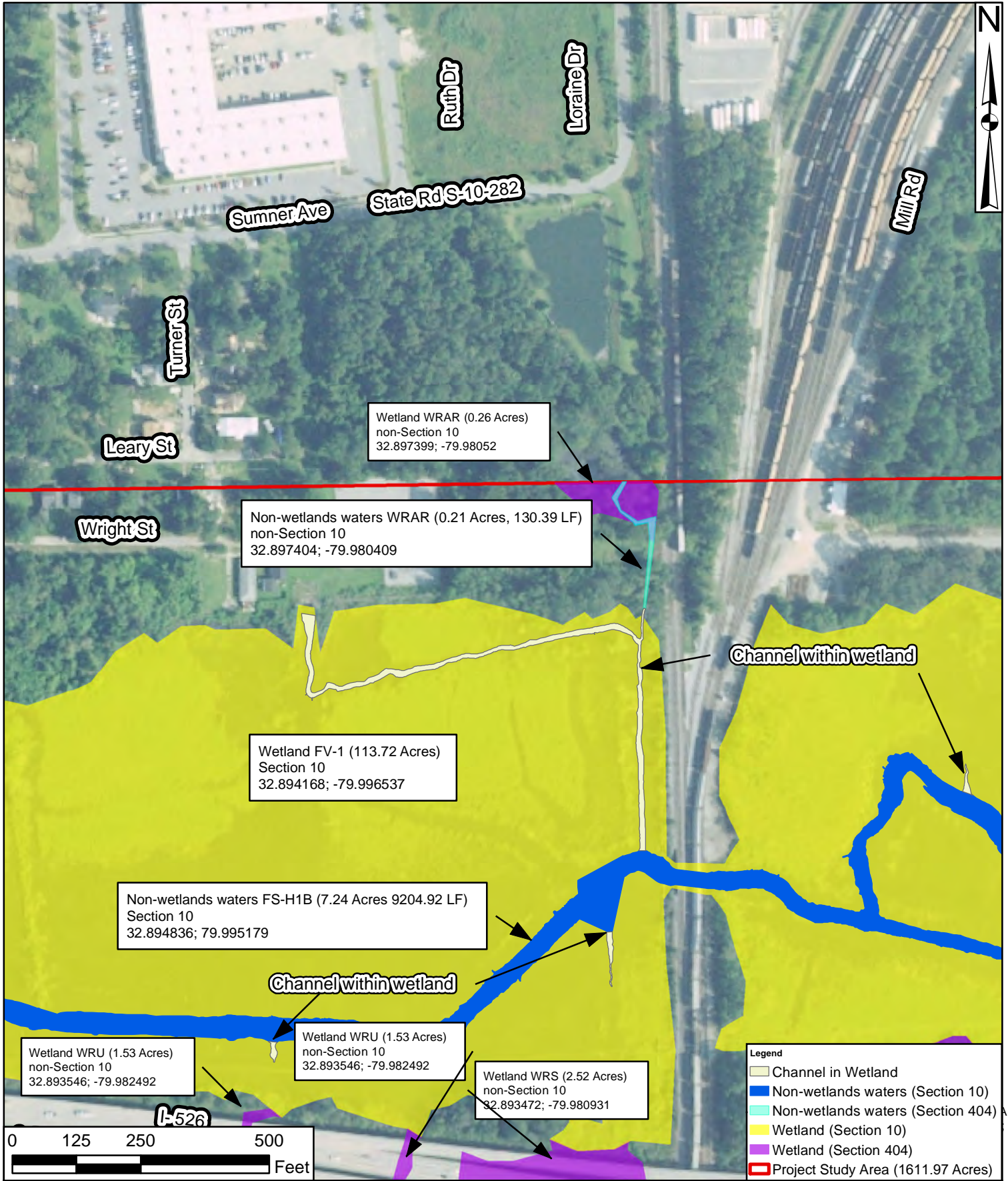
Drawn By: RHH  
QA/QC: KLM

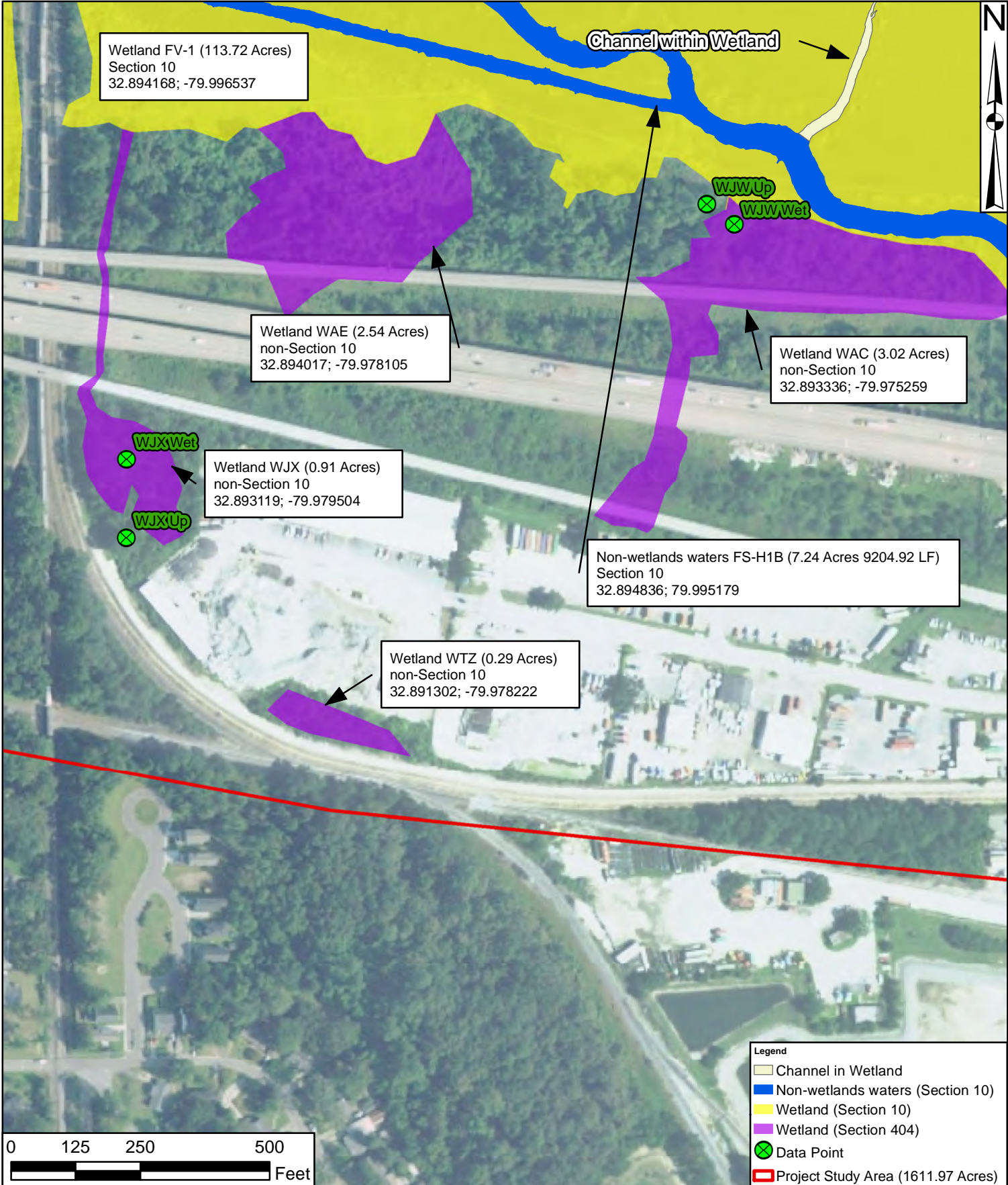
I-526 Lowcountry Corridor West  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 66 of 85







Wetland FV-1 (113.72 Acres)  
Section 10  
32.894168; -79.996537

Channel within Wetland

WJWUp  
WJWet

Wetland WAE (2.54 Acres)  
non-Section 10  
32.894017; -79.978105

Wetland WAC (3.02 Acres)  
non-Section 10  
32.893336; -79.975259

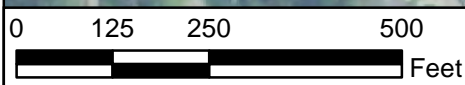
WJXWet  
WJXUp

Wetland WJX (0.91 Acres)  
non-Section 10  
32.893119; -79.979504

Non-wetlands waters FS-H1B (7.24 Acres 9204.92 LF)  
Section 10  
32.894836; 79.995179

Wetland WTZ (0.29 Acres)  
non-Section 10  
32.891302; -79.978222

- Legend**
- Channel in Wetland
  - Non-wetlands waters (Section 10)
  - Wetland (Section 10)
  - Wetland (Section 404)
  - Data Point
  - Project Study Area (1611.97 Acres)



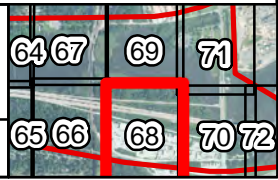
Source:  
NRCS NAIP Aerial  
2017

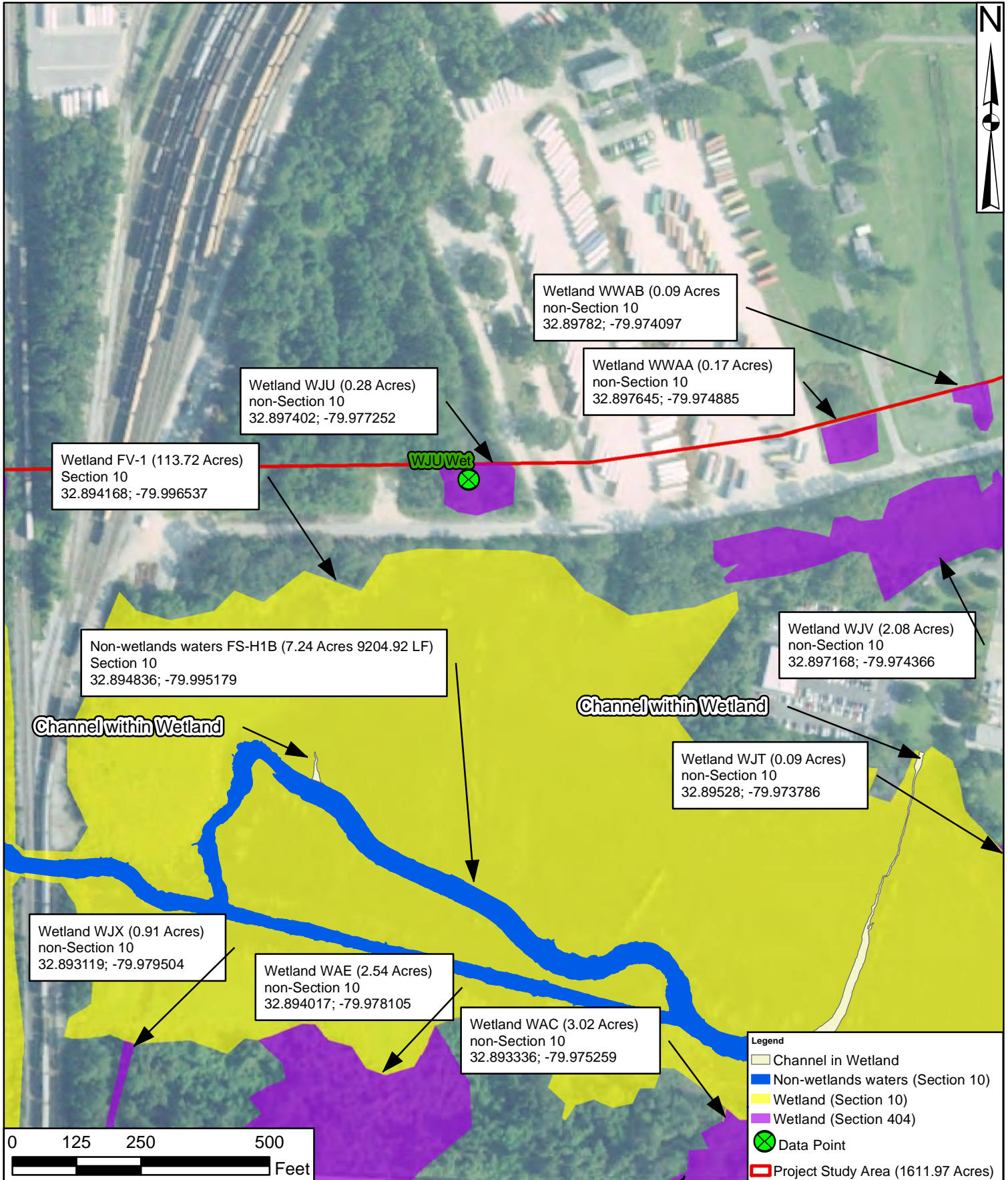
Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

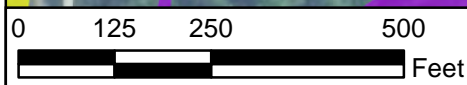
Sheet 68 of 85

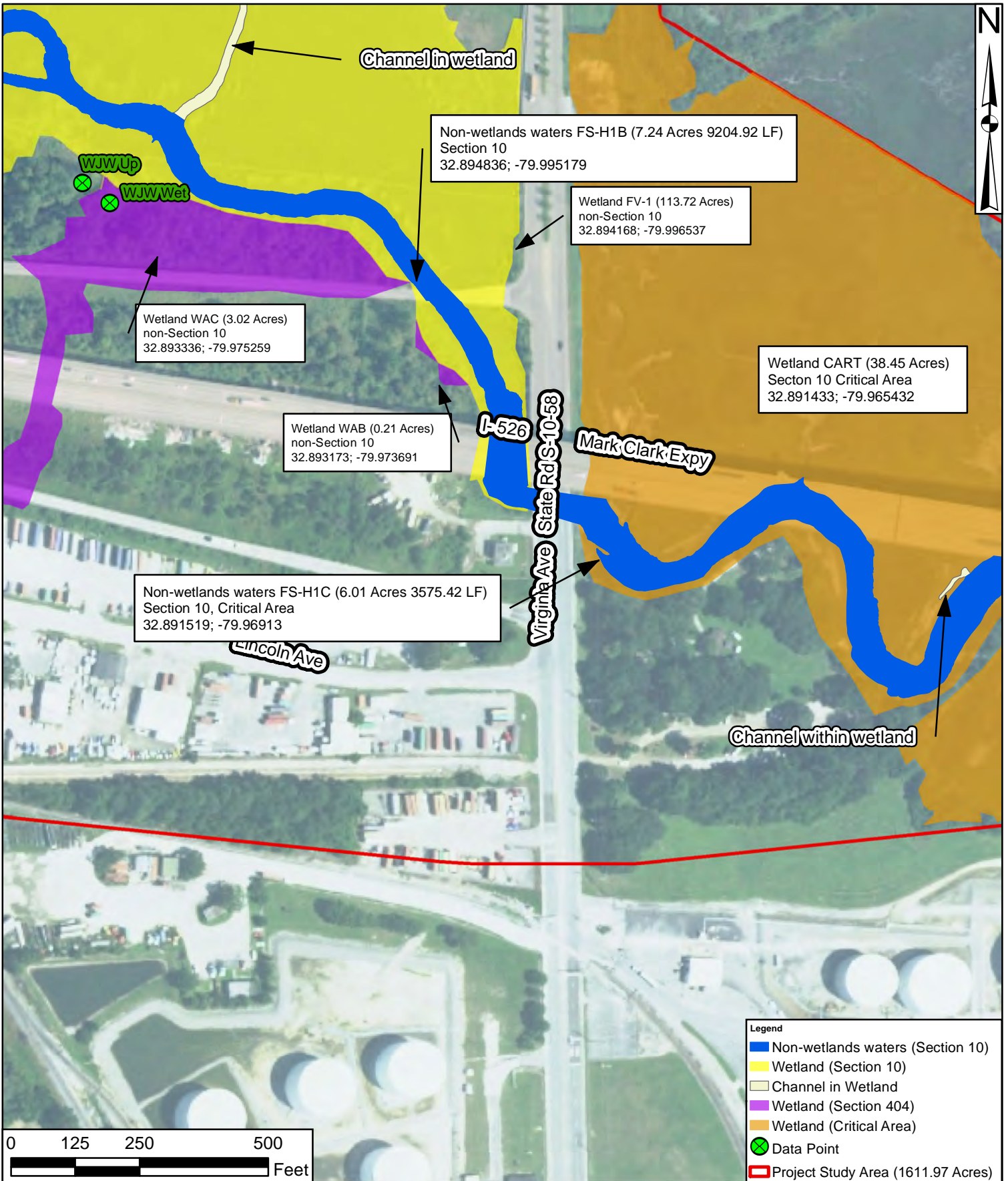




**Legend**

- Channel in Wetland
- Non-wetlands waters (Section 10)
- Wetland (Section 10)
- Wetland (Section 404)
- X Data Point
- Project Study Area (1611.97 Acres)





Non-wetlands waters FS-H1B (7.24 Acres 9204.92 LF)  
Section 10  
32.894836; -79.995179

Wetland FV-1 (113.72 Acres)  
non-Section 10  
32.894168; -79.996537

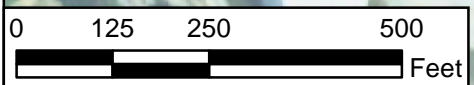
Wetland WAC (3.02 Acres)  
non-Section 10  
32.893336; -79.975259

Wetland WAB (0.21 Acres)  
non-Section 10  
32.893173; -79.973691

Wetland CART (38.45 Acres)  
Section 10 Critical Area  
32.891433; -79.965432

Non-wetlands waters FS-H1C (6.01 Acres 3575.42 LF)  
Section 10, Critical Area  
32.891519; -79.96913

- Legend**
- Non-wetlands waters (Section 10)
  - Wetland (Section 10)
  - Channel in Wetland
  - Wetland (Section 404)
  - Wetland (Critical Area)
  - ⊗ Data Point
  - ▬ Project Study Area (1611.97 Acres)



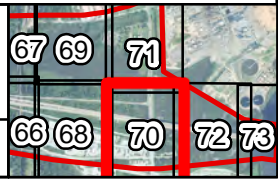
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2017

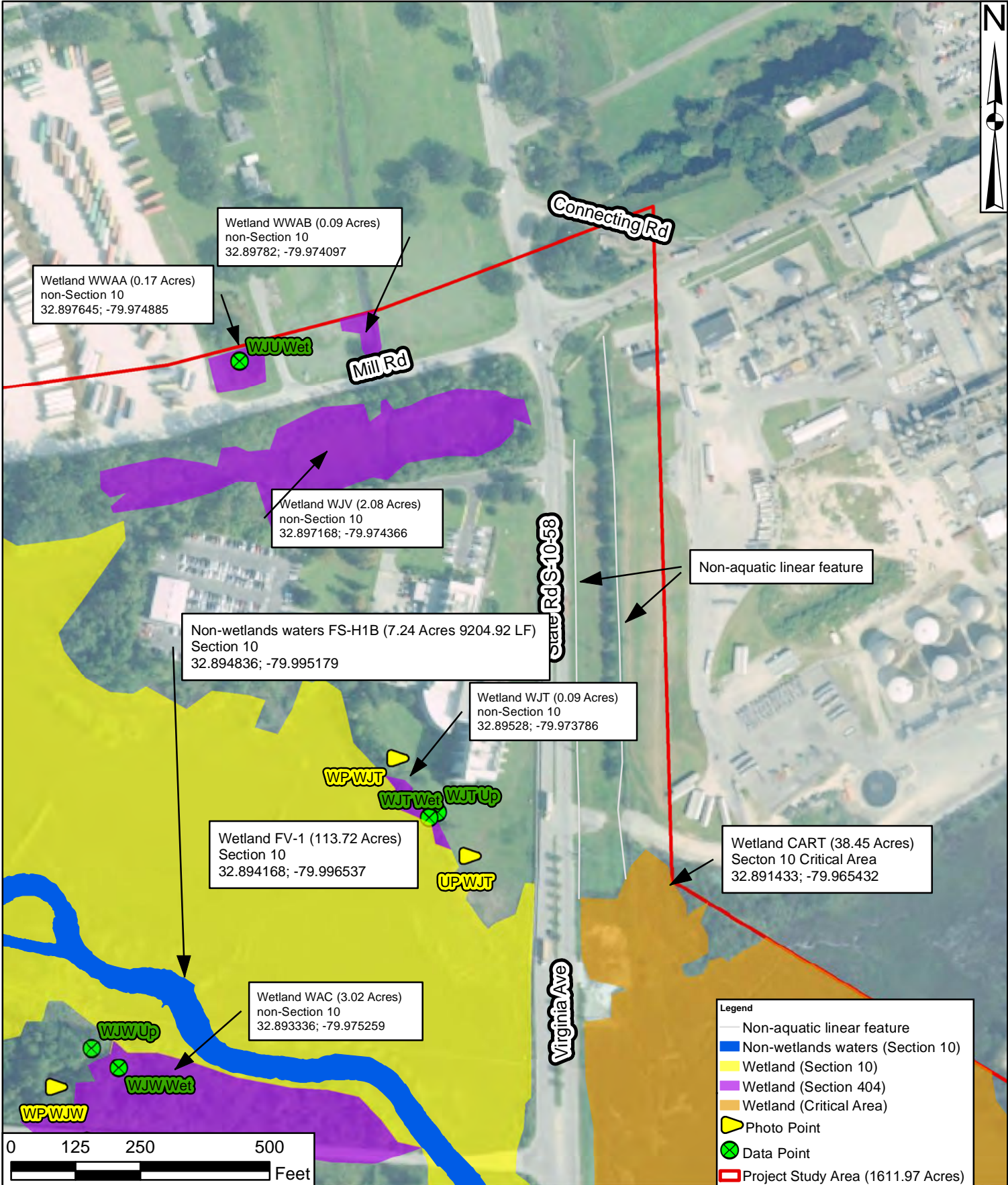
Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 70 of 85





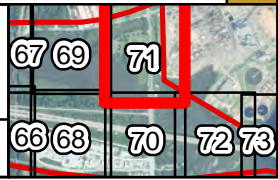
Source:  
NRCS NAIP Aerial  
2017

Drawn By: RHH  
QA/QC: KLM

I-526 Lowcountry Corridor West  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 71 of 85



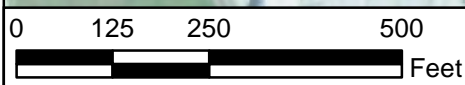


Wetland CART (38.45 Acres)  
 Section 10 Critical Area  
 32.891433; -79.965432

Non-wetlands waters FS-H1C (6.01 Acres 3575.42 LF)  
 Section 10 Critical Area  
 32.891519; -79.96913

Mark Clark Expy I-526

Channel within wetland



- Legend**
- Channel in Wetland
  - Non-wetland Waters (Section 10)
  - Wetland (Critical Area)
  - Project Study Area (1611.97 Acres)



Source:  
 NRCS NAIP Aerial  
 2017

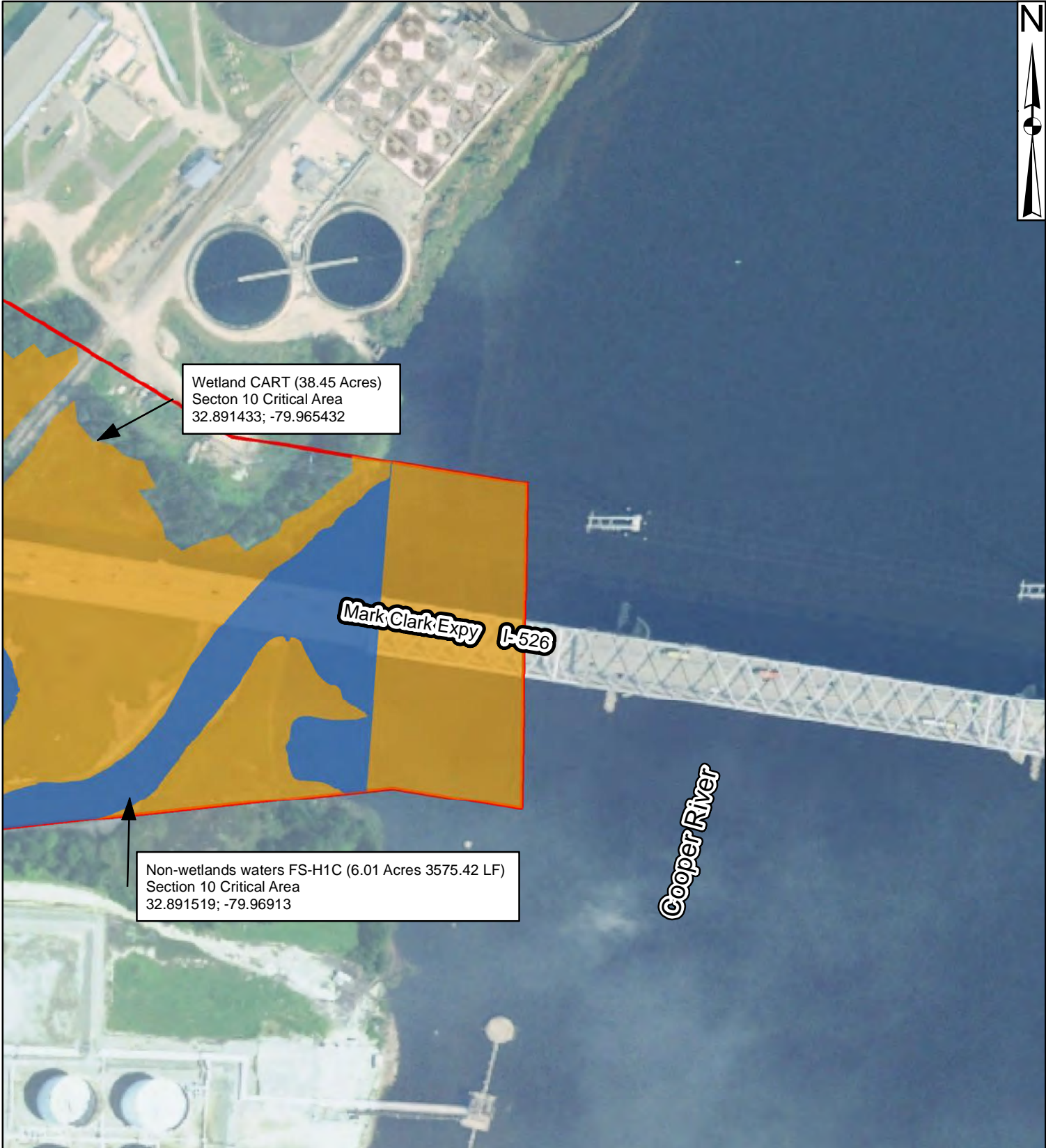
Drawn By: RHH  
 QA/QC: KLM

**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**October 31 2019**

Aquatic Resources

Sheet 72 of 85



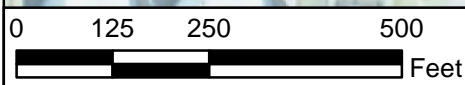


Wetland CART (38.45 Acres)  
Section 10 Critical Area  
32.891433; -79.965432

Non-wetlands waters FS-H1C (6.01 Acres 3575.42 LF)  
Section 10 Critical Area  
32.891519; -79.96913

Mark Clark Expy I-526

Cooper River

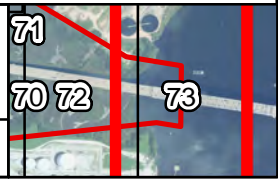


Legend	
	Non-wetland Waters (Section 10)
	Wetland (Critical Area)
	Project Study Area (1611.97 Acres)



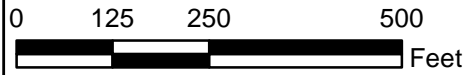
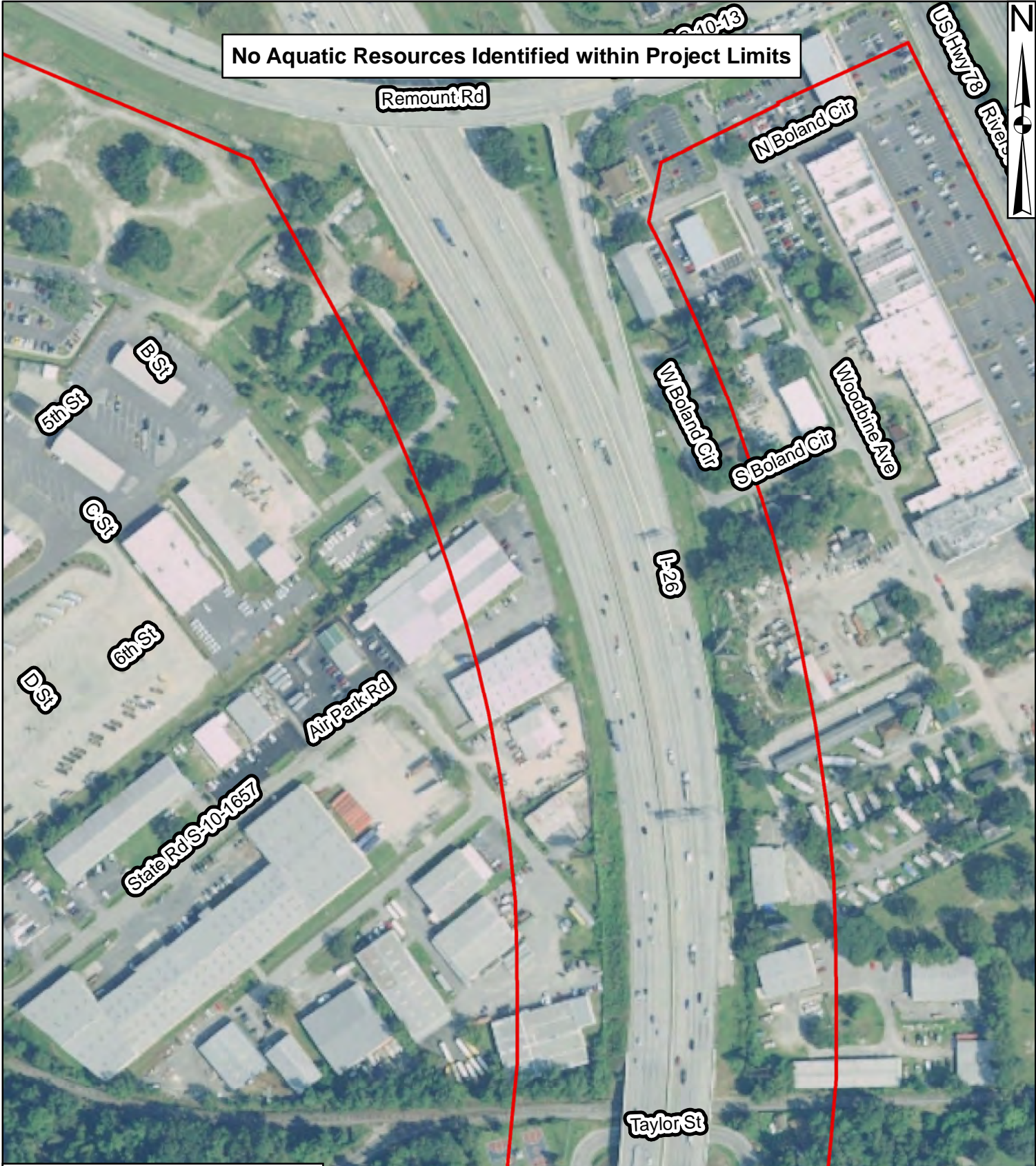
Source:  
NRCS NAIP Aerial  
2017  
  
Drawn By: RHH  
QA/QC: KLM

I-526 Lowcountry Corridor West  
Charleston County  
SCDOT P032102  
October 31 2019  
  
Aquatic Resources      Sheet 73 of 85





No Aquatic Resources Identified within Project Limits

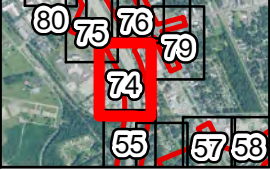


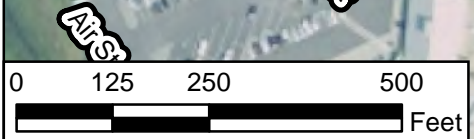
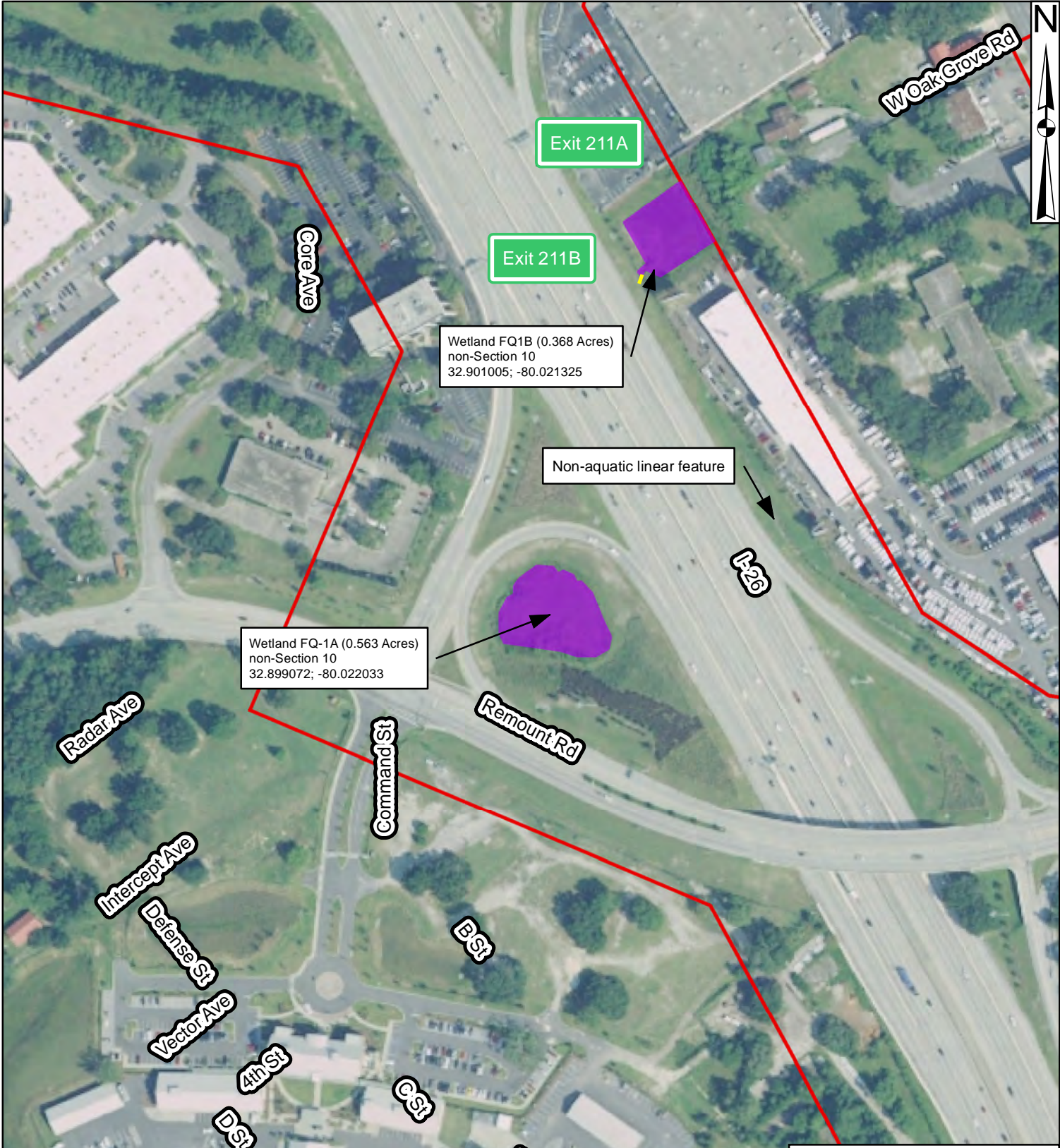
Legend  
Project Study Area (1611.97 Acres)



Source:  
NRCS NAIP Aerial  
2017  
  
Drawn By: RHH  
QA/QC: KLM

I-526 Lowcountry Corridor West  
Charleston County  
SCDOT P032102  
October 31 2019  
  
Aquatic Resources  
Sheet 74 of 85





- Legend**
- Drainage Connection
  - Wetland
  - Non-wetlands waters
  - Project Study Area (1611.97 Acres)

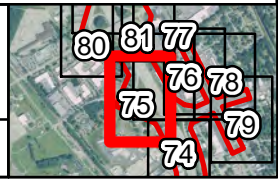


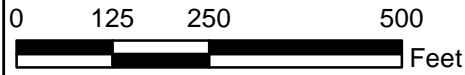
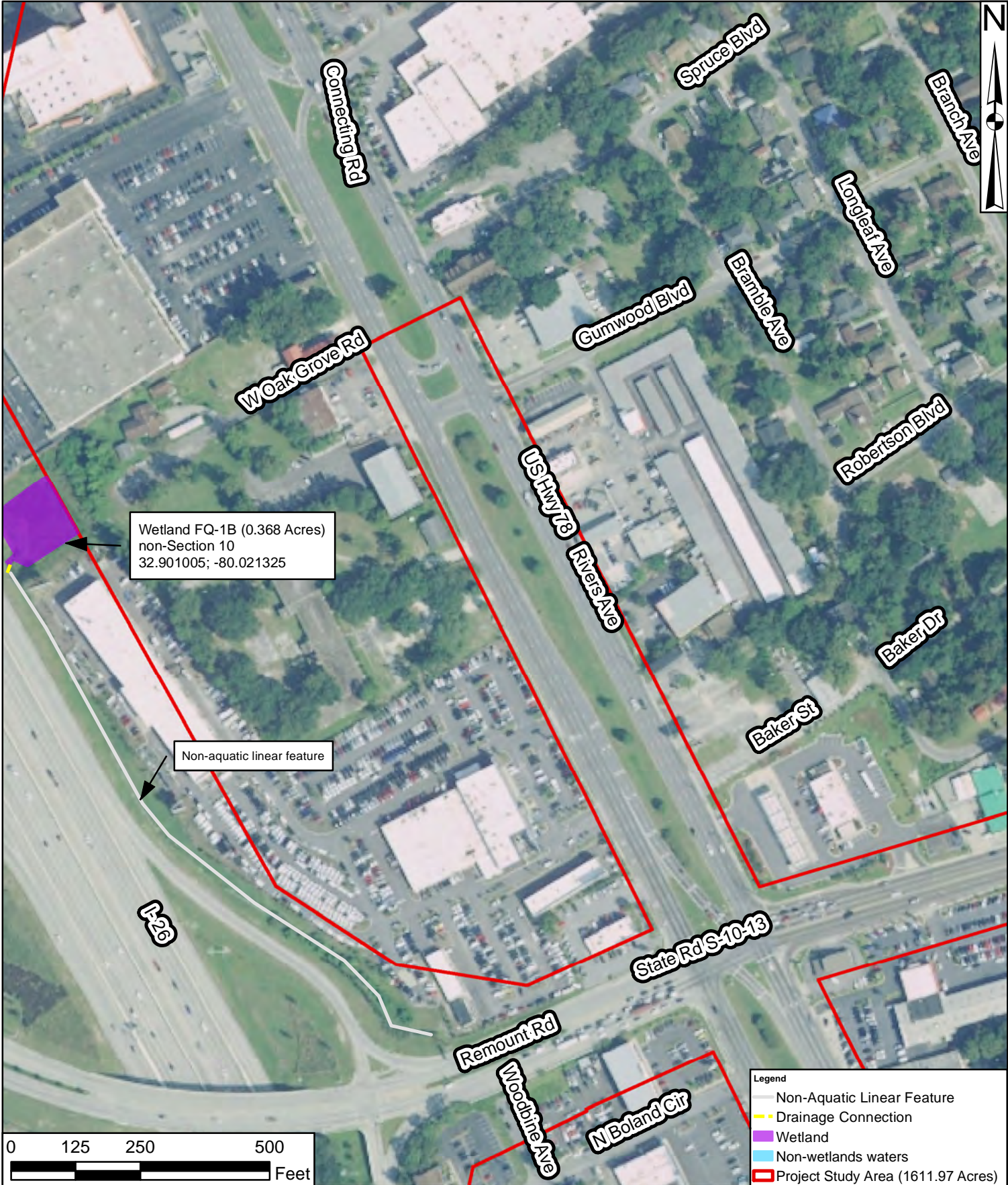
Source:  
NRCS NAIP Aerial  
2017

Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources      Sheet 75 of 85





- Legend**
- Non-Aquatic Linear Feature
  - Drainage Connection
  - Wetland
  - Non-wetlands waters
  - Project Study Area (1611.97 Acres)



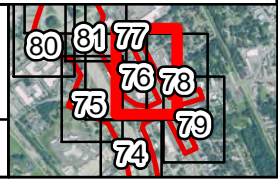
Source:  
NRCS NAIP Aerial  
2017

Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 76 of 85





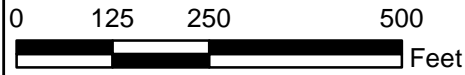
Wetland FQ-1B (0.36 Acres)  
non-Section 10  
32.901005; -80.021325

Wetland FQ-1A (0.56 Acres)  
non-Section 10  
32.899072; -80.022033

Non-aquatic linear feature

Exit 211A

- Legend
- Non-Aquatic Linear Feature
  - Drainage Connection
  - Wetland
  - Project Study Area (1611.97 Acres)

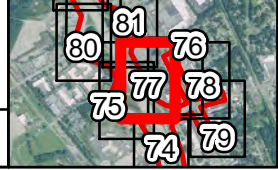


Source:  
NRCS NAIP Aerial  
2017

Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

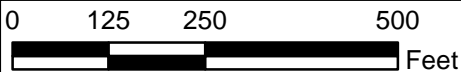
Aquatic Resources      Sheet 77 of 85



No Aquatic Resources Identified within Project Limits



Non-aquatic linear feature



Legend  
Project Study Area (1611.97 Acres)



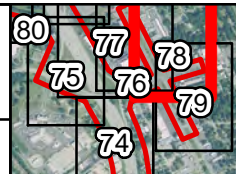
Source:  
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2017

I-526 Lowcountry Corridor West  
Charleston County  
SCDOT P032102  
October 31 2019

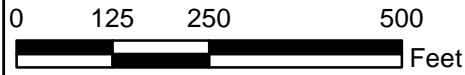
Drawn By: RHH  
QA/QC: KLM

Aquatic Resources

Sheet 78 of 85



No Aquatic Resources Identified within Project Limits



Legend  
 Project Study Area (1611.97 Acres)



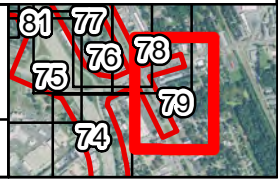
Source:  
 NRCS NAIP Aerial  
 2017

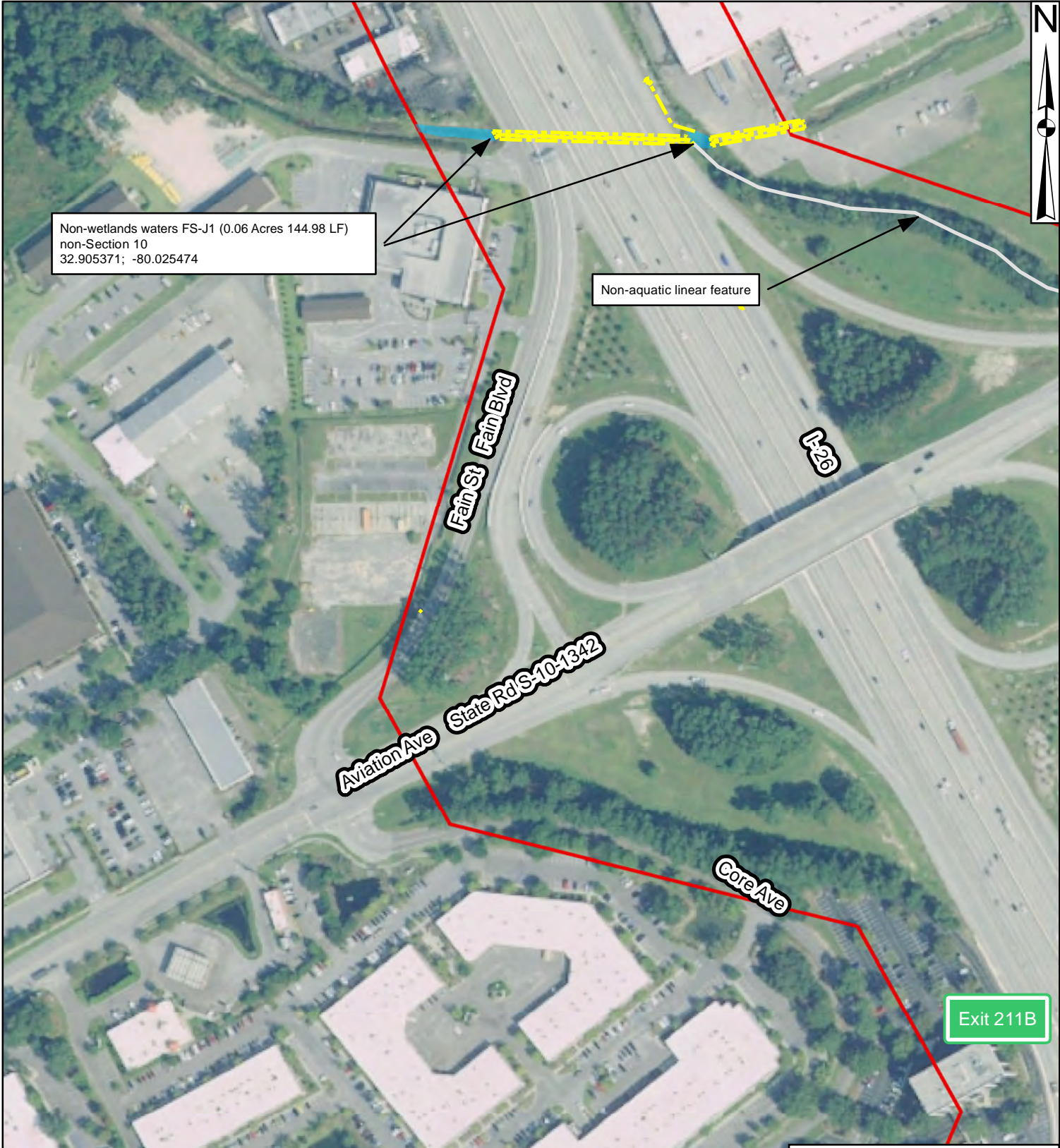
Drawn By: RHH  
 QA/QC: KLM

I-526 Lowcountry Corridor West  
 Charleston County  
 SCDOT P032102  
 October 31 2019

Aquatic Resources

Sheet 79 of 85





Non-wetlands waters FS-J1 (0.06 Acres 144.98 LF)  
 non-Section 10  
 32.905371; -80.025474

Non-aquatic linear feature

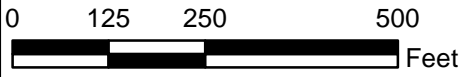
Rain St Fain Blvd

I-526

Aviation Ave State Rd S-10-1342

Core Ave

Exit 211B



- Legend
- Non-Aquatic Linear Feature
  - - - Drainage Connection
  - Non-wetlands waters
  - Project Study Area (1611.97 Acres)



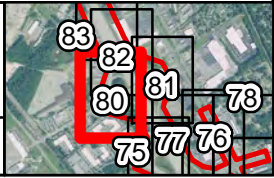
Source:  
 NRCS NAIP Aerial  
 2017

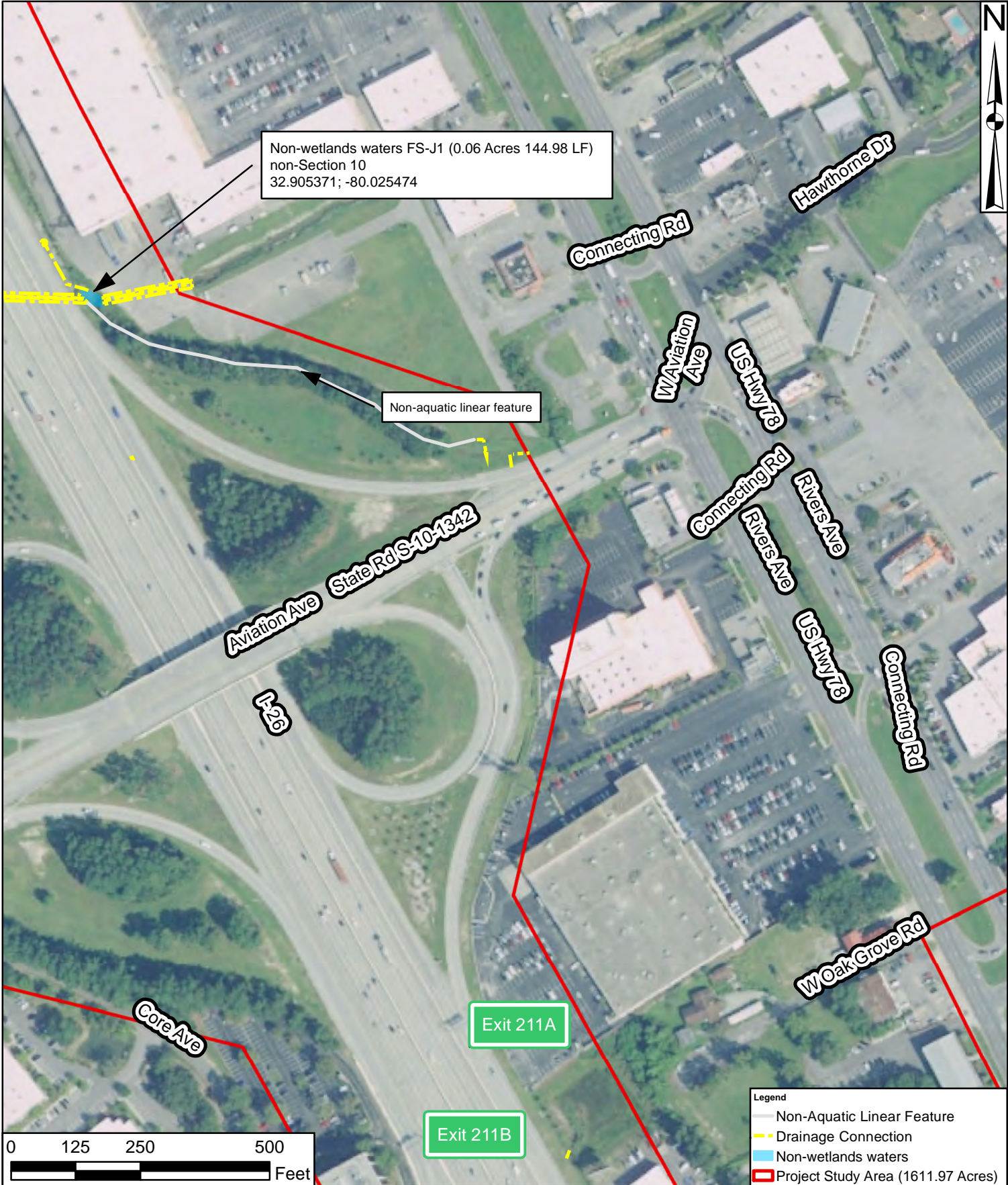
Drawn By: RHH  
 QA/QC: KLM

I-526 Lowcountry Corridor West  
 Charleston County  
 SCDOT P032102  
 October 31 2019

Aquatic Resources

Sheet 80 of 85

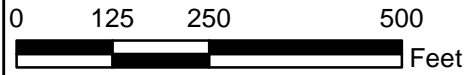




Non-wetlands waters FS-J1 (0.06 Acres 144.98 LF)  
 non-Section 10  
 32.905371; -80.025474

Non-aquatic linear feature

- Legend**
- Non-Aquatic Linear Feature
  - Drainage Connection
  - Non-wetlands waters
  - Project Study Area (1611.97 Acres)

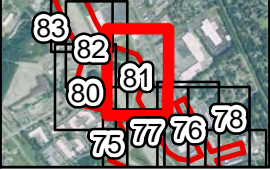


Source:  
 NRCS NAIP Aerial  
 2017

Drawn By: RHH  
 QA/QC: KLM

**I-526 Lowcountry Corridor West**  
 Charleston County  
 SCDOT P032102  
 October 31 2019

Aquatic Resources      Sheet 81 of 85



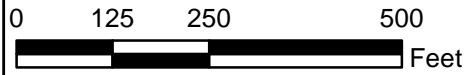




Exit 211

Non-wetlands waters FS-J1 (0.06 Acres 144.98 LF)  
 non-Section 10  
 32.905371; -80.025474

Non-aquatic linear feature



- Legend
- Non-Aquatic Linear Feature
  - - - Drainage Connection
  - Non-wetlands waters
  - Project Study Area (1611.97 Acres)

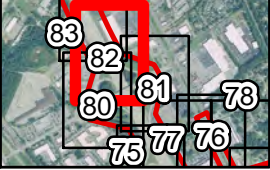
Source:  
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 2017

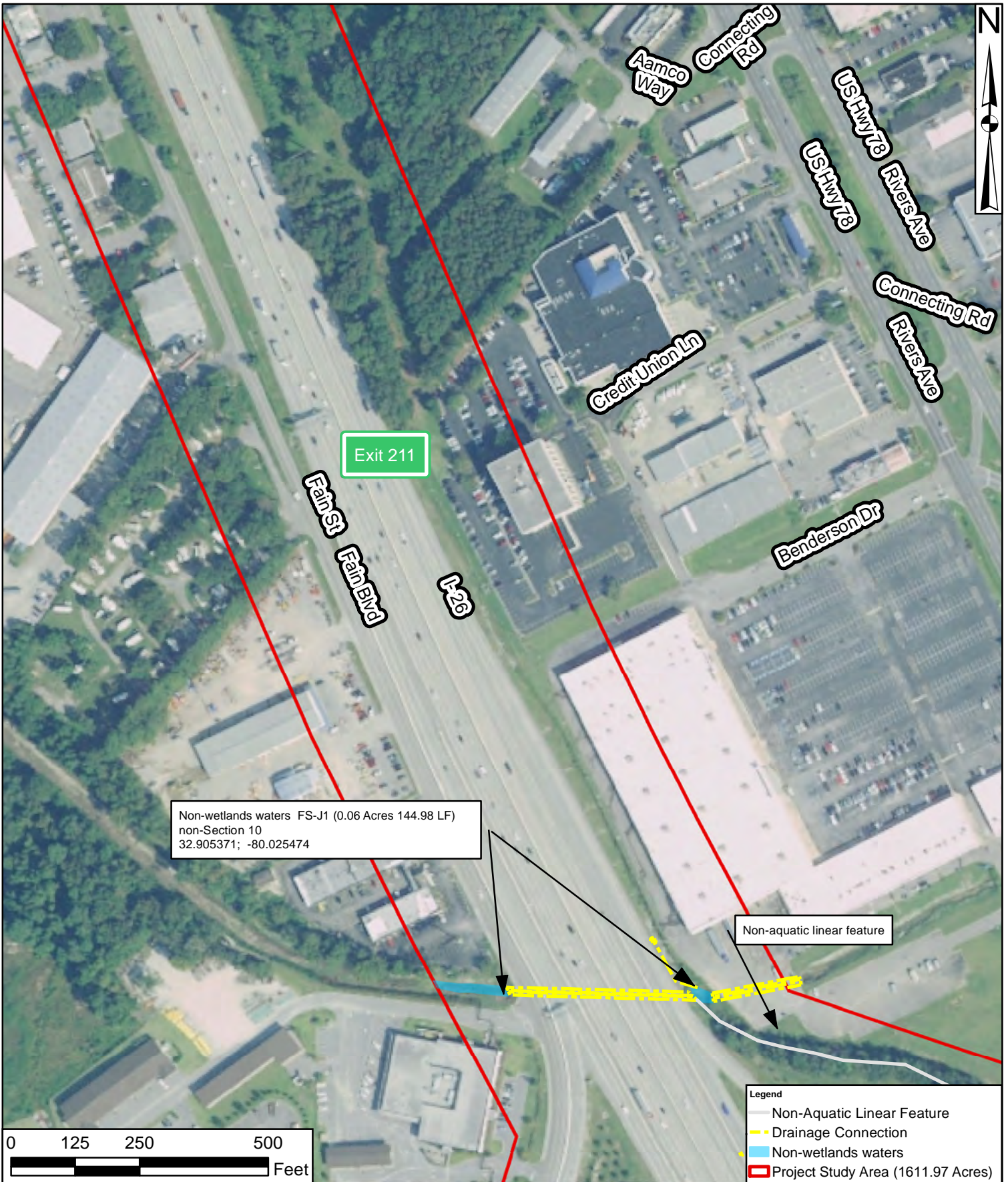
Drawn By: RHH  
 QA/QC: KLM

**I-526 Lowcountry Corridor West**  
 Charleston County  
 SCDOT P032102  
 October 31 2019

Aquatic Resources

Sheet 82 of 85

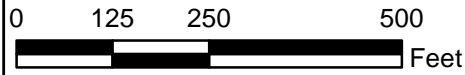




Non-wetlands waters FS-J1 (0.06 Acres 144.98 LF)  
 non-Section 10  
 32.905371; -80.025474

Non-aquatic linear feature

- Legend**
- Non-Aquatic Linear Feature
  - Drainage Connection
  - Non-wetlands waters
  - Project Study Area (1611.97 Acres)



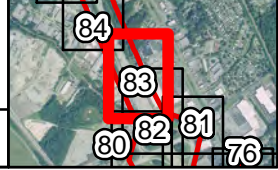
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 NRCS NAIP Aerial  
 2017

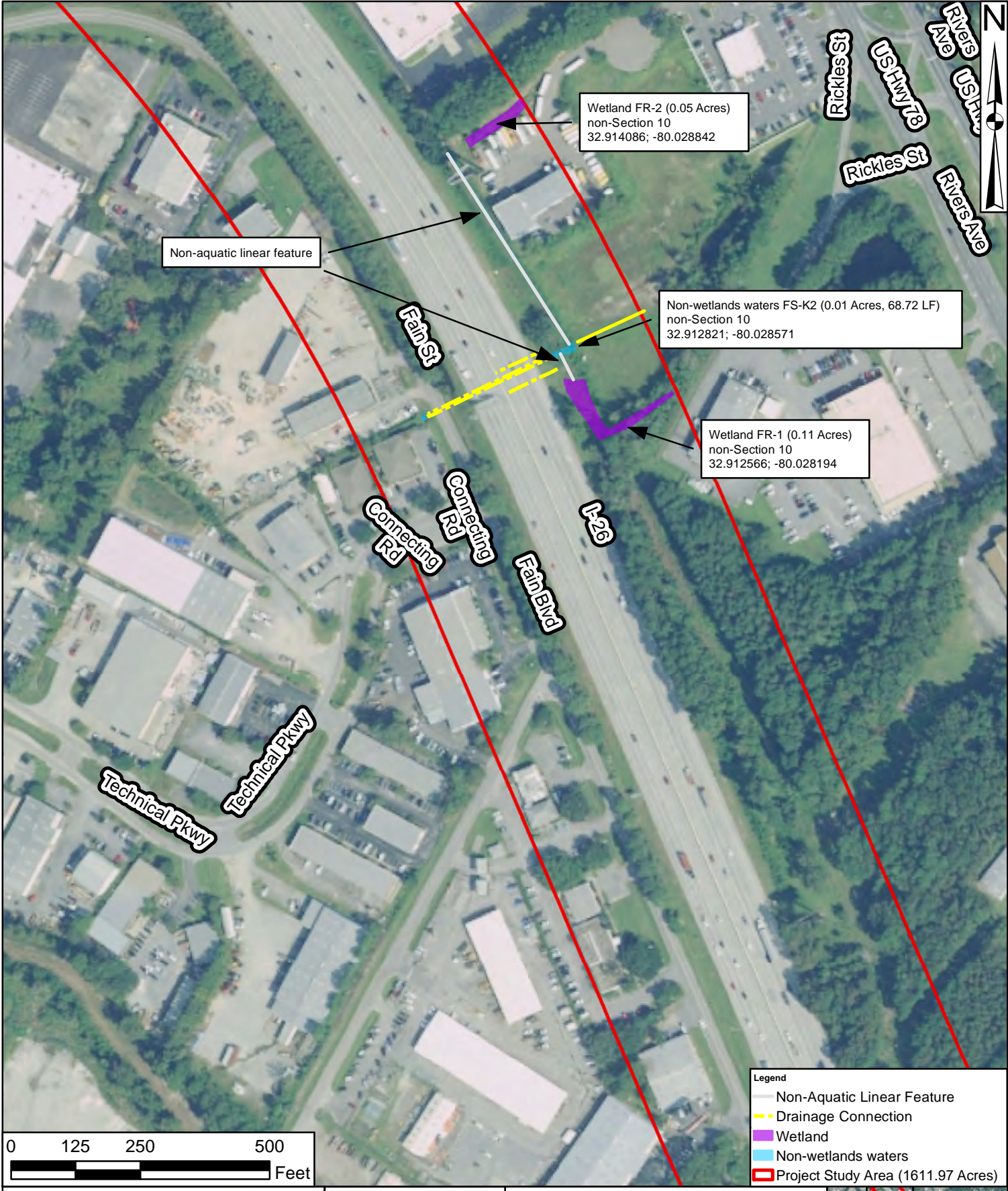
Drawn By: RHH  
 QA/QC: KLM

**I-526 Lowcountry Corridor West**  
**Charleston County**  
 SCDOT P032102  
 October 31 2019

Aquatic Resources

Sheet 83 of 85





Non-aquatic linear feature

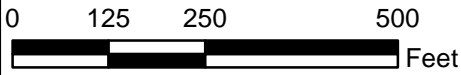
Wetland FR-2 (0.05 Acres)  
non-Section 10  
32.914086; -80.028842

Non-wetlands waters FS-K2 (0.01 Acres, 68.72 LF)  
non-Section 10  
32.912821; -80.028571

Wetland FR-1 (0.11 Acres)  
non-Section 10  
32.912566; -80.028194

**Legend**

- Non-Aquatic Linear Feature
- Drainage Connection
- Wetland
- Non-wetlands waters
- Project Study Area (1611.97 Acres)

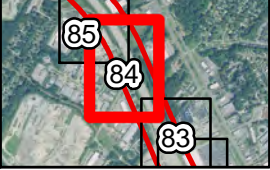


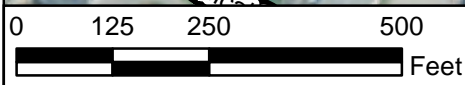
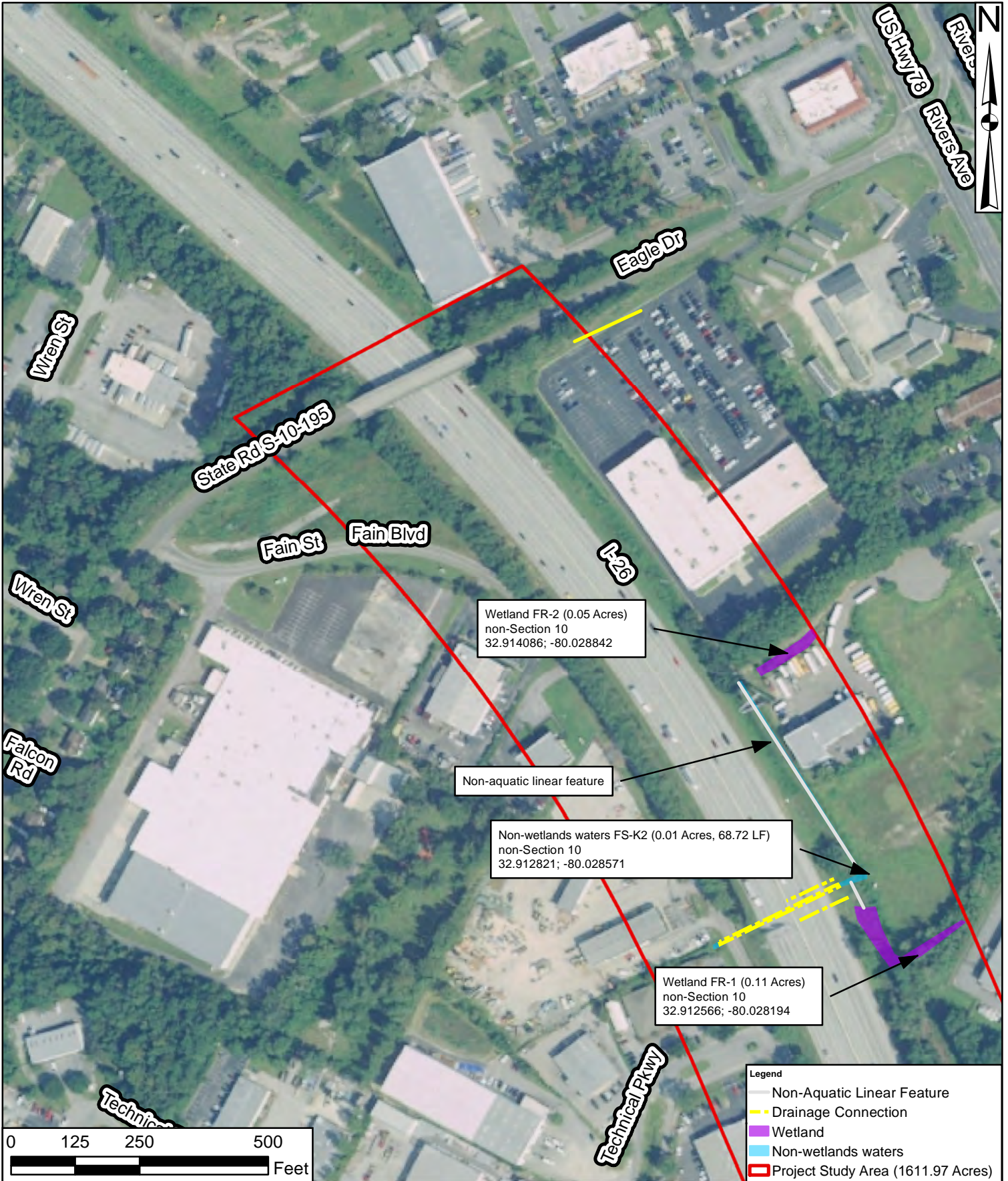
Source:  
NRCS NAIP Aerial  
2017

Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources      Sheet 84 of 85





- Legend**
- Non-Aquatic Linear Feature
  - Drainage Connection
  - Wetland
  - Non-wetlands waters
  - Project Study Area (1611.97 Acres)



Source:  
NRCS NAIP Aerial  
2017

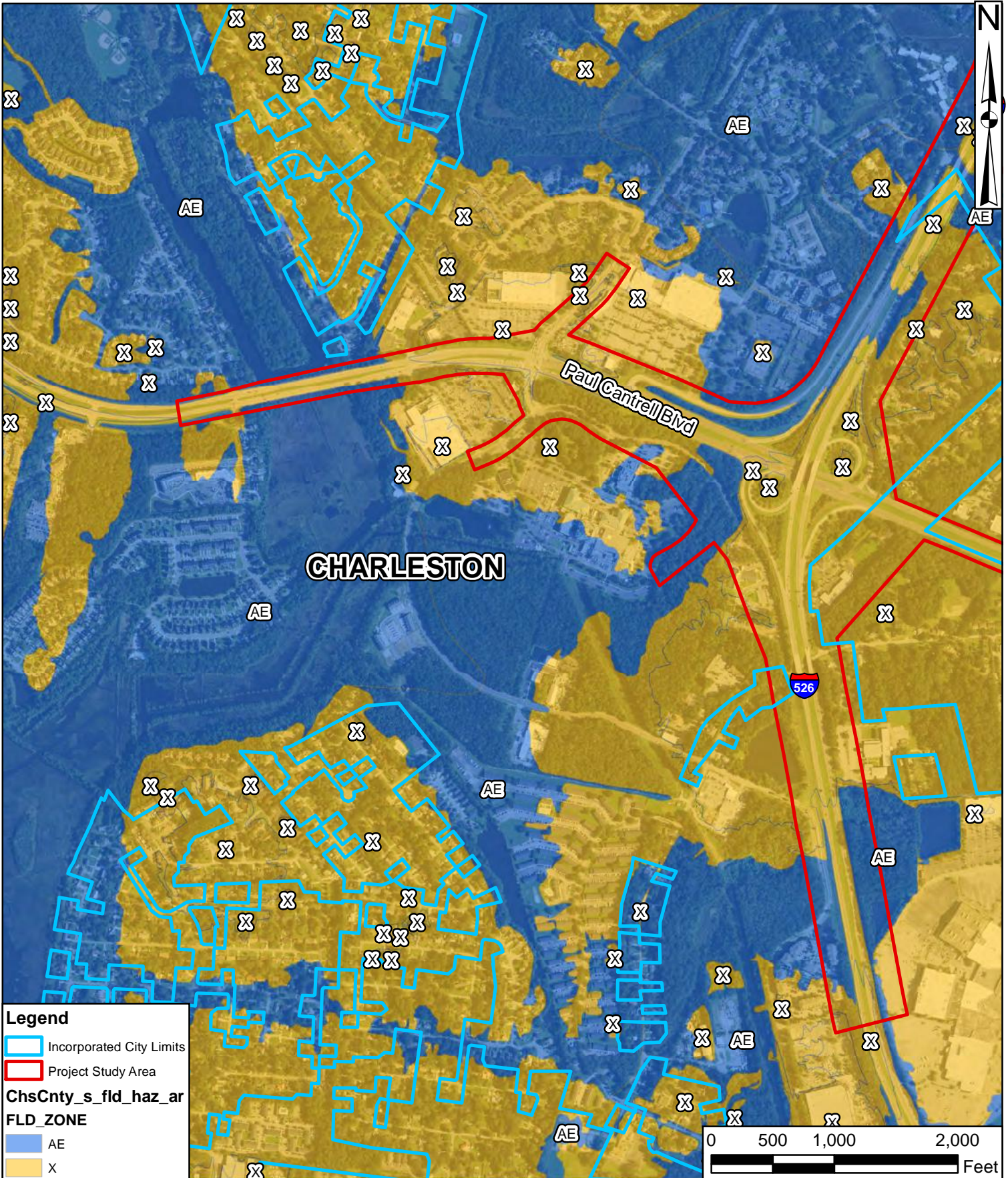
Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
Charleston County  
SCDOT P032102  
October 31 2019

Aquatic Resources

Sheet 85 of 85





**Legend**

- Incorporated City Limits
- Project Study Area

**ChsCnty\_s\_fld\_haz\_ar**

**FLD\_ZONE**

- AE
- X




Source:  
FEMA Floodplain Q3flood  
2019

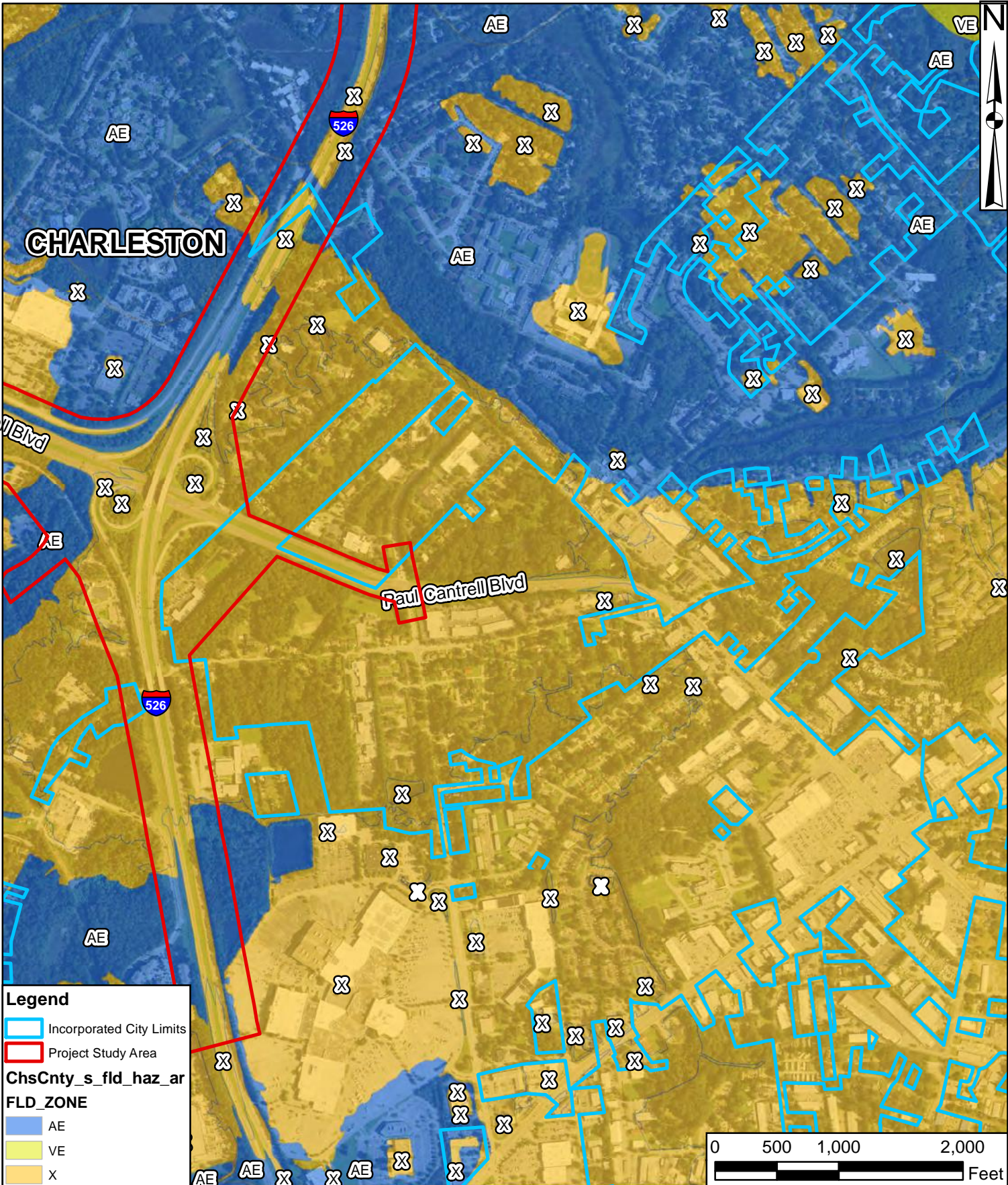
Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

FEMA Floodzones

Figure 9  
Sheet 1 of 11





**Legend**

- Incorporated City Limits
- Project Study Area

**ChsCnty\_s fld haz ar**

**FLD\_ZONE**

- AE
- VE
- X



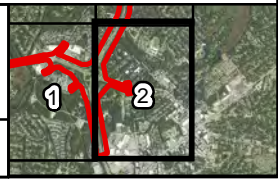

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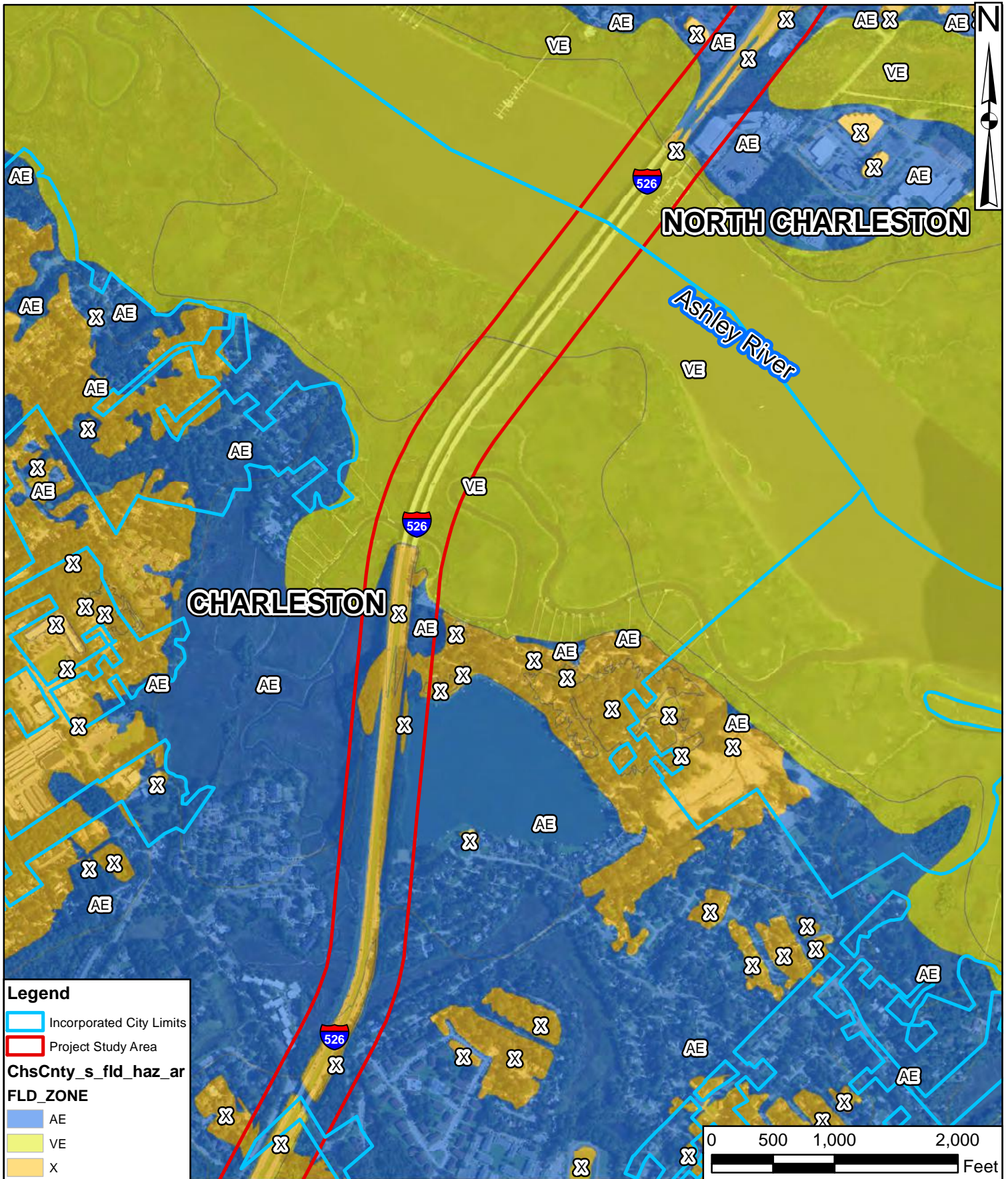
Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

FEMA Floodzones

Figure 9  
Sheet 2 of 11





Source:  
FEMA Floodplain Q3flood  
2019

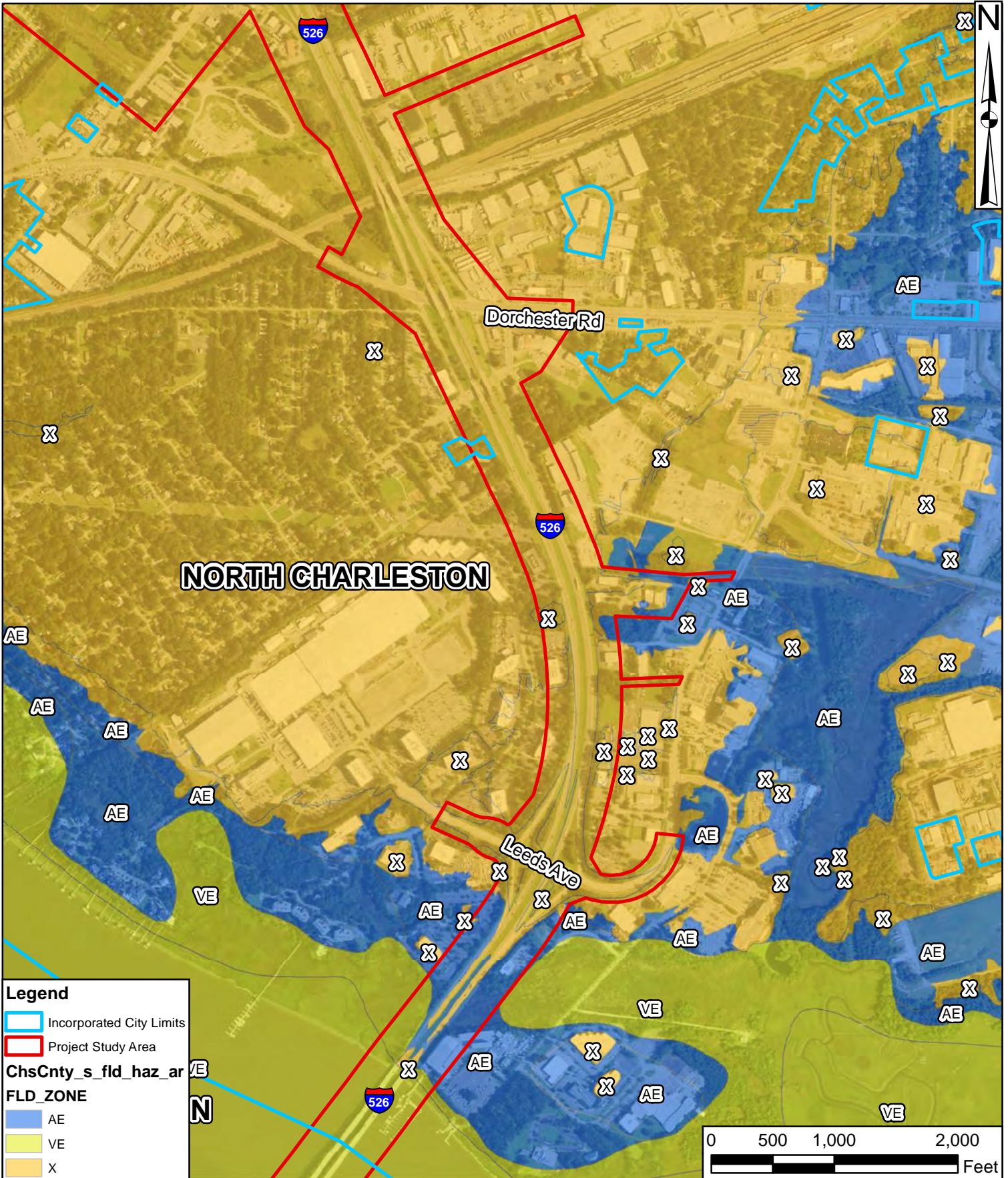
Drawn By: RHH  
QA/QC: KLM

I-526 Lowcountry Corridor West  
Charleston County  
SCDOT P032102  
February 2020

FEMA Floodzones

Figure 9  
Sheet 3 of 11





**Legend**

- Incorporated City Limits
- Project Study Area

**ChsCnty\_s\_fld\_haz\_ar**

**FLD\_ZONE**

- AE
- VE
- X

Source:  
FEMA Floodplain Q3flood  
2019

Drawn By: RHH  
QA/QC: KLM

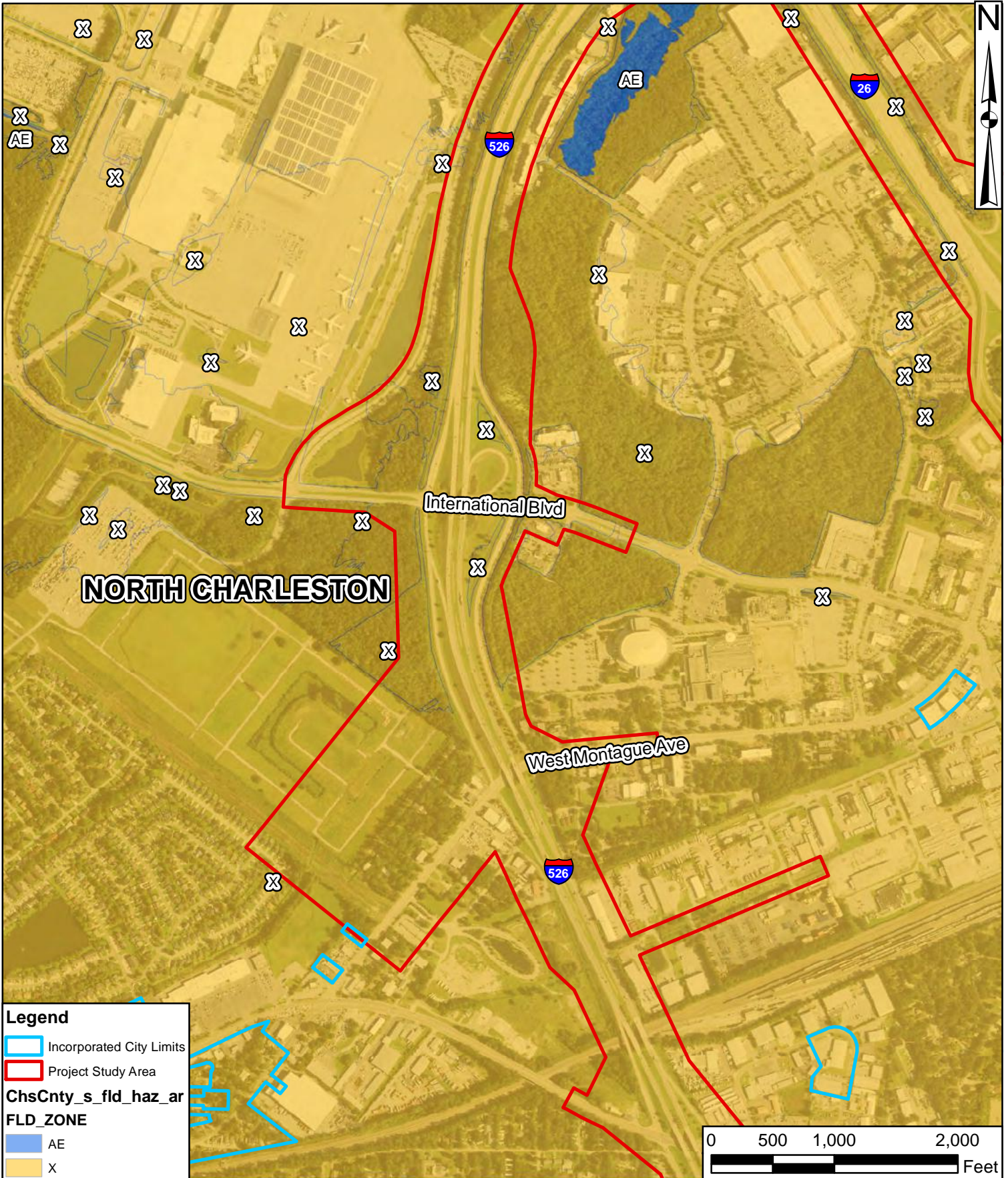
**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

FEMA Floodzones

Figure 9  
Sheet 4 of 11







**Legend**

- Incorporated City Limits
- Project Study Area

**ChsCnty\_s\_fld\_haz\_ar**

**FLD\_ZONE**

- AE
- X




Source:  
FEMA Floodplain Q3flood  
2019

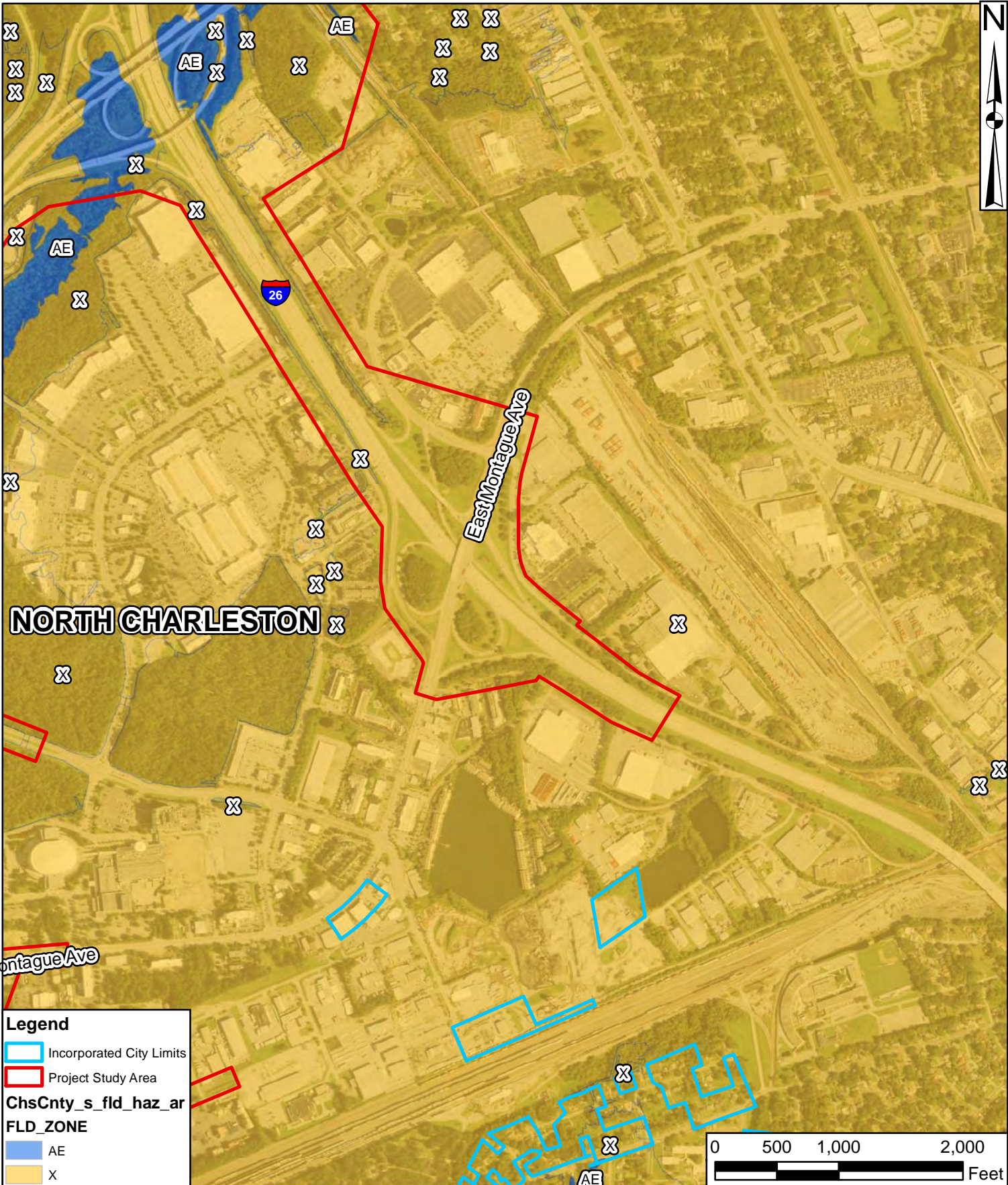
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QA/QC: KLM

**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

FEMA Floodzones

Figure 9  
Sheet 5 of 11





**Legend**

- Incorporated City Limits
- Project Study Area

**ChsCnty\_s\_fld\_haz\_ar**

**FLD\_ZONE**

- AE
- X




Source:  
FEMA Floodplain Q3flood  
2019

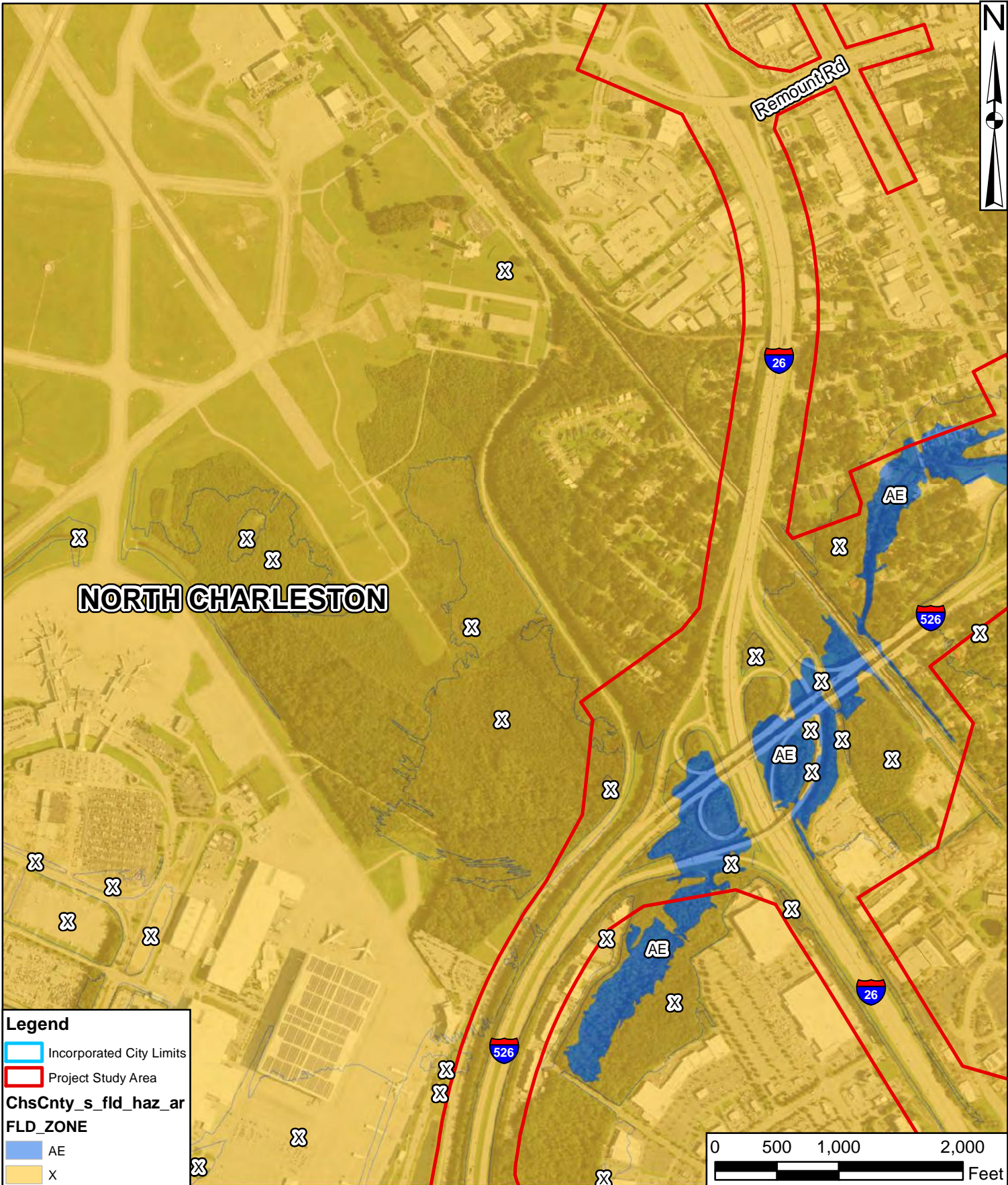
Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

FEMA Floodzones

Figure 9  
Sheet 6 of 11





**Legend**

- Incorporated City Limits
- Project Study Area

**ChsCnty\_s\_fld\_haz\_ar**

**FLD\_ZONE**

- AE
- X




Source:  
FEMA Floodplain Q3flood  
2019

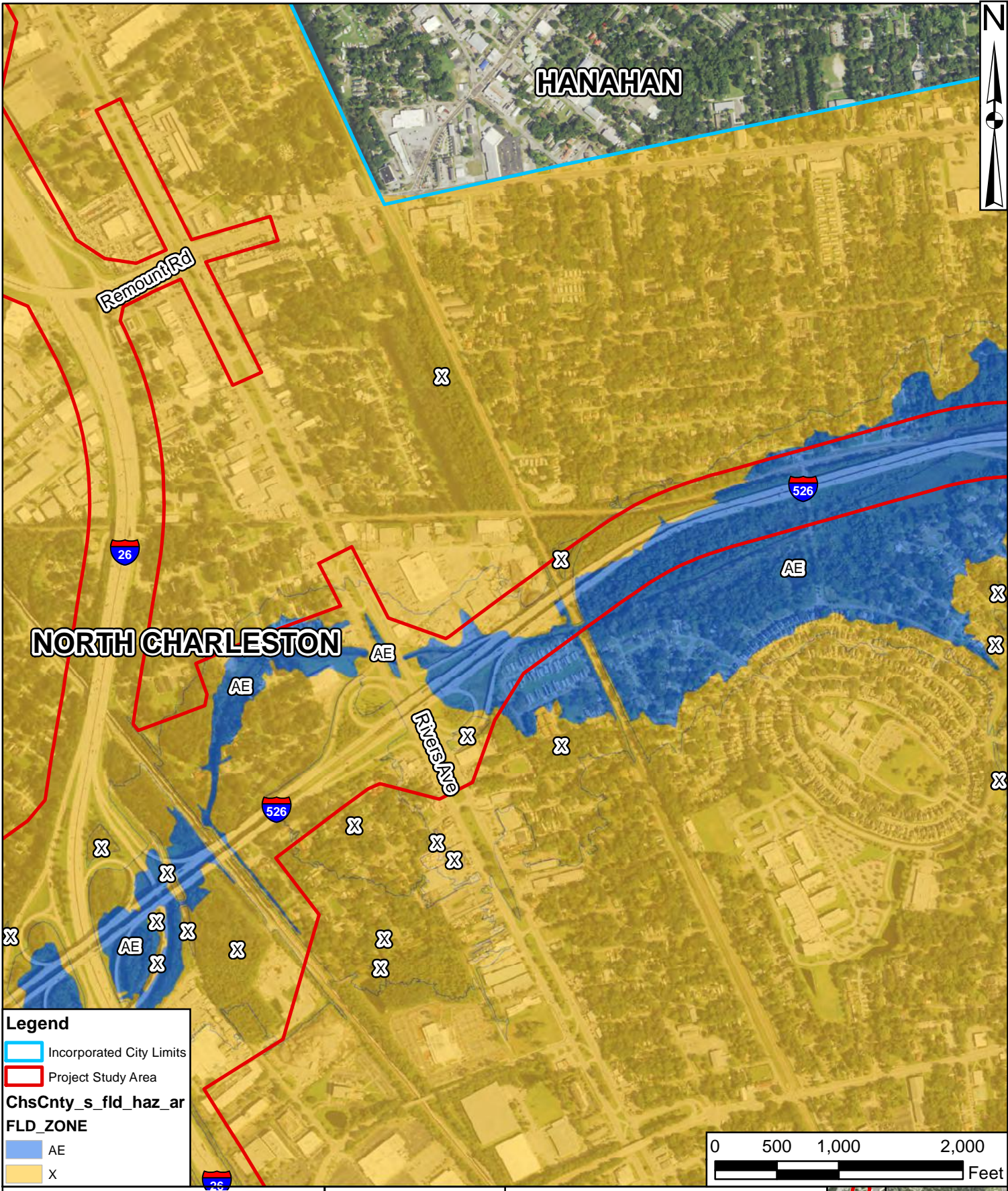
Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

FEMA Floodzones

Figure 9  
Sheet 7 of 11





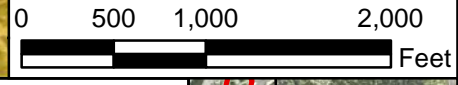
**Legend**

- Incorporated City Limits
- Project Study Area

**ChsCnty\_s\_fld\_haz\_ar**

**FLD\_ZONE**

- AE
- X



Source:  
FEMA Floodplain Q3flood  
2019

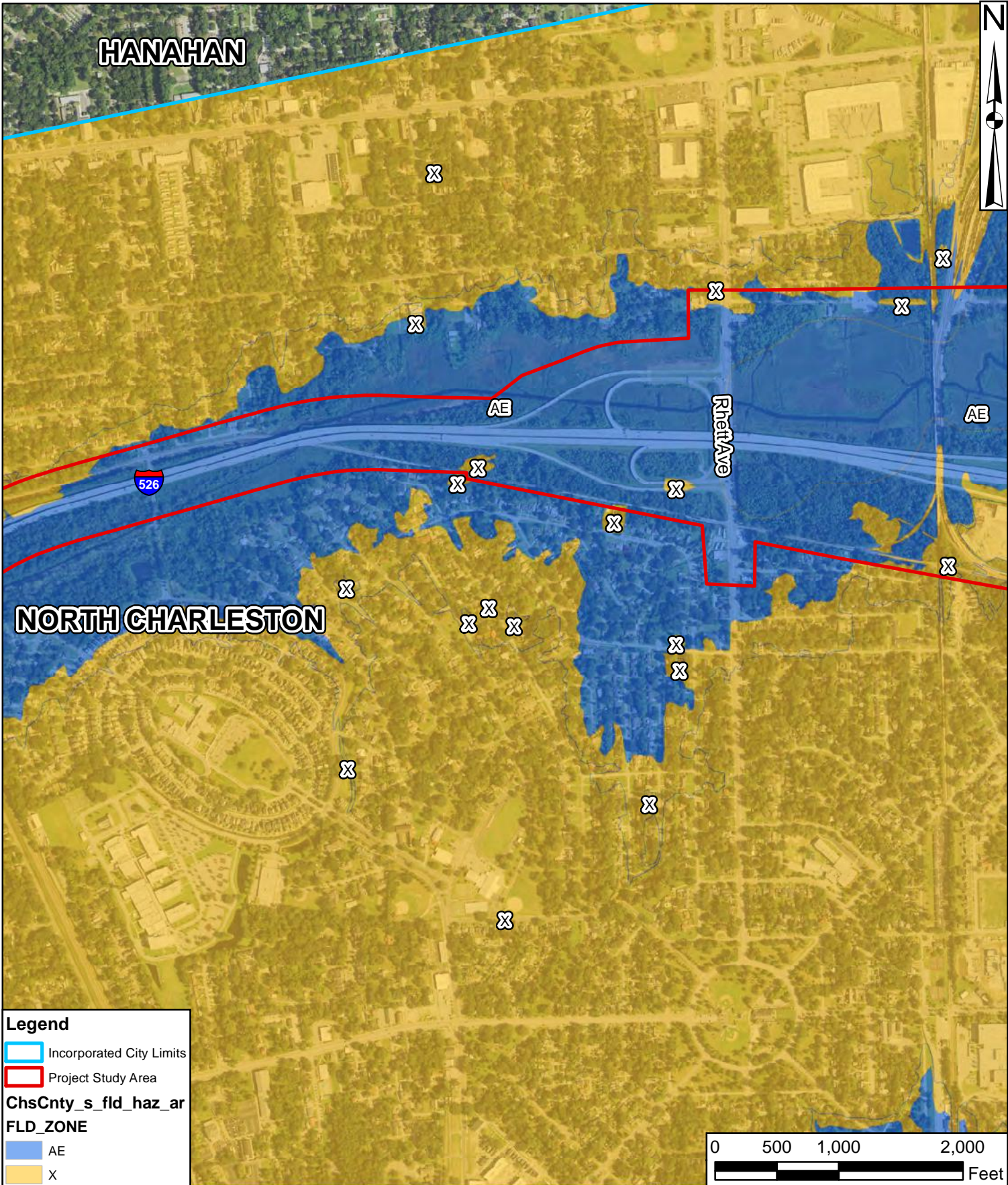
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QA/QC: KLM

**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

FEMA Floodzones

Figure 9  
Sheet 8 of 11





**Legend**

- Incorporated City Limits
- Project Study Area

**ChsCnty\_s\_fld\_haz\_ar**

**FLD\_ZONE**

- AE
- X



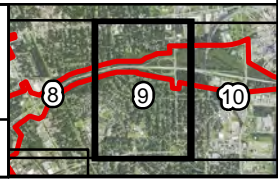

Source:  
FEMA Floodplain Q3flood  
2019

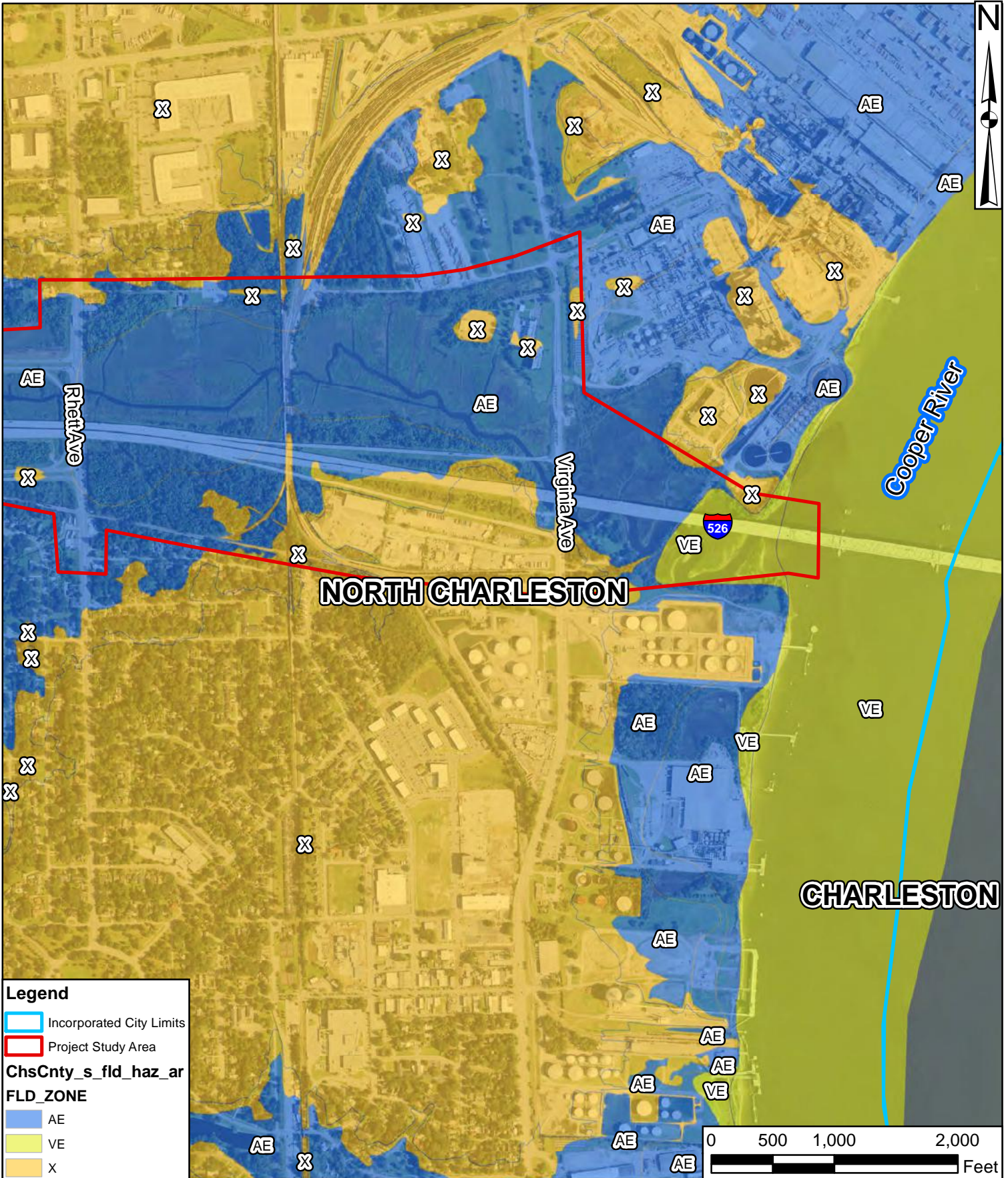
Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

FEMA Floodzones

Figure 9  
Sheet 9 of 11





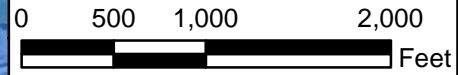
**Legend**

- Incorporated City Limits
- Project Study Area

**ChsCnty\_s\_fld\_haz\_ar**

**FLD\_ZONE**

- AE
- VE
- X



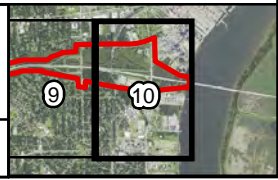
Source:  
FEMA Floodplain Q3flood  
2019

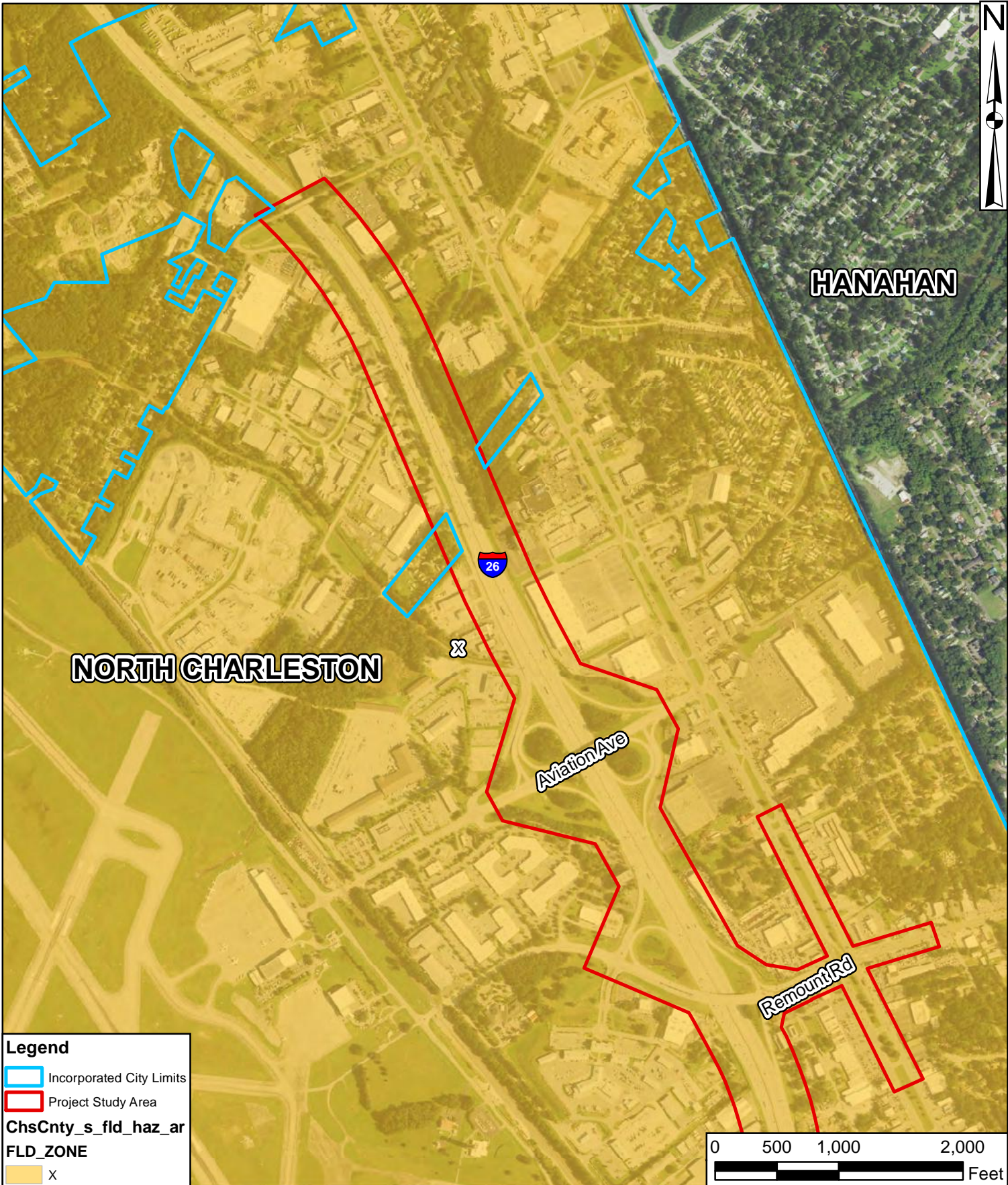
Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

FEMA Floodzones

Figure 9  
Sheet 10 of 11





**Legend**

- Incorporated City Limits
- Project Study Area

**ChsCnty\_s\_fld\_haz\_ar**

**FLD\_ZONE**

- X



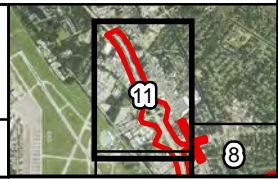

Source:  
FEMA Floodplain Q3flood  
2019

Drawn By: RHH  
QA/QC: KLM

**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

FEMA Floodzones

Figure 9  
Sheet 11 of 11



**APPENDIX B**

**SCDHEC Watershed and Water  
Quality Information**





1/28/2020

## Watershed and Water Quality Information

### General Information

**Applicant Name:** I-526 West Lowcounty Corridor

**Permit Type:** Construction

**Latitude:** 32.8380

**Longitude:** -80.0227

**MS4 Designation:** Small MS4

**Monitoring Station:** RO-14360

**Within Coastal Critical Area:** YES

**Water Classification (Provisional):** SA-SP

**Waterbody Name:** ASHLEY RIVER

**Entered Waterbody Name:**

### Parameter Descriptions

NH3N	Ammonia	FC	Fecal Coliform
CR	Chromium	FCB	Fecal Coliform (Shellfish)
CU	Copper	BIO	Macroinvertebrates (Bio)
HG	Mercury	TP	(Lakes) Phosphorus
NI	Nickel	TN	(Lakes) Nitrogen
PB	Lead	CHLA	(Lakes) Chlorophyll a
ZN	Zinc	ENTERO	(Beach) Enterococcus
DO	Dissolved Oxygen	HGF	Mercury (Fish)
PH	pH	PCB	PCB (Fish)

### Impaired Status (downstream sites)

Station	NH3N	CR	CU	HG	NI	PB	ZN	DO	PH	TURBIDITY	ECOLI	FCB	BIO	TP	TN	CHLA	ENTERO	HGF	PCB
RO-14360	F	F	F	F	F	X	F	F	F	F	X	X	X	X	X	X	F	X	X
MD-052	A	A	A	A	A	X	A	A	A	A	X	X	X	X	X	X	A	X	X
MD-049	A	A	A	A	A	X	A	A	A	A	X	X	X	X	X	X	A	X	X

F = Standards Fully Supported  
N = Standards Not Supported

A = Assessed at Upstream Station  
X = Parameter Not Assessed at Station

T = Within TMDL Approved Watershed

### Parameters to be addressed (those not supporting standards)

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### Fish Consumption Advisory

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### TMDL Information - TMDL Parameters to be addressed

**In TMDL Watershed:** Yes

**TMDL Site:** MD-052

**TMDL Report No:** 0506-13

**TMDL Parameter:** DO

**TMDL Document Link:** [http://www.scdhec.gov/sites/default/files/docs/HomeAndEnvironment/Docs/Chas\\_Hbr\\_DO\\_TMDL.pdf](http://www.scdhec.gov/sites/default/files/docs/HomeAndEnvironment/Docs/Chas_Hbr_DO_TMDL.pdf)

**APPENDIX C**

**USACE Jurisdictional Determination**

**Letter**



**DEPARTMENT OF THE ARMY**  
CHARLESTON DISTRICT, CORPS OF ENGINEERS  
69A HAGOOD AVENUE  
CHARLESTON, SOUTH CAROLINA 29403-5107

October 31, 2019

Regulatory Division

South Carolina Department of Transportation  
Attn: Mr. Sean Connolly  
Post Office Box 191  
Columbia, South Carolina 29202-0191  
ConnollyMS@scdot.org

Dear Mr. Connolly:

This is in response to your request for a Preliminary Jurisdictional Determination (PJD) (SAC-2019-00593) received in our office on July 15, 2019, for a 1,611.97-acre site located along I-526 and I-26, Charleston County, South Carolina. Along I-526 the project extends on the extern extent from the Cooper River near Virginia Avenue and continues west past Glenn McConnell Parkway and Paul Cantrell Boulevard, ending adjacent to the Citadel Mall. The north and south extent of the project extends from 108-ft north of Eagle Drive to 2,030-ft south of West Montague Drive, along I-26. (Center of project: Latitude: 32.883452°, Longitude: -80.019879°). A PJD is used to indicate the approximate location(s) and boundaries of wetlands and/or other aquatic resources presumed to be waters of the United States on a site pursuant to Section 404 of the Clean Water Act (CWA) (33 U.S.C. § 1344) and/or navigable waters of the United States pursuant to Section 10 of the Rivers and Harbors Act of 1899 (RHA) (33 U.S.C. § 403).

The site is shown on the referenced depictions, sheets 1 through 6 of 6, entitled "I-526 Lowcountry Corridor West Grid Index Layout" and dated October 31, 2019, and sheets 1 through 85 of 85, entitled "I-526 Lowcountry Corridor Aquatic Resources" and dated October 31, 2019, both prepared by Civil Engineering Consulting Services, Inc. Based upon on-site inspections, a review of aerial photography, topographic maps, National Wetlands Inventory maps, LiDar depictions, soil survey information, and Wetland Determination Data Forms, we conclude the boundaries shown on the referenced depiction are a reasonable approximation of the aquatic resources found within the site that are presumed to be subject to regulatory jurisdiction of the Corps of Engineers. While the project area expected to be evaluated in the permit application will encompass a project area of 1673.52 acres, 61.55 acres of that area is not included in this PJD as that area is subject to Department of the Army Permit SAC-2004-13767 (Boeing). Therefore, the project area evaluated in this PJD includes an area of 1,611.97 acres. The project area in question contains approximately 119.79 acres of federally defined wetlands and approximately 6.89 acres of open water and approximately 9.46 acres (or 28,390.01 linear feet) of other aquatic resources that are presumed to be waters of the United States subject to Corps' jurisdiction under Section 404 of the CWA. The site also contains 203.98 acres of federally defined wetlands and 13.25 acres of open water that are presumed to be waters of the United States subject to Corps' jurisdiction under Section 404 of the CWA and are also navigable waters of the United States subject to Corps' jurisdiction under Section 10 of the RHA.

You are cautioned the boundaries of the delineated wetlands and/or other aquatic resources presumed to be subject to regulatory jurisdiction of the Corps of Engineers shown on the attached depiction are approximate and subject to change.

By providing this PJD, the Corps of Engineers is making no legally binding determination of any type regarding whether jurisdiction exists over the particular aquatic resource(s) in question. This PJD is not a definitive determination of the presence or absence of areas within the Corps of Engineers' jurisdiction, and, therefore, it does not have an expiration date. Also note this PJD is not an appealable action under the Corps of Engineers' administrative appeal procedures defined at 33 CFR 331 as it is not a final action. A PJD is "preliminary" in the sense that a recipient of a PJD can later request and obtain an Approved Jurisdictional Determination (AJD) for a definitive, official determination of the presence or absence of jurisdictional aquatic resources on a site, including the identification of the geographic limits of the jurisdictional aquatic resources. To receive a definitive determination of jurisdiction, you must submit an AJD request.

Be aware a permit from this office may be required for certain activities in the areas identified as wetlands and/or other aquatic resources that are presumed to be subject to regulatory jurisdiction of the Corps of Engineers. These areas may further be subject to restrictions or requirements of other state or local government agencies. A PJD may be used as the basis of a permit decision however, when computing impacts, compensatory mitigation requirements, and other resource protection measures, a permit decision made on the basis of a PJD will treat all aquatic resources affected in any way by the permitted activity as jurisdictional. If you intend to request an AJD in the future, you are advised not to commence work in these wetlands and/or other aquatic resources presumed to be jurisdictional prior to receiving the AJD. Attached is a Preliminary Jurisdictional Determination Form describing the areas in question and clarifying the option to request an AJD.

If you submit a permit application as a result of this PJD, include a copy of this letter and the referenced depictions as part of the application. Not submitting the letter and depiction will cause a delay while we confirm a PJD was performed for the proposed permit project area. Note that some or all of these areas may be regulated by other state or local government entities, and you should contact the South Carolina Department of Health and Environmental Control, Bureau of Water, or Department of Ocean and Coastal Resource Management, to determine the limits of their jurisdiction.

This PJD was conducted to identify approximate location(s) of aquatic resources presumed to be subject to regulatory jurisdiction of the Corps of Engineers on the particular site identified in this request. This PJD may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work.

Attached is a copy of the Preliminary Jurisdictional Determination Form signed by our office. Please sign, retain a copy for your records, and return a signed copy to this office within 30 days of receipt of this letter.

In all future correspondence, please refer to file number SAC-2019-00593. A copy of this letter is being forwarded to State and/or Federal agencies for their information. If you have any questions, please contact Christopher Mims by phone at 843-329-8154, or by email at Christopher.D.Mims@usace.army.mil.

Sincerely,

 Date: 2019.10.31  
15:46:41 -04'00'

Amanda L. Heath  
Chief, Special Projects Branch

Attachments:

Preliminary Jurisdictional Determination Form  
Notification of Appeal Options  
Delineation depiction: Titled "I-95 Bridge Replacement over Bagshaw Swamp", and dated August 2019

Copies Furnished:

South Carolina Department of Transportation  
Attn: Mr. Will McGoldrick  
Post Office Box 191  
Columbia, South Carolina 29202-0191  
BeckhamJC@scdot.org

Civil Engineering Consulting Services, Inc.  
Attn: Mr. Robert Hibbitts  
2000 Park Street, Suite 201  
Columbia, South Carolina 29201  
hibbittsr@cecsinc.com

Three Oaks Engineering  
Attn: Russell Chandler  
1310 Lady Street, Suite 400  
Columbia, South Carolina 29201  
russell.chandler@threeoaksengineering.com

SCDHEC - Bureau of Water  
2600 Bull Street  
Columbia, South Carolina 29201  
WQCWetlands@dhec.sc.gov

SCDHEC - OCRM  
1362 McMillan Avenue, Suite 400  
North Charleston, South Carolina 29405  
OCRMPermitting@dhec.sc.gov

**Appendix 2 - PRELIMINARY JURISDICTIONAL DETERMINATION (PJD) FORM**

**BACKGROUND INFORMATION**

**A. REPORT COMPLETION DATE FOR PJD:** October 31, 2019

**B. NAME AND ADDRESS OF PERSON REQUESTING PJD:**

**Applicant:**

South Carolina Department of  
Transportation  
Attn: Mr. Will McGoldrick  
955 Park Street  
Columbia, South Carolina 29201  
McGoldriWR@scdot.org

**Consultant**

Civil Engineering Consulting Services, Inc.  
Attn: Mr. Robert Hibbitts  
2000 Park Street, Suite 201  
Columbia, South Carolina 29201  
hibbittsr@cecsinc.com

**C. DISTRICT OFFICE, FILE NAME, AND NUMBER:** Charleston District, SCDOT I-526 and I-26 Lowcountry Corridor West in Charleston County Project ID P032102, SAC-2019-00593

**D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION:** The project is located largely along I-526 and I-26. Along I-526 the project extends on the eastern extent from the Cooper River near Virginia Avenue and continues west past Glenn McConnell Parkway and Paul Cantrell Boulevard and ends adjacent to the Citadel Mall. The north and south extent of the project extends from 108-ft north of Eagle Drive to 2,030-ft south of West Montague Drive, along I-26.

On behalf of the applicant, the South Carolina Department of Transportation, Civil Engineering Consulting Services, and Three Oaks Engineering prepared documentation in support of the preliminary presumption of jurisdiction described herein by this office. This Preliminary Jurisdictional Determination has been prepared in support of an in advance of an anticipated permit application for the widening and improvement of the existing Interstate 526 and Interstate 26, within the above referenced project location. While the project area expected to be evaluated in the permit application will encompass a project area of 1673.52 acres, 61.55 acres of that area is not included in this PJD as that area is subject to Department of the Army Permit number SAC-2004-13767 (Boeing). The project area evaluated in this PJD includes an area of 1,611.97 acres.

**(USE THE TABLE BELOW TO DOCUMENT MULTIPLE AQUATIC RESOURCES AND/OR AQUATIC RESOURCES AT DIFFERENT SITES)**

State: South Carolina      County/parish/borough: Charleston      City: Charleston

Center coordinates of site (lat/long in degree decimal format):

Lat.: 32.883452°      Long.: -80.019879°

Locations of project termini:

Termini Location	Latitude	Longitude
East I-526	32.891526°	-79.966103°
West I-526	32.79735°	-80.034977°
North I-26	32.915766°	-80.031441°
South I-26	32.868551°	-80.006186°

Universal Transverse Mercator:

Name of nearest waterbody: Ashley River, Cooper River, Filbin Creek

**E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):**

Office (Desk) Determination. Date: October 31, 2019

Field Determination. Date(s): August 28, 2019, September 16, 2019, September 18, 2019, September 20, 2019.

**TABLE OF AQUATIC RESOURCES IN REVIEW AREA WHICH “MAY BE” SUBJECT TO REGULATORY JURISDICTION.**

**1A. Freshwater Wetlands (area of waters in acres unless otherwise indicated)**

Site number	Latitude (decimal degrees)	Longitude (decimal degrees)	Estimated amount of aquatic resource in review area (acreage and linear feet, if applicable)	Type of aquatic resource (i.e., wetland vs. non-wetland waters)	Geographic authority to which the aquatic resource “may be” subject (i.e., Section 404 or Section 10/404)
Wetland FA-1	32.810982	-80.052325	0.06	PFO	Section 404
Wetland FA-2	32.811417	-80.049709	0.49	PEM	Section 404
Wetland FA-3A	32.913783	-80.042550	0.04	PFO	Section 404
Wetland FA-3B	32.814413	-80.041902	0.11	PFO	Section 404
Wetland FB-1	32.809749	-80.040036	0.17	PEM	Section 404
Wetland FB-2	32.809485	-80.039749	0.93	PFO	Section 404
Wetland FB-3	32.809869	-80.038892	0.95	PFO	Section 404
Wetland FC-1	32.808074	-80.039532	3.50	PFO	Section 404
Wetland FD-1	32.810785	-80.038640	0.12	PFO	Section 404
Wetland FE-1	32.807052	-80.035022	4.47	PFO	Section 404
Wetland FF-1	32.802420	-80.035449	0.75	PFO	Section 404
Wetland FF-2	32.801659	-80.035198	0.25	PFO	Section 404
Wetland FF-3	32.800642	-80.035258	0.86	PFO	Section 404
Wetland FG-1	32.800238	-80.036479	0.50	PFO	Section 404
Wetland FG-2	32.825671	-80.029449	0.08	PFO	Section 404
Wetland FH-1A	32.813981	-80.034911	2.32	PEM	Section 404
Wetland FH-1B	32.913981	-80.034911	0.23	PFO	Section 404
Wetland FH-2	32.820140	-80.030219	0.42	PFO	Section 404
Wetland FI-1	32.820140	-80.030219	0.42	PFO	Section 404
Wetland FI-2	32.815408	-80.032262	0.18	PFO	Section 404
Wetland FI-3	32.816172	-80.031760	1.04	PFO	Section 404
Wetland FJ-1	32.817381	-80.032461	0.67	PFO	Section 404
Wetland FK-1	32.839325	-80.020128	0.47	PFO	Section 404
Wetland FL-2	32.857973	-80.023789	0.03	PEM	Section 404
Wetland FM-1	32.860479	-80.031146	0.25	PFO	Section 404
Wetland FN-1	32.866115	-80.026141	3.40	PFO	Section 404
Wetland FN-2	32.865978	-80.028411	1.28	PFO	Section 404
Wetland FN-3	32.868043	-80.023437	0.53	PFO	Section 404

SAC 2019-00593 Lowcountry Corridor West Widening (Highway 526 and 26)

Wetland FN-4	32.868534	-80.023210	0.68	PFO	Section 404
Wetland FO-1	32.872495	-80.027481	2.33	PFO	Section 404
Wetland FO-5	32.874086	-80.257200	24.77	PFO	Section 404
Wetland FO-6	32.877838	-80.025986	0.99	PFO	Section 404
Wetland FO-7	32.880685	-80.024038	1.52	PFO	Section 404
Wetland FP-1	32.882852	-80.017717	11.84	PFO	Section 404
Wetland FP-5	32.882890	-80.015424	0.31	PFO	Section 404
<b>1A. Freshwater Wetlands</b>					
Wetland FP-8	32.886235	-80.017516	5.58	PFO	Section 404
Wetland FQ-1A	32.899072	-80.022033	0.56	PEM	Section 404
Wetland FQ-1B	32.901005	-80.021325	0.36	PEM	Section 404
Wetland FR-1	32.912566	-80.028194	0.11	PFO	Section 404
Wetland FR-2	32.914086	-80.028842	0.05	PFO	Section 404
Wetland FS-1	32.889525	-80.015181	0.05	PEM	Section 404
Wetland FS-2A	32.890035	-80.015271	0.24	PEM	Section 404
Wetland FS-2B	32.889317	-80.016318	1.38	PFO	Section 404
Wetland FT-1	32.889329	-80.010560	0.12	PEM	Section 404
Wetland FT-2	32.889059	-80.009476	1.49	PEM	Section 404
Wetland FU-1	32.891298	-80.005928	7.93	PFO/PEM	Section 404
Wetland FU-2	32.890349	-80.007111	0.02	PEM	Section 404
Wetland FV-1	32.894168	-79.996537	113.72	PFO/PEM	Section 404/10
Wetland FV-1A	32.893575	-79.997256	10.60	PFO	Section 404
Wetland FW-1	32.847254	-80.016957	0.44	PFO	Section 404
Wetland FW-2	32.847575	-80.018537	0.61	PFO	Section 404
Wetland FW-6	32.886091	-80.886091	0.18	PFO	Section 404
Wetland FW-8	32.885638	-80.019219	0.21	PFO	Section 404
Wetland FZ-1	32.869414	-80.010169	0.12	PFO/PEM	Section 404
Wetland WWAB	32.897820	-79.974097	0.09	PEM	Section 404
Wetland WWAA	32.897645	-79.974885	0.17	PEM	Section 404
Wetland WAC	32.893336	-79.975259	3.02	PSS	Section 404
Wetland WWA	32.893613	-79.986402	0.22	PFO	Section 404
Wetland WAD	32.893743	-79.988457	0.21	PFO	Section 404
Wetland WAB	32.893173	-79.973691	0.21	PEM	Section 404
Wetland WWC	32.893143	-79.989387	0.12	PFO	Section 404
Wetland WWB	32.892730	-79.986320	1.13	PFO	Section 404
Wetland WRAR	32.897399	-79.980520	0.26	PFO	Section 404
Wetland WRV	32.893110	-79.983903	4.81	PFO	Section 404
Wetland WAE	32.894017	-79.978105	2.54	PFO	Section 404
Wetland WTA	32.896447	-79.986076	0.95	PFO	Section 404
Wetland WJV	32.897168	-79.974366	2.08	PFO	Section 404
Wetland WJY	32.893884	-79.990779	1.35	PFO	Section 404
Wetland WJU	32.897402	-79.977252	0.28	PFO	Section 404
Wetland WRS	32.893472	-79.980931	2.52	PFO	Section 404
Wetland WRU	32.893546	-79.982492	1.53	PFO	Section 404
Wetland WJX	32.893119	-79.979504	0.91	PFO	Section 404
Wetland WJT	32.895280	-79.973786	0.09	PFO	Section 404
Wetland WTZ	32.891302	-79.978222	0.29	PFO	Section 404



**1B. Critical Area Wetlands**

<b>Site number</b>	<b>Latitude (decimal degrees)</b>	<b>Longitude (decimal degrees)</b>	<b>Estimated amount of aquatic resource in review area (acreage and linear feet, if applicable)</b>	<b>Type of aquatic resource (i.e., wetland vs. non- wetland waters)</b>	<b>Geographic authority to which the aquatic resource "may be" subject (i.e., Section 404 or Section 10/404)</b>
Wetland CW-1B	32.811925	-80.050012	0.35	E2EM	Section 10 tidal
Wetland CW-1C	32.819614	-80.031591	5.88	E2EM	Section 10 tidal
Wetland CW-1E	32.823806	-80.031133	0.64	E2EM	Section 10 tidal
Wetland CW-2H	32.832757	-80.026918	16.43	E2EM	Section 10 tidal
Wetland CW-1I	32.838385	-80.022346	3.76	E2EM	Section 10 tidal
Wetland CW-1J	32.838772	-80.020506	2.30	E2EM	Section 10 tidal
Wetland CW-2C	32.818520	-80.030525	3.00	E2EM	Section 10 tidal
Wetland CW-1G	32.826757	-80.029174	1.86	E2EM	Section 10 tidal
Wetland CW-2G	32.827699	-80.030218	5.71	E2EM	Section 10 tidal
Wetland CW-1H	32.830243	-80.028896	11.88	E2EM	Section 10 tidal
Wetland CART	32.891433	-79.965432	38.45	E2EM	Section 10 tidal

**1C. Non-wetlands waters (Freshwater Streams)**

<b>Site number</b>	<b>Latitude (decimal degrees)</b>	<b>Longitude (decimal degrees)</b>	<b>Estimated amount of aquatic resource in review area (acreage and linear feet, if applicable)</b>	<b>Type of aquatic resource (i.e., wetland vs. non- wetland waters)</b>	<b>Geographic authority to which the aquatic resource “may be” subject (i.e., Section 404 or Section 10/404)</b>
Non-wetlands waters FS-B1	32.806277	-80.037764	0.03 Acres/198.35 LF	R3UB	Section 404
Non-wetlands waters FS-C1	32.808298	-80.039691	0.31 Acres/1011.36 LF	R3UB	Section 404
Non-wetlands waters FS-D1	32.816979	-80.030525	0.04 Acres/95.16 LF	R3UB	Section 404
Non-wetlands waters FS-F1	32.859455	-80.020988	0.31 Acres/1575.16 LF	R3UB	Section 404
Non-wetlands waters FS-G1	32.860706	-80.031301	0.10 Acres/207.35 LF	R3UB	Section 404
Non-wetlands waters FS-G2	32.860027	-80.030486	0.01 Acres/485.54 LF	R3UB	Section 404
Non-wetlands waters FS-H1A	32.887423	-80.014750	4.14 Acres/8831.15 LF	R2UB	Section 404
Non-wetlands waters FS-H1B	32.894836	-79.995179	7.24 Acres/9204.92 LF	R2UB	Section 10/404
Non-wetlands waters FS-H2	32.878957	-80.017639	1.25 Acres/4568.80 LF	R3UB	Section 404
Non-wetlands waters FS-H3	32.878682	-80.016210	1.38 Acres/3028.81 LF	R3UB	Section 404
Non-wetlands waters FS-H4	32.882983	-80.016239	0.29 Acres/1236.77 LF	R3UB	Section 404
Non-wetlands waters FS-H5	32.884010	-80.015183	0.45 Acres/1278.41 LF	R3UB	Section 404
Non-wetlands waters FS-H7	32.888053	-80.018283	0.03 Acres/1081.98 LF	R3UB	Section 404
Non-wetlands waters FS-H8	32.890083	-80.014732	0.01 Acres/115.31 LF	R3UB	Section 404
Non-wetlands waters FS-H9	32.889516	-80.008745	0.05 Acres/264.60 LF	R3UB	Section 404
Non-wetlands waters FS-H10	32.890998	-80.007257	0.08 Acres/560.97 LF	R3UB	Section 404
Non-wetlands waters FS-H11	32.892436	-80.004275	0.09 Acres/590.61 LF	R3UB	Section 404
Non-wetlands waters FS-H12	32.893201	-80.000842	0.09 Acres/500.05 LF	R3UB	Section 404
Non-wetlands waters FS-J1	32.905371	-80.025474	0.06 Acres/144.98 LF	R3UB	Section 404
Non-wetlands waters FS-K2	32.912821	-80.028571	0.01 Acres/68.72 LF	R3UB	Section 404
Non-wetlands waters FS-L1	32.846030	-80.016313	0.12 Acres/625.65 LF	R3UB	Section 404
Non-wetlands waters FS-L2	32.848389	-80.015042	0.14 Acres/764.18 LF	R3UB	Section 404
Non-wetlands waters FS-L3	32.847671	-80.016144	0.24 Acres/851.18 LF	R3UB	Section 404
Non-wetlands waters FS-L4	32.848383	-80.016145	0.02 Acres/174.53 LF	R3UB	Section 404
Non-wetlands waters WRAR	32.897404	-79.980409	0.21 Acres/130.39 LF	R3UB	Section 404

**1D. Non-wetlands waters (Tidal Stream Section 10)**

<b>Site number</b>	<b>Latitude (decimal degrees)</b>	<b>Longitude (decimal degrees)</b>	<b>Estimated amount of aquatic resource in review area (acreage and linear feet, if applicable)</b>	<b>Type of aquatic resource (i.e., wetland vs. non- wetland waters)</b>	<b>Geographic authority to which the aquatic resource “may be” subject (i.e., Section 404 or Section 10/404)</b>
Non-wetlands waters TCS-A1	32.818701	-80.030554	0.15 Acres/632.43 LF	R1UB	Section 10 tidal
Non-wetlands waters TCS-A2	32.820628	-80.030018	0.03 Acres/237.85 LF	R1UB	Section 10 tidal
Non-wetlands waters TCS-B1	32.820474	-80.03137	0.70 Acres/1405.30 LF	R1UB	Section 10 tidal
Non-wetlands waters TCS-C1	32.828709	-80.029313	1.52 Acres/1368.48 LF	R1UB	Section 10 tidal
Non-wetlands waters TCS-D1	32.831419	-80.028144	0.78 Acres/966.12 LF	R1UB	Section 10 tidal
Non-wetlands waters TCS-E1	32.835725	-80.02419	21.08 Acres/604.40 LF	R1UB	Section 10 tidal
Non-wetlands waters TCS-F1	31.83858	-80.022031	0.15 Acres/769.21 LF	R1UB	Section 10 tidal
Non-wetlands waters FS-H1C	32.891519	-79.96913	6.01 Acres/3575.42 LF	R1UB	Section 10 tidal

**1E. Non-wetlands waters (Open Water)**

Site number	Latitude (decimal degrees)	Longitude (decimal degrees)	Estimated amount of aquatic resource in review area (acreage and linear feet, if applicable)	Type of aquatic resource (i.e., wetland vs. non- wetland waters)	Geographic authority to which the aquatic resource “may be” subject (i.e., Section 404 or Section 10/404)
Non-wetlands waters OA-1	32.803143	-80.037074	1.18	PUB	Section 404
Non-wetlands waters OC-1	32.799758	-80.034826	0.85	PUB	Section 404
Non-wetlands waters OG-1	32.887742	-80.016675	0.07	PUB	Section 404
Non-wetlands waters OH-1	32.845472	-80.018373	0.33	PUB	Section 404
Non-wetlands waters OB-1	32.799396	-80.036230	0.40	PUB	Section 404
Non-wetlands waters OE-1	32.843151	-80.019301	0.25	PUB	Section 404
Non-wetlands waters OF-1	32.842453	-80.017500	0.03	PUB	Section 404
Non-wetlands waters OJ-1	32.873874	-80.014181	0.21	PUB	Section 404
Non-wetlands waters OD-1	32.823633	-80.029503	3.38	PUB	Section 404
Non-wetlands waters OZ-1	32.881873	-80.014745	0.19	PUB	Section 404

- 1) The Corps of Engineers believes that there may be jurisdictional aquatic resources in the review area, and the requestor of this PJD is hereby advised of his or her option to request and obtain an approved JD (AJD) for that review area based on an informed decision after having discussed the various types of JDs and their characteristics and circumstances when they may be appropriate.
- 2) In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring “pre-construction notification” (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an AJD for the activity, the permit applicant is hereby made aware that: (1) the permit applicant has elected to seek a permit authorization based on a PJD, which does not make an official determination of jurisdictional aquatic resources; (2) the applicant has the option to request an AJD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an AJD could possibly result in less compensatory mitigation being required or different special conditions; (3) the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) undertaking any activity in reliance upon the subject permit authorization without requesting an AJD constitutes the applicant’s acceptance of the use of the PJD; (6) accepting a permit

authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a PJD constitutes agreement that all aquatic resources in the review area affected in any way by that activity will be treated as jurisdictional, and waives any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an AJD or a PJD, the JD will be processed as soon as practicable. Further, an AJD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331. If, during an administrative appeal, it becomes appropriate to make an official determination whether geographic jurisdiction exists over aquatic resources in the review area, or to provide an official delineation of jurisdictional aquatic resources in the review area, the Corps will provide an AJD to accomplish that result, as soon as is practicable. This PJD finds that there “*may be*” waters of the U.S. and/or that there “*may be*” navigable waters of the U.S. on the subject review area, and identifies all aquatic features in the review area that could be affected by the proposed activity, based on the following information:

**SUPPORTING DATA. Data reviewed for PJD (check all that apply)**

Checked items should be included in subject file. Appropriately reference sources below where indicated for all checked items:

- Maps, plans, plots or plat submitted by or on behalf of the PJD requestor: Map: Civil Engineering Consulting Services, Inc.
- Data sheets prepared/submitted by or on behalf of the PJD requestor.
  - Office concurs with data sheets/delineation report. (This office does not necessarily concur with all of the data provided on the provided data sheets, however this office concurs with the conclusion reached.
  - Office does not concur with data sheets/delineation report. Rationale: NA
- Data sheets prepared by the Corps: NA
- Corps navigable waters’ study:
  - U.S. Geological Survey Hydrologic Atlas:
  - USGS NHD data. USGS 8 and 12-digit HUC maps – HUC 030502010605 Lower Ashley River; 030502020202 Stono River- Atlantic Intracoastal waterway; 030502010707 Lower Cooper River; 030502010706 Goose Creek
- U.S. Geological Survey map(s). Cite scale & quad name: 1:24,000 – Johns Island, Ladson, North Charleston.
- Natural Resources Conservation Service Soil Survey. Citation: Charleston County Soil Survey (SC690) 1971.
- National wetlands inventory map(s). Cite name: USFWS, Charleston County
- State/local wetland inventory map(s):
- FEMA/FIRM maps:
- 100-year Floodplain Elevation is: (National Geodetic Vertical Datum of 1929)

SAC 2019-00593 Lowcountry Corridor West Widening (Highway 526 and 26)

- Photographs:  Aerial (Name & Date): Aerial Photos obtained online by Google, Inc. Aerial infrared photos by SCDNR 2006, Aerial photos provided by consultant, LiDar imaged provided by the consultant.
- Other (Name & Date): Photos provided by consultant in PJD
- Previous determination(s). File no. and date of response letter: SAC 2004-13767
- Other information (please specify): Site visits as cited above.

**IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.**



Digitally signed by  
MIMS, CHRISTOPHER.DALE.1289  
378282  
Date: 2019.10.31 15:40:52 -04'00'

Signature and date of  
Regulatory staff member  
completing PJD

\_\_\_\_\_  
Signature and date of  
person requesting PJD  
(REQUIRED, unless obtaining the  
signature is impracticable)<sup>1</sup>

<sup>1</sup> Districts may establish timeframes for requestor to return signed PJD forms. If the requestor does not respond within the established time frame, the district may presume concurrence and no additional follow up is necessary prior to finalizing an action.

**APPENDIX D**

**USFWS Letter of Intent Response**

**USFWS Charleston County Protected**

**Species List**



## United States Department of the Interior

### FISH AND WILDLIFE SERVICE

176 Croghan Spur Road, Suite 200  
Charleston, South Carolina 29407



February 1, 2016

Mr. Chad Long  
NEPA Coordinator  
South Carolina Department of Transportation  
P.O. Box 191  
Columbia, SC 29202-0191

Re: Letter of Intent, I-526 Widening, SCDOT Project ID: P027507, Charleston County, SC  
FWS Log No. 2016-CPA-0062

Dear Mr. Long:

The U.S. Fish and Wildlife Service (Service) has received your January 27, 2016, Letter of Intent (LOI) for the proposed widening of a portion of I-526 in Charleston County, South Carolina. The South Carolina Department of Transportation (SCDOT) is proposing to widen 7.5 miles of I-526 from its interchange at Rivers Avenue to the interchange at Paul Cantrell Boulevard. The SCDOT is soliciting comments for consideration and incorporation into an Environmental Assessment (EA) which is being prepared pursuant to the National Environmental Policy Act of 1969, as amended (43 U.S.C. 4321 *et seq.*) (NEPA).

The LOI states that study alternatives included considerations of roadways alignments shifts and bicycle/pedestrian path options. The Service encourages SCDOT to utilize such measures in order to avoid or minimize impacts, particularly near wetland resources. Widening I-526 to the inside of the existing median would result in the lowest amount of resource impacts. This is particularly important as improving the approach causeways for the General Westmoreland Bridge has the potential to impact critically important salt marsh wetlands of the Ashley River. Once a range of alternatives has been identified, the Service recommends that SCDOT schedule a multi-agency site visit to review the project's potential impacts.

The Ashley River and its emergent salt marsh habitat is considered suitable habitat for the American wood stork and the West Indian manatee. The Service recommends that SCDOT conduct a survey for the presence of these two species, as well as other T&E species and their suitable habitats, during the planning phase for I-526. Once the survey is complete, it should be submitted to our office for review and approved by the Service before project begins.

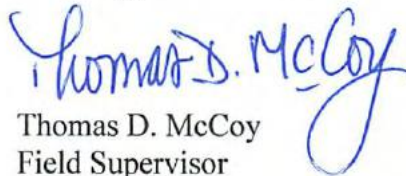


For SCDOT's convenience, the Service has included with this letter a list of species that are currently protected under the Endangered Species Act of 1973 (ESA). This list includes species that are considered as a candidate for listing under the ESA and those that have been petitioned for listing under the ESA. Appropriate survey timeframes or windows for each species are included in the list. The species which have been petitioned for listing are considered "At-Risk Species" (ARS) and may occur in Charleston County, South Carolina. Although there are no Federal protections afforded to ARS, please consider including ARS in your survey efforts. Incorporating proactive measures to avoid or minimize harm to ARS may improve their status and assist with precluding the need to list these species. Additional information on ARS can be found at:

<http://www.fws.gov/southeast/candidateconservation>

The Service appreciates the opportunity to provide input at this early stage of the project's development. If you have any questions, please contact Mr. Mark Caldwell at (843) 727-4707 ext. 215, and reference FWS Log No. 2016-CPA-0062.

Sincerely,

  
Thomas D. McCoy  
Field Supervisor

TDM/MAC

## South Carolina List of At-Risk, Candidate, Endangered, and Threatened Species - Charleston County

CATEGORY	COMMON NAME/STATUS	SCIENTIFIC NAME	SURVEY WINDOW/ TIME PERIOD	COMMENTS
Amphibian	Frosted flatwoods salamander (T, CH)	<i>Ambystoma cingulatum</i>	January 1-April 30	Larvae present in breeding ponds
	Gopher frog (ARS)	<i>Lithobates capito</i>	Breeding: October-March	Call survey: February-April
Bird	American wood stork (T)	<i>Mycteria americana</i>	February 15-September 1	Nesting season
	Bachman's warbler (E)	<i>Vermivora bachmanii</i>	May 1-June 15	Breeding
	Bald eagle (BGEPA)	<i>Haliaeetus leucocephalus</i>	October 1-May 15	Nesting season
	Black-capped petrel (ARS)	<i>Pterodroma hasitata</i>	April-October	offshore water primarily
	Black rail (ARS)	<i>Laterallus jamaicensis</i>	May-July	
	MacGillivray's seaside sparrow (ARS)	<i>Ammodramus maritimus macgillivrayi</i>	May-June	
	Piping plover (T, CH)	<i>Charadrius melodus</i>	July 15-May 1	Migration and wintering
	Red-cockaded woodpecker (E)	<i>Picoides borealis</i>	April 1-July 31	Nesting season
	Red knot (T)	<i>Calidris canutus rufa</i>	August 1-May 31	Migration and wintering
Crustacean	None Found			
Fish	American eel (ARS)	<i>Anguilla rostrata</i>	March 1-May 30; October 1-December 15	Temperature dependent: normally (17-20°C); can be found between 13-25°C
	Atlantic sturgeon* (E)	<i>Acipenser oxyrinchus*</i>	February 1-April 30	Spawning migration
	Blueback herring (ARS)	<i>Alosa aestivalis</i>	Mid-January-mid May	Peak: March-April
	Shortnose sturgeon* (E)	<i>Acipenser brevirostrum*</i>	February 1-April 30	Spawning migration
Insect	Monarch butterfly (ARS)	<i>Danaus plexippus</i>	August-December	Overwinter population departs: March-April
	Rare skipper (ARS)	<i>Problema bulenta</i>	May; July-September	Two brood periods
Mammal	Finback whale* (E)	<i>Balaenoptera physalus*</i>	November 1-April 30	Off the coast
	Humpback whale * (E)	<i>Megaptera novaengliae</i>	January 1-March 31	Migration off the coast
	Rafinesque's big-eared bat (ARS)	<i>Corynorhinus rafinesquii</i>	Year round	Found in mines, caves, large hollow trees, buildings, and bat towers
	Right whale* (E)	<i>Balaena glacialis</i>	November 1-April 30	Off the coast
	Tri-colored bat (ARS*)	<i>Perimyotis subflavus</i>	Year round	Found in mines and caves in the winter
	West Indian manatee (E)	<i>Trichechus manatus</i>	May 15-October 15	In coastal waters
Mollusk	None Found			
Plant	American chaffseed (E)	<i>Schwalbea americana</i>	May-August	1-2 months after a fire
	Bog asphodel (ARS*)	<i>Narthecium americanum</i>	June-July	
	Boykin's lobelia (ARS)	<i>Lobelia boykinii</i>	May-July/August	
	Canby's dropwort (E)	<i>Oxypolis canbyi</i>	Mid-July-September	
	Carolina bishopweed (ARS)	<i>Ptilimnium ohlesii</i>	May-July	
	Ciliate-leaf tickseed (ARS)	<i>Coreopsis integrifolia</i>	August-November	
	Godfrey's privet (ARS)	<i>Forestiera godfreyi</i>	April-June	
	Hedge-nettle	<i>Stachys caroliniana</i>	Late June-August	Can be confused with <i>S. floridana</i>
	Pondberry (E)	<i>Lindera melissifolia</i>	February-March	
	Seabeach amaranth (T)	<i>Amaranthus pumilus</i>	July-October	

## South Carolina List of At-Risk, Candidate, Endangered, and Threatened Species - Charleston County

CATEGORY	COMMON NAME/STATUS	SCIENTIFIC NAME	SURVEY WINDOW/ TIME PERIOD	COMMENTS
Reptile	Eastern diamondback rattlesnake (ARS)	<i>Crotalus adamanteus</i>	Most of the year	Peak: April-November
	Green sea turtle ** (T)	<i>Chelonia mydas</i> **	May 1-October 31	Nesting and hatching
	Kemp's ridley sea turtle ** (E)	<i>Lepidochelys kempii</i> **	May 1-October 31	In coastal waters
	Leatherback sea turtle ** (E)	<i>Dermochelys coriacea</i> **	May 1-October 31	Nesting and hatching
	Loggerhead sea turtle ** (T, CH)	<i>Caretta caretta</i> **	May 1-October 31	Nesting and hatching
	Southern hognose snake (ARS)	<i>Heterodon simus</i>	Most of the year	
	Spotted turtle (ARS)	<i>Clemmys guttata</i>	February-mid April	

\* Contact National Marine Fisheries Service (NMFS) for more information on this species

\*\* The U.S. Fish and Wildlife Service (FWS) and NMFS share jurisdiction of this species

ARS Species that the FWS has been petitioned to list and for which a positive 90-day finding has been issued (listing may be warranted); information is provided only for conservation actions as no Federal protections currently exist.

ARS\* Species that are either former Candidate Species or are emerging conservation priority species

BGEPA Federally protected under the Bald and Golden Eagle Protection Act

C FWS or NMFS has on file sufficient information on biological vulnerability and threat(s) to support proposals to list these species

CH Critical Habitat

E Federally Endangered

P or P - CH Proposed for listing or critical habitat in the Federal Register

S/A Federally protected due to similarity of appearance to a listed species

T Federally Threatened

These lists should be used only as a guideline, not as the final authority. The lists include known occurrences and areas where the species has a high possibility of occurring. Records are updated as deemed necessary and may differ from earlier lists.

For a list of State endangered, threatened, and species of concern, please visit <https://www.dnr.sc.gov/species/index.html>.

## CHARLESTON COUNTY

CATEGORY	COMMON NAME/STATUS	SCIENTIFIC NAME	SURVEY WINDOW/ TIME PERIOD	COMMENTS
<b>Amphibians</b>	Frosted flatwoods salamander (T, CH)	<i>Ambystoma cingulatum</i>	January 1-April 30	Larvae present in breeding ponds
	Gopher frog (ARS)	<i>Lithobates capito</i>	Breeding: October-March	Call survey: February-April
<b>Birds</b>	American wood stork (T)	<i>Mycteria americana</i>	February 15-September 1	Nesting season
	Bachman's warbler (E)	<i>Vermivora bachmanii</i>	May 1-June 15	Breeding
	Bald eagle (BGEPA)	<i>Haliaeetus leucocephalus</i>	October 1-May 15	Nesting season
	Black-capped petrel (ARS)	<i>Pterodroma hasitata</i>	April-October	Offshore water primarily
	Eastern black rail (P)	<i>Laterallus jamaicensis jamaicensis</i>	April-June	Minimum of five surveys/survey point
	Piping plover (T, CH)	<i>Charadrius melodus</i>	July 15-May 1	Migration and wintering
	Red-cockaded woodpecker (E)	<i>Picoides borealis</i>	March 1-July 31	Nesting season
	Red knot (T)	<i>Calidris canutus rufa</i>	August 1-May 31	Migration and wintering
	Saltmarsh sparrow (ARS)	<i>Ammodramus caudacuta</i>	Fall/winter	Fall/winter surveys
<b>Crustaceans</b>	None Found			
<b>Fishes</b>	Atlantic sturgeon* (E)	<i>Acipenser oxyrinchus*</i>	February 1-April 30	Spawning migration
	Shortnose sturgeon* (E)	<i>Acipenser brevirostrum*</i>	February 1-April 30	Spawning migration
<b>Insects</b>	Frosted elfin (ARS)	<i>Callophrys irus</i>	March - June	
	Monarch butterfly (ARS)	<i>Danaus plexippus</i>	August-December	Overwinter population departs: March-April
<b>Mammals</b>	Finback whale* (E)	<i>Balaenoptera physalus*</i>	November 1-April 30	Off the coast
	Humpback whale * (E)	<i>Megaptera novaengliae</i>	January 1-March 31	Migration off the coast
	Northern long-eared bat (T)	<i>Myotis septentrionalis</i>	Year round	Winter surveys not as successful
	Right whale* (E)	<i>Balaena glacialis</i>	November 1-April 30	Off the coast
	Sei whale* (E)	<i>Balaenoptera borealis</i>		
	Sperm whale* (E)	<i>Physeter macrocephalus</i>		
	Tri-colored bat (ARS)	<i>Perimyotis subflavus</i>	Year round	Found in mines and caves in the winter
West Indian manatee (T)	<i>Trichechus manatus</i>	May 1-November 15	In coastal waters	
<b>Mollusks</b>	None Found			

## CHARLESTON COUNTY

CATEGORY	COMMON NAME/STATUS	SCIENTIFIC NAME	SURVEY WINDOW/ TIME PERIOD	COMMENTS
Plants	American chaffseed (E)	<i>Schwalbea americana</i>	May-August	1-2 months after a fire
	Boykin's lobelia (ARS)	<i>Lobelia boykinii</i>	May-July/August	
	Canby's dropwort (E)	<i>Oxypolis canbyi</i>	Mid-July-September	
	Ciliate-leaf tickseed (ARS)	<i>Coreopsis integrifolia</i>	August-November	
	Pondberry (E)	<i>Lindera melissifolia</i>	February-March	
	Seabeach amaranth (T)	<i>Amaranthus pumilus</i>	July-October	
Reptiles	Eastern diamondback rattlesnake (ARS)	<i>Crotalus adamanteus</i>	Most of the year	Peak: April-November
	Green sea turtle ** (T)	<i>Chelonia mydas</i> **	May 1-October 31	Nesting and hatching
	Kemp's ridley sea turtle ** (E)	<i>Lepidochelys kempii</i> **	May 1-October 31	In coastal waters
	Leatherback sea turtle ** (E)	<i>Dermochelys coriacea</i> **	May 1-October 31	Nesting and hatching
	Loggerhead sea turtle ** (T, CH)	<i>Caretta caretta</i> **	May 1-October 31	Nesting and hatching
	Southern hognose snake (ARS)	<i>Heterodon simus</i>	Most of the year	
	Spotted turtle (ARS)	<i>Clemmys guttata</i>	February-mid April	

\* Contact National Marine Fisheries Service (NMFS) for more information on this species.

\*\* The U.S. Fish and Wildlife Service (FWS) and NMFS share jurisdiction of this species.

ARS Species that the FWS has been petitioned to list and for which a positive 90-day finding has been issued (listing may be warranted); information is provided only for conservation actions as no Federal protections currently exist.

ARS\* Species that are either former Candidate Species or are emerging conservation priority species.

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# **APPENDIX E**

## ***DRAFT* Northern Long-Eared Bat 4(d) Rule Streamlined Consultation Form**

## Northern Long-Eared Bat 4(d) Rule Streamlined Consultation Form

Federal agencies should use this form for the optional streamlined consultation framework for the northern long-eared bat (NLEB). This framework allows federal agencies to rely upon the U.S. Fish and Wildlife Service's (USFWS) January 5, 2016, intra-Service Programmatic Biological Opinion (BO) on the final 4(d) rule for the NLEB for section 7(a)(2) compliance by: (1) notifying the USFWS that an action agency will use the streamlined framework; (2) describing the project with sufficient detail to support the required determination; and (3) enabling the USFWS to track effects and determine if reinitiation of consultation is required per 50 CFR 402.16.

This form is not necessary if an agency determines that a proposed action will have no effect to the NLEB or if the USFWS has concurred in writing with an agency's determination that a proposed action may affect, but is not likely to adversely affect the NLEB (i.e., the standard informal consultation process). Actions that may cause prohibited incidental take require separate formal consultation. Providing this information does not address section 7(a)(2) compliance for any other listed species.

### Information to Determine 4(d) Rule Compliance:

	YES	NO
1. Does the project occur wholly outside of the WNS Zone <sup>1</sup> ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. Have you contacted the appropriate agency <sup>2</sup> to determine if your project is near known hibernacula or maternity roost trees?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3. Could the project disturb hibernating NLEBs in a known hibernaculum?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. Could the project alter the entrance or interior environment of a known hibernaculum?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5. Does the project remove any trees within 0.25 miles of a known hibernaculum at any time of year?	<input type="checkbox"/>	<input type="checkbox"/>
6. Would the project cut or destroy known occupied maternity roost trees, or any other trees within a 150-foot radius from the maternity roost tree from June 1 through July 31.	<input type="checkbox"/>	<input type="checkbox"/>

You are eligible to use this form if you have answered yes to question #1 **or** yes to question #2 **and** no to questions 3, 4, 5 and 6. The remainder of the form will be used by the USFWS to track our assumptions in the BO.

**Lead Federal Agency:** Federal Highway Administration

**Applicant<sup>3</sup> (Name, Email, Phone No.):** South Carolina Department of Transportation

Will McGoldrick, mcgoldriWR@scdot.org, 803-737-1326

**Project PIN/Project Number:** P032012

**Project County:** Charleston County

**Project Name:** I-526 West Lowcountry Corridor

**Project Location (include coordinates if known):** Charleston and North Charleston

The project extends 11.4 miles from near Paul Cantrell Boulevard in West Ashley to Virginia Avenue.

32.811417; -80.049709

**Basic Project Description (provide narrative below or attach additional information):**

SCDOT proposes to add two travel lanes in each direction along I-526 and to upgrade the interchange of I-526 and I-26. Improvements to access I-526 from Paul Cantrell Boulevard, North Rhett Avenue, and Virginia Avenue are also proposed.

<sup>1</sup> <http://www.fws.gov/midwest/endangered/mammals/nleb/pdf/WNSZone.pdf>

<sup>2</sup> See <http://www.fws.gov/midwest/endangered/mammals/nleb/nhisites.html>

<sup>3</sup> If applicable - only needed for federal actions with applicants (e.g., for a permit, etc.) who are party to the consultation.

General Project Information	YES	NO
Does the project occur within 0.25-mile of a known hibernaculum?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Does the project occur within 150 feet of a known maternity roost tree?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Does the project include forest conversion <sup>4</sup> ? (if yes, report acreage below)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Estimated total acres of forest conversion		
If known, estimated acres <sup>5</sup> of forest conversion from April 1 to October 31		
If known, estimated acres of forest conversion from June 1 to July 31 <sup>6</sup>		
Does the project include timber harvest? (if yes, report acreage below)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Estimated total acres of timber harvest	N/A	
If known, estimated acres of timber harvest from April 1 to October 31		
If known, estimated acres of timber harvest from June 1 to July 31		
Does the project include prescribed fire? (if yes, report acreage below)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Estimated total acres of prescribed fire	N/A	
If known, estimated acres of prescribed fire from April 1 to October 31		
If known, estimated acres of prescribed fire from June 1 to July 31		
Does the project install new wind turbines? (if yes, report capacity in MW below)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Estimated wind capacity (MW)	N/A	

Agency Determination:

By signing this form, the action agency determines that this project may affect the NLEB, but that any resulting incidental take of the NLEB is not prohibited by the final 4(d) rule.

If the USFWS does not respond within 30 days from submittal of this form, the action agency may presume that its determination is informed by the best available information and that its project responsibilities under 7(a)(2) with respect to the NLEB are fulfilled through the USFWS January 5, 2016, Programmatic BO. The action agency will update this determination annually for multi-year activities.

The action agency understands that the USFWS presumes that all activities are implemented as described herein. The action agency will promptly report any departures from the described activities to the appropriate USFWS Field Office. The action agency will provide the appropriate USFWS Field Office with the results of any surveys conducted for the NLEB. Involved parties will promptly notify the appropriate USFWS Field Office upon finding a dead, injured, or sick NLEB.

Signature: Will M. G. Baker

Date Submitted: 4-1-20

<sup>4</sup> Any activity that temporarily or permanently removes suitable forested habitat, including, but not limited to, tree removal from development, energy production and transmission, mining, agriculture, etc. (see page 48 of the BO).

<sup>5</sup> If the project removes less than 10 trees and the acreage is unknown, report the acreage as less than 0.1 acre.

<sup>6</sup> If the activity includes tree clearing in June and July, also include those acreage in April to October.



## **APPENDIX F**

### **Representative Site Photolog**



**Photo #: 1**

**Description: Upland maintained development habitat type (4/26/19)**



**Photo #: 2**

**Description: Upland maintained development habitat type (10/21/2016)**



**Photo #: 3**

**Description: Upland pine/ mixed-hardwood forest habitat type (10/21/2016)**



**Photo #: 4**

**Description: Upland young pine/ mixed-hardwood forest habitat type (1/4/17)**



**Photo #: 5**  
**Description: Upland scrub/shrub habitat type (12/16/16)**



**Photo #: 6**  
**Description: Upland scrub/shrub habitat type (1/19/17)**



**Photo #: 7**

**Description: Upland maritime forest habitat type (4/17/19)**



**Photo #: 8**

**Description: Bottomland hardwood forest type (1/6/17)**



**Photo #: 9**

**Description: Bottomland hardwood forest habitat type (5/16/19)**



**Photo #: 10**

**Description: Tidal marsh habitat type (10/14/16)**



**Photo #: 11**  
**Description: Brackish marsh habitat type (10/14/16)**



**Photo #: 12**  
**Description: Freshwater wetland habitat type (1/4/17)**



**Photo #: 13**

**Description: Freshwater wetland habitat type (4/15/19)**



**Photo #: 14**

**Description: Forested wetland habitat type (4/15/19)**





**Photo #: 15**  
**Description: Forested wetland habitat type (2/22/17)**



**Photo #: 16**  
**Description: Cypress-tupelo wetland habitat type (11/9/16)**



**Photo #: 17**

**Description: Open water pond habitat type (10/14/16)**



**Photo #: 18**

**Description: Open water pond habitat type (7/24/2017)**



**Photo #: 19**

**Description: Open water stream habitat type (7/24/17)**



**Photo #: 20**

**Description: Open water stream habitat type (1/11/17)**



**Photo #: 21**  
**Description: Wildlife habitat (4/17/19)**



**Photo #: 22**  
**Description: Wildlife habitat (4/17/19)**



**Photo #: 23**  
**Description: Wildlife habitat (9/28/16)**



**Photo #: 24**  
**Description: Wildlife habitat (11/9/2016)**



**Photo #: 25**  
**Description: Wildlife habitat (10/14/2016)**



**Photo #: 26**  
**Description: Potential wildlife habitat (10/21/16)**



**Photo #: 27**  
**Description: Potential wildlife habitat (10/21/16)**



**Photo #: 28**  
**Description: Potential wildlife habitat (6/28/19)**



## **Appendix L.2**

# **Biological Assessment**

**for National Oceanic and Atmospheric Administration,  
National Marine Fisheries Service**





## BIOLOGICAL ASSESSMENT

FOR NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION,  
NATIONAL MARINE FISHERIES SERVICE

Prepared For:



Prepared By:



November 16, 2020

## Table of Contents

1. Project Overview.....	4
1.1 Federal Nexus.....	4
1.2 Project Description.....	4
1.3 Project Area and Setting .....	4
1.4 Consultation History .....	6
2. Federally Proposed & Listed Species & Designated Critical Habitat.....	6
2.1 Shortnose Sturgeon .....	6
2.2 Atlantic Sturgeon .....	7
3. Environmental Baseline .....	8
4. Project Details .....	10
4.1 Construction.....	10
4.1.1 Construction Overview .....	10
4.1.2 Temporary Access .....	11
4.1.3 Prestressed Concrete Pile Installation .....	12
4.1.4 Drilled Shaft Installation .....	12
4.1.6 Drainage .....	13
4.1.7 Painting.....	13
4.1.8 Project Timeline.....	14
4.2 Operations and Maintenance .....	14
5. Project Action Area .....	14
5.1 Project Action Area .....	14
6. Effects Analysis.....	15
6.1 Direct and Indirect Effects .....	15
6.1.1 Hydroacoustic Noise.....	15
6.1.2 Construction Material Strikes or Vessel Strikes .....	16
6.1.3 Water Quality .....	17
6.3 Interrelated and Interdependent Actions and Activities .....	17
7. Effect Determinations .....	17
8. Environmental Commitments and Conservation Measures.....	18
9. References .....	19

## Tables

- Table 1. Estimated number of permanent piles needed for bridge construction.
- Table 2. Estimated number of permanent drilled shafts needed for bridge construction.
- Table 3. Potential Average Sound Pressure Levels (dB) in the Ashley River during Construction.

## Appendices

### Appendix A

- Figure 1 Project Location Map
- Figure 2 SC DHEC Waters Classification
- Figure 3 HUC Boundary and Water Quality Monitoring Stations
- Figure 4 Shellfish Harvest Classifications

### Appendix B

- I-526 Ashley River Conceptual Design Plans and Impact Areas

### Appendix C

- I-526 Lowcountry Corridor West Natural Resources Technical Memorandum

### Appendix D

- SCDOT Best Management Practices (Section 815 Erosion Control Specifications)

# 1. Project Overview

## 1.1 Federal Nexus

The purpose of this Biological Assessment (BA) is to address the effect of the I-526 Lowcountry Corridor West project on U.S. Endangered Species Act (ESA) listed species, listed as endangered or threatened, or their designated critical habitat, under the jurisdiction of the National Oceanic and Atmospheric Administration-National Marine Fisheries Service (NOAA-NMFS). Those species under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS) are addressed in a separate BA.

The South Carolina Department of Transportation (SCDOT), on behalf of the Federal Highway Administration (FHWA), is pursuing informal consultation under Section 7 of the ESA on the impacts to species that will result from the proposed I-526 West project. Section 7 of the ESA assures that, through consultation with NOAA-NMFS and/or the USFWS, federal actions do not jeopardize the continued existence of any threatened, endangered, or proposed species, or result in the destruction or adverse modification of critical habitat.

## 1.2 Project Description

The proposed I-526 Lowcountry Corridor West project extends approximately 11.4 miles from near Paul Cantrell Boulevard in West Ashley to Virginia Avenue in North Charleston in Charleston County, SC. SCDOT currently ranks the segment of I-526 between I-26 and Virginia Avenue as the most congested segment of interstate highway in the state. The remainder of the I-526 LCC West project, from I-26 to Paul Cantrell Boulevard, ranks among the top ten of the state's existing most congested corridors. Traffic forecasts show that segments of that corridor will continue to be among the state's most congested in 2040. The interchange of I-526 and I-26 is the major source of the congestion.

Through various reasonable build alternatives, SCDOT proposes to add two travel lanes in each direction along I-526 (for a total of four lanes in each direction) and to upgrade the interchange of I-526 and I-26. Improvements to access I-526 from Paul Cantrell Boulevard, North Rhett Avenue, and Virginia Avenue are also proposed. Proposed improvements to I-526 would include providing additional travel lanes over the Ashley River, through widening the existing bridges. An EIS is being completed that outlines potential alternatives to satisfy the purpose and need of the project.

## 1.3 Project Area and Setting

The area surrounding the project study area (PSA) is a densely populated region to the west of the City of Charleston, South Carolina (Figure 1). Based on the size of this project and the density of development in greater Charleston, the land use with this vicinity varies greatly. A large portion of the land within this

PSA has been developed for residential, commercial, and industrial uses. Undeveloped land primarily consists of maintained rights of way, landscaped lawns, wooded forests, and tidal marshes. Filbin Creek and its floodplain parallel and cross through the PSA, flowing to the Cooper River; this area is largely undeveloped forested wetlands. The Ashley River flows through the PSA and is surrounded by tidal mudflats and vegetated marshes. Within the PSA, the Ashley River Watershed extends approximately 1,800 feet (0.3 mile) north of Paul Cantrell Boulevard, north across the Ashley River, to 2,500 feet (0.5 mile) north of International Boulevard. It includes portions of two named water bodies including the Ashley River and Bulls Creek. Numerous streams and wetlands are present in the PSA in the Ashley River Watershed, including forested wetlands, emergent wetlands, tidally influenced streams, and freshwater streams.

The General William C. Westmoreland Bridge (Westmoreland Bridge) is located along I-526 and connects the City of North Charleston with the West Ashley area of Charleston. The twin span bridge carries two lanes of I-526 in each direction across the Ashley River and the surrounding tidal marshes and creeks. The 3,908-foot long bridge was constructed in 1980 and each bridge is approximately 43 feet wide. The existing bridge deck consists of two 12-foot travel lanes, two in each direction; a 5-foot, 6-inch inside left shoulder; and a 10-foot outside right shoulder. Additionally, there are barriers on each side of the bridge (2 total) that are 1-foot, 8-inches wide each. The Westmoreland Bridge spans the Ashley River with a horizontal clearance of 60 feet and a vertical clearance of 35 feet when measured from mean high water (MHW). This is a twin span fixed bridge with four main spans. The longest span is approximately 120 feet. The concrete deck is approximately 43 feet wide.



*General William C. Westmoreland Bridge over the Ashley River.*

## 1.4 Consultation History

A Letter of Intent was sent to the USFWS and NOAA-NMFS by SCDOT on January 27, 2016. A Notice of Intent was published in the Federal Register on November 11, 2019. The project has been discussed at several Agency Coordination Effort meetings with the USFWS, NOAA-NMFS, U.S. Environmental Protection Agency, FHWA, U.S. Army Corps of Engineers, South Carolina Department of Natural Resources (SCDNR), and FHWA on March 14, 2019; July 10, 2019; July 25, 2019; August 14, 2019; September 11, 2019; October 9, 2019; November 13, 2019; December 11, 2019; January 8, 2020; February 12, 2020; and March 11, 2020. The project was also discussed via telephone with Andrew Herndon, NOAA-NMFS and SCDOT and via email with Bill Post, SCNDR (March 23 and April 9, 2020).

## 2. Federally Proposed & Listed Species & Designated Critical Habitat

The project is located within the range of two species listed under the ESA within the jurisdiction of NOAA-NMFS. There are no proposed or candidate species and no Critical Habitat in or near the PSA. Additional species information is available in the I-526 West Lowcountry Corridor Natural Resources Technical Memorandum (Appendix C).

### Fish

Shortnose sturgeon (*Acipenser brevirostrum*) (32 Federal Register (FR) 4001; Recovery plan: NMFS 1998)

Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) (77 FR 5880 and 77 FR 5914)

### 2.1 Shortnose Sturgeon

The shortnose sturgeon is an anadromous fish species which spends most of the year in brackish or salt water and moves into fresh water only to spawn. The shortnose sturgeon was listed as endangered in 1967 and remained on the list with enactment of the ESA in 1974 when NOAA-NMFS assumed its jurisdiction. There are 19 Distinct Population Segments (DPS) rangewide with 11 DPS occurring in the southeastern U.S. A recovery plan exists for this species and was issued in 1998. Spawning season for the shortnose sturgeon occurs from late winter to early spring. The shortnose sturgeon is dark-colored on its dorsal side and light on the ventral side. This species of sturgeon has a wide mouth pointed downward beneath a short snout and can grow up to three feet long. The shortnose sturgeon inhabits the lower portions of large rivers and coastal rivers along the Atlantic Coast. Shortnose sturgeon feed on invertebrates and the stems and leaves of macrophytes. Adults forage at night in shallows immediately adjacent to deep-water areas occupied during the day. Juveniles generally remain in deep-water areas throughout the day. In South Carolina shortnose sturgeon have been found in the Great Pee Dee,

Waccamaw, Edisto, Cooper, Santee, and Savannah Rivers. They may also be found in the Black, Sampit, and Ashley Rivers. Suitable freshwater spawning habitat for this species is not present within the PSA however, suitable foraging habitat for the shortnose sturgeon exists within the Ashley River within the PSA. The shortnose sturgeon may use Filbin Creek up to Virginia Avenue for foraging by way of the Cooper River but would not likely not use it for spawning. Additionally, water quality in Filbin Creek is impaired due to elevated levels of *Enterococcus* bacteria and is listed on the Section 303(d) list. This is a State list of waters that are not meeting water quality standards or have impaired uses

## 2.2 Atlantic Sturgeon

The Atlantic sturgeon is an anadromous fish species, similar in habitat requirements and appearance to the shortnose sturgeon. In 2007, NOAA-NMFS conducted a status review for the Atlantic sturgeon and determined at least three of the distinct population segments (DPS) warranted listing under the ESA. In 2012, NOAA-NMFS issued the final rule to list the Carolina DPS and South Atlantic DPS as endangered. The Atlantic sturgeon can be distinguished by their large size, snout shape, and bony plates called scutes. They can grow up to 14 feet in length and weigh up to 800 pounds. The Atlantic sturgeon is bluish-black or olive brown dorsally with paler sides and a white belly. The sides of its body also contain five rows of scutes. Adults are commonly found in brackish and estuarine waters along the coastline. The adult Atlantic sturgeon will migrate upstream to fresh water to spawn in the spring, and can go as far inland as the fall line in South Carolina, as long the stream is unobstructed. Following spawning, Atlantic sturgeon typically inhabit coastal estuarine waters with gravel or sand substrate. Adult sturgeon typically feed on benthic invertebrates such as mussels, worms, and shrimp. In South Carolina, Atlantic sturgeon have been captured in the Great Pee Dee, Waccamaw, Santee, Cooper, Edisto, Combahee, and Savannah Rivers. Atlantic sturgeon have been tagged in the Ashley River (W. Post, personal communication, April 9, 2020). Suitable freshwater spawning habitat for this species is not present within the PSA however, suitable foraging habitat for the Atlantic sturgeon exists within the Ashley River within the PSA. The Atlantic sturgeon may use Filbin Creek up to Virginia Avenue for foraging by way of the Cooper River but would not likely not use it for spawning. Use of Filbin Creek would also be limited due to the previously noted Section 303(d) listing for impairments. The Cooper River contains designated Critical Habitat for the Atlantic sturgeon. The area near the Cooper River is included in the PSA, however there is no proposed in-water work and there are no effects expected to the Cooper River.

### 3. Environmental Baseline

The Ashley River is a tidally influenced river with the headwaters originating in Dorchester County. The river eventually joins the Cooper River to form the Charleston Harbor before discharging eastward into the Atlantic Ocean. The entire drainage of the Ashley River system, including its headwaters in Cypress and Wassamassaw swamps, extends approximately 60 river miles. At the project site, the width of the main navigational channel of the Ashley River is approximately 60 feet wide. The full width of the Ashley River at the project site is approximately 1,500 feet wide. Water depths in the river range from approximately 0 to 20 feet. The Ashley River is a designated State Scenic River, largely in part to numerous historic properties located along the riverbanks. Per the NOAA Ashley River bridge station (Station ID 8665099) the mean tidal range is 5.68 feet and the diurnal range is 6.23 feet. Mean high water is approximately 3.08 feet and mean low water is -3.16 feet at the center of the channel. Salinity at the PSA ranges from 12 to 17 parts per thousand (ppt).

SCDHEC has classified the waterbodies (streams and rivers) of South Carolina based on the desired uses of each waterbody. SCDHEC has established standards for various parameters to protect all uses within each waterbody classification. The Ashley River is classified as salt water (Figure 2). Monitoring station MD-049 is located approximately 4 miles upstream of the PSA, along the Ashley River (Figure 3). Aquatic life uses are not supported at MD-049 based on pH and turbidity. The term pH is a measure of the hydrogen ion concentration of water, and is used to indicate degree of acidity. The pH scale ranges from 0 to 14. A pH of 7 is considered neutral, with values less than 7 being acidic, and values greater than 7 being basic. Low pH values are found in natural waters rich in dissolved organic matter, especially in coastal plain swamps and black water rivers. Turbidity is an expression of the scattering and absorption of light through water. The presence of clay, silt, fine organic and inorganic matter, plankton, and other microscopic organisms increases turbidity. Increasing turbidity can be an indication of increased runoff from land. Recreation is only partially supported at this same site (MD-049), based on elevated fecal coliform levels. A fish consumption advisory due to elevated mercury levels in certain types of fish is in place for the Ashley River, including the area at the I-526/General William C. Westmoreland Bridge and northwards/upstream of the project to SC 165.

A Total Maximum Daily Load (TMDL) has been developed for the Charleston Harbor, Cooper, Ashley, and Wando Rivers and approved by the Environmental Protection Agency to identify opportunities to increase



dissolved oxygen (DO) in the watershed<sup>1</sup>. Many coastal waters in South Carolina have DO levels below the established DO criteria. Wastewater discharges and other anthropogenic influences may contribute to low DO in coastal waters. Natural factors such as organic loading and reduced oxygen levels from wetlands and marshes and estuarine dynamics in the mixing zone where freshwater and saltwater come together can create naturally low DO conditions. The waters in and around Charleston Harbor are considered to be both naturally low in DO and further impacted by wastewater dischargers. Potential sources of oxygen demand loading that were considered include National Pollutant Discharge Elimination System (NPDES) wastewater discharges (continuous point sources), NPDES stormwater discharges (noncontinuous point sources), non-point sources, and natural background sources.

A large portion of the PSA is within Shellfish Growing Area 10B (Figure 4) as designated by SCDHEC. This area encompasses the Charleston Harbor, Ashley River, Cooper River, and their tributaries that support shellfish. Waters within this management area in the PSA have been given the classification of “prohibited” and as such, these areas are closed to all human consumption. Prohibited areas are those that are administratively closed for the harvesting of shellfish for any purposes related to human consumption. These closures are established adjacent to permitted wastewater discharges, marina facilities, or areas containing multiple point sources of pollution. This classification is not based upon violation of a bacteriological standard.

There are various types of navigational activities by numerous vessel types that occur along the Ashley River. To determine the types and extents of activity in the channel, existing documentation was reviewed regarding known vessel use. This included a review of bridge opening records of a nearby moveable downstream facility, the T. Allen Legare Bridges, located at milepoints 2.4 and 2.5. A large portion of marine traffic in the area surrounding the proposed project constitutes recreational and commercial (fishing) boating. The W.O. Thomas Jr. Boat Landing is a public boat ramp managed by the Charleston County Park and Recreation Commission. This facility is located approximately 500 feet southeast or downstream of the proposed project. The landing is used by private recreational and commercial boats. There is a private marina located adjacent to the proposed project (Rivers Edge Marina Sales). The marina is used to launch, store, maintain and fuel private, recreational boats. Emergency operations are conducted by the U.S. Coast Guard (USCG), SCDNR, Charleston County, and the City of Charleston Fire

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[https://www.scdhec.gov/sites/default/files/docs/HomeAndEnvironment/Docs/Chas\\_Hbr\\_DO\\_TMDL.pdf](https://www.scdhec.gov/sites/default/files/docs/HomeAndEnvironment/Docs/Chas_Hbr_DO_TMDL.pdf)  
Last Accessed May 15, 2020.

Department Marine Units in the Ashley River. The Charleston County Volunteer Rescue Squad responds to waterway incidents with a variety of light, medium and heavy rescue vehicles. This includes a variety of boats including an air boat and vessels equipped with specialty equipment such as side scan sonar. The Charleston Fire Department operates one Fireboat, Marine 101. The responding vessel features a 980-horsepower engine, is 40 feet long, and has the capacity to pump 3,800 gallons of water a minute.

## 4. Project Details

### 4.1 Construction

#### 4.1.1 Construction Overview

This project is expected to be delivered either via the design build or bid build process and final construction and design plans would be determined by the contractor and/or SCDOT. To maintain competitiveness during the bid process, means and methods of construction may not be final, giving contractors the ability to propose specific methods and equipment. The following is an outline of the likely construction activities and project designs. This may vary slightly depending on the selected contractor and bid process. Any modifications from those proposed in this document that could impact effects to listed species would require additional coordination with SCDOT and federal agencies.

The proposed bridges would be widened to include two additional travel lanes in each direction that are 12 feet wide, and shoulders in each direction of travel that are 12 feet wide (Appendix B, Conceptual Design Plans). Additionally, a 14-foot shared use path (SUP) to accommodate pedestrians and cyclists would be added to the upstream side of the bridge. The westbound bridge would be widened with two additional vehicle lanes plus a 12-foot shoulder, and the SUP would be outside of those lanes. The SUP would be located on the north side of the bridges, adjacent to the westbound travel lanes. The 14-foot path would be separated from the motorized travel lanes with a raised barrier separating the path from the outside 12-foot paved shoulder. Barriers for safety would be provided along both sides of the SUP which would also prevent fishing or casting from the path. Providing pedestrian and cyclist paths to connect to the bridge path would be planned and permitted by others, likely local municipalities and/or Charleston County. Due to the geography of the area, it is not likely that the future path connections would be located in suitable habitat for Atlantic or shortnose sturgeon. During construction of the widened bridge, traffic would be maintained on the existing facility. Maintenance and improvements would be made to the existing Westmoreland Bridges and the structure would be retained at its existing height and length.

The proposed minimum horizontal clearance for the main navigational opening would be 60 feet between fenders. This configuration will be similar to the existing bridge, or would be less restrictive. The vertical clearance of the proposed fixed span bridge would be a minimum of 35 feet from the MHW datum to meet the needs of mariners in the area.

Generally, the project improvements would consist of the following components:

- Widening of the westbound and eastbound roadway approaches to the Westmoreland Bridges.
- Construction of temporary access areas to include matting, barges, and work trestles.
- Widen existing eastbound structure to the north, or upstream side, of the existing bridge (between the current bridges) on a mix of prestressed concrete piles and drilled shafts.
- Widen existing westbound structure to the north, or upstream side of the existing bridge on a mix of prestressed concrete piles and drilled shafts.
- Extension of the existing fender system to the south of the existing Westmoreland Bridge.
- Paint the existing and new steel beams over the Ashley River main navigational channel and over Bulls Creek.
- Lighting to be installed for navigation and to meet SCDOT urban interstate lighting requirements (“Roadway Lighting on Interstate Routes in South Carolina”).

#### 4.1.2 Temporary Access

Temporary work trestles would be placed in marsh and wetland areas for construction access outside of the existing eastbound bridge (Appendix B, Conceptual Design Plans). Temporary trestle would be approximately 40 feet wide and would be supported by steel pipe piles. The steel piles would be approximately 24-inches in diameter and would be installed using an impact hammer. It is estimated that 240 24-inch steel pipe piles would be needed for temporary work trestle. With one work crew performing installation, approximately 4 piles would be driven per day with an average of 350 impact hammer strikes per pile. If additional crews are utilized, more piles would be driven per day, however it is estimated that the contractor would have one crew working on the trestle at a time, given space limitations. A second crew could work on the drilled shafts in the Ashley River.

For access over marsh areas between the existing bridges either trestle or a combination of barge, barge mats, and timber mats would be needed due to the limited space between the structures. Deeper water

and the main channel of the Ashley River would be accessed via barges for construction. Barges may be delivered and moved via water and transport vessels or via land on flatbed trucks with cranes and other heavy equipment. At no point would barges in the Ashley River block more than 50% of the channel.

#### 4.1.3 Prestressed Concrete Pile Installation

Prestressed concrete piles will be installed outside of the main channel of the Ashley River. These piles would have an H-pile steel “stinger” at the end of the concrete pile to prevent damage to the pile as it is driven into hard subsurface materials. Piles would be installed with a hammer or vibratory hammer. Within the Ashley River, Bents 72 through 79 would be supported by prestressed concrete piles. Additional concrete piles would be installed in the adjacent marshes, outside of the boundaries of the Ashley River. It is estimated that 649 24-inch prestressed concrete piles would be needed for bridge widening (Table 1).

**Table 1. Estimated number of permanent piles needed for bridge construction.**

Westbound (single row of piles per bent)	51	6	306
Westbound (double row of piles per bent)	4	12	48
Eastbound (single row of piles per bent)	51	5	255
Eastbound (double row of piles per bent)	4	10	40
<b>Total number of permanent concrete prestressed piles for bridge bents:</b>			<b>649</b>
<i>Fender piles</i>	<i>n/a</i>	<i>n/a</i>	<i>60</i>
<b>Total number of permanent concrete prestressed piles:</b>			<b>709</b>

With one work crew performing installation, approximately 2 to 3 piles would be driven per day with an average of 300 impact hammer strikes per pile. If additional crews are utilized, more piles would be driven per day, however it is expected that one crew would work on the trestle at a time.

#### 4.1.4 Drilled Shaft Installation

At the approaches to, and over the main channel of the Ashley River, drilled shafts are proposed to support the new bridge structures. Each shaft would be approximately 7 feet in diameter. To install, steel casing (approximately 7 feet in diameter) would be installed at each location using a vibratory method. Inside of that casing would be drilled so that rebar cage can be installed. Concrete would then be poured into the casing to create a large support structure in the water. Approximately 150 drilled shafts would be needed for the bridge widening (Table 2).

**Table 2. Estimated number of permanent drilled shafts needed for bridge construction.**

Westbound I-526	30	3	90
Eastbound I-526	30	2	60
<b>Total number of drilled shafts:</b>			<b>150</b>

One shaft per day would be constructed by one work crew, but multiple crews could install supports concurrently. At this point in the project development process, one work crew for the drilled shafts is estimated. Within the Ashley River, these drilled shafts would be installed at bents 48 through 71, and at bents A, B, C, and D (see Appendix C Bridge Plan and Profile design sheets). Bents 48 through 59 are located at the southerly or westerly (West Ashley) approach to the Ashley River. Bents A through D are at the deepest portion of the main channel of the Ashley River. Bents 60 through 71 are located at the northerly or easterly (North Charleston) approach to the Ashley River. Bents 59 through 79 and bents A through D are located within the Ashley River and are the focus of this analysis.

#### 4.1.5 Fender System

The existing fender system will be extended with a system that can accommodate all required uses of the waterway and that meets USCG requirements. The proposed fender system will be designed for both recreational watercraft, as well as larger vessels such as commercial fishing boats and tug boats. The fender elements would likely consist of rubber fenders, with a steel panel and polyethylene facing. Additional prestressed concrete piles will be required to support the new fender systems. These piles would not be load bearing and would not require extensive pile strikes such as those on the permanent bridge system. It is estimated that 60 piles (24-inch) would be impact driven (approximately 150 strikes per pile) to support the fender extension.

#### 4.1.6 Drainage

Drainage of stormwater from surface runoff from the newly constructed bridges is proposed to be discharged via open scuppers.

#### 4.1.7 Painting

Steel girders would be used in the construction of the new bridge spans over the main channel of the Ashley River and would need to be surface prepped and painted to withstand impacts from weather and the marine environment. The contractor would be required to submit a painting operation plan to include

timing, methodologies to prohibit overspray into waters or adjacent vegetation, and weather and wind thresholds for painting operations.

#### 4.1.8 Project Timeline

Construction is expected to begin in 2027. Construction of the bridge phase over the Ashley River would last approximately 3 years. Within that 3-year period, in-water work of an estimated 6 months would be needed for prestressed pile bents and 17 months would be needed for drilled shaft bents. This project is expected to be delivered via the design build process and final construction sequencing will be determined by the contractor. The following is an outline of the likely construction sequence. This sequence may vary slightly depending on the selected contractor. Any modifications from this proposed by the contractor that could impact effects to listed species would require additional coordination with SCDOT and federal agencies.

## 4.2 Operations and Maintenance

Routine maintenance is expected on the existing and proposed new bridges including sanding/painting, deck resurfacing, concrete patching, lighting replacement, and periodic fender and dolphin repair from exposure and/or vessel strikes.

## 5. Project Action Area

### 5.1 Project Action Area

The action area, as defined under 50 CFR §402.02, includes all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. The nearshore action area, as currently proposed, extends 500 meters (1,650 feet) upstream and downstream of the proposed project. The basis for the selection of the 1,650 feet upstream and downstream of the proposed project was due to the limits of the proposed action and potential turbidity effects in the Ashley River. Although sedimentation is not expected to be long lasting or severe based on the velocity of currents in the area, the effects from sedimentation are expected to be wider ranging than noise effects.

The area near the Cooper River is included in the PSA, however there is no proposed in-water work and there are no effects expected to the Cooper River.

## 6. Effects Analysis

### 6.1 Direct and Indirect Effects

#### 6.1.1 Hydroacoustic Noise

A temporary increase in underwater noise from construction could cause behavioral changes in sturgeon. Loud levels of intermittent or continuous construction noise from drilled shaft installation and work trestle pile driving could harm sturgeon if they were close to the noise source for prolonged periods. Depending on the duration and intensity of sound produced during construction, aquatic organisms could suffer hearing loss, ranging from temporary to permanent. Other potential percussion injuries include interference with migration, bruising, damage to internal organs, or death.

Typical metrics used to evaluate construction noise impacts for impulsive or non-impulsive activities include peak sound pressure level ( $dB_{peak}$ ), root mean square (RMS), and sound exposure level (SEL). SEL can be expressed as a value for a single strike and for multiple strikes. SEL is commonly referred to as the cumulative SEL or  $SEL_{CUMULATIVE}$ .

The Greater Atlantic Regional Fisheries Office (GARFO) Acoustic Tool (2019) and Appendix I (Compendium of Pile Driving Sound Data) from the California Department of Transportation (Caltrans) Technical Guidance for Assessment and Mitigation of the Hydroacoustic Effects of Pile Driving on Fish (2015) were used to estimate underwater sound pressure levels caused by in-water pile driving during construction. These references include data from major and minor projects that used un-attenuated pile driving with varying pile size, pile type, and water depths. Noise levels are generally higher if impact pile driving is used, as compared to vibratory hammer driving or extraction. Impact pile driving creates an impulsive sound, while vibratory hammers generate a continuous, low-level noise that is generally considered non-impulsive.

Table 3 provides a summary of the potential un-attenuated sound pressure levels that may occur during the proposed bridge construction sound pressure levels caused by in-water pile driving during construction. The expected pile sizes for the I-526 West project do not exactly correlate with the guidance documents; therefore, the data was best fit or overestimated. The assumed pile sizes that were used to estimate the potential average sound pressure levels are noted in Table 3.

**Table 3. Potential Average Sound Pressure Levels (dB) in the Ashley River during Construction.**

Bridge Element	Diameter	Assumed Installation Method	Average Sound Pressure Level (dB)		
			dB (peak)	RMS	SEL
Concrete Drilled Shafts <sup>1</sup>	7 feet	Vibratory Hammer	195	180	180
Concrete Piles <sup>2</sup>		Impact Hammer			
Temporary Trestle Steel Pipe Piles <sup>3</sup>	24 inches	Impact Hammer	203	189	178
<i>Sturgeon Thresholds:</i>					
			206	150	183 (Fish<2g) 187 (Fish>2g)

Source: NOAA Greater Atlantic Regional Fisheries Office Acoustics Tool (Updated 9/23/2019) and Caltrans, 2015.

<sup>1</sup> Based on 6-foot steel pipe piles (loudest measurement) at an average of 5-meters relative water depth.

<sup>2</sup> Based on 24-inch concrete piles at an average of 5-meters relative water depth.

<sup>3</sup> Based on 24-inch steel pipe piles at an average of 5-meters relative water depth.

Construction noise can cause behavioral changes for sturgeon. NOAA-NMFS generally uses 150 dB RMS as the threshold for behavioral effects to listed fish species (Caltrans 2015). Use of the vibratory hammer to install the bridge columns and temporary work trestle may exceed 150 dB and cause a behavioral disturbance or stress. Noise from the vibratory hammer would be intermittent. Permanent piles would require a total of 236 days for installation in open waters and nearby tidal marsh and temporary trestle piles would require additional auditory strikes. It is reasonable to assume that a sturgeon, upon detecting underwater levels of noise would modify its behavior such that it redirects its course of movement away from the ensonified area. These movements would not amount to substantial changes to essential sturgeon foraging behaviors.

In 2008, the Fisheries Habitat Working Group (FHWG) developed the *Agreement in Principal for Interim Criteria for Injury to Fish from Pile Driving Activities*, which identifies the following thresholds for onset of physical injury to fish: 206 decibels (dB) peak; 187 dB cumulative SEL for fish 2 grams or greater; and 183 dB cumulative SEL for fish of less than 2 grams (FHWG 2008). As shown in Table 1, the SEL thresholds are not expected to be exceeded by the project activities.

#### 6.1.2 Construction Material Strikes or Vessel Strikes

If sturgeon were present within the project area, potential impacts to sturgeon could result from direct strikes by construction equipment (piles, casings, etc) or by construction vessels (work boats or barges).



The factors relevant to determining the risk to fish from vessel strikes vary but may be related to the size and speed of the vessels, navigational clearance (i.e., depth of water and draft of the vessel) in the area where the vessel is operating, and the behavior of individuals in the area. No evidence of ship strike interactions with sturgeon on the Ashley River is available. The use of construction vessels during the construction period will not meaningfully increase the risk of interactions between listed species and vessels in the action area when added to baseline conditions. As such, any increased risk of a vessel strike caused by the project would be too small to be meaningfully measured or detected. As a result, the increased risk of a vessel strike on listed species in the action area is not expected to be substantial.

### 6.1.3 Water Quality

Turbidity associated with construction may be increased through the placement of fill for bridge approaches and pile driving or construction of drilled shafts. Turbidity from pile driving may temporarily decrease water quality. Pouring concrete into the drilled shaft casings would require a sequencing plan from the contractor to ensure that no spills of material into nearby waters would occur. Temporary formwork for the bent construction and superstructure would need to be removed over the water. The contractor would provide a staged plan for removing the formwork, and would utilize Best Management Practices (BMPs) such as netting, floating barges, and/or other containment measures. The contractor would be required to submit a painting operation plan to include timing, methodologies to prohibit overspray into waters or adjacent vegetation, and weather and wind thresholds for painting operations. Temporary clearing within the salt marsh adjacent to the Ashley River may occur to install erosion and sediment control measures. The contractor would utilize SCDOT BMPs for soil and erosion control, which may include seeding of slopes, silt fences, standard height (5 feet) turbidity curtains, and sediment basins as appropriate, and prepare a spill prevention and pollution control plan to minimize the potential impact on adjacent wetlands. Timber mats and/or barges may cause temporary impacts to salt marsh grasses during construction. However, the SCDOT would minimize these temporary impacts by regularly moving mats and barges to limit compaction of marsh soils and shading of marsh grasses.

## 6.3 Interrelated and Interdependent Actions and Activities

Interrelated and interdependent actions are those that are part of a larger action and depend on the larger action for their justification. There are no related or dependent actions to the I-526 West project.

## 7. Effect Determinations

This section includes effect determinations to listed species. There are no proposed species, candidate species, or critical habitat within or near the PSA. **The proposed project may affect, but is not likely to**

**adversely affect, shortnose sturgeon or Atlantic sturgeon.** This biological assessment analyzes the proposed action to determine the potential adverse effects to these species as a result of bridge construction. Risk factors include being struck by construction equipment (piles, barges, trestles), construction-associated noise and turbidity, temporary or permanent loss of habitat, and temporary disruption of spawning/migratory behaviors.

## 8. Environmental Commitments and Conservation Measures

The SCDOT commits to implementing the following conservation measures, or actions, to minimize or compensate for effects to each species:

- Follow SCDOT Best Management Practices during construction (Appendix D)
- Obtain NPDES permit and prepare a Stormwater Pollution Prevention Plan
- Ensure equipment does not obstruct or impede passage through more than 50 percent of the Ashley River.
- Use of “slow starts” for pile driving, barge movement, and other vessel movement where activity ramps up slowly in an effort to deter marine species from the work area.
- Avoid demolition of existing in-water structures.

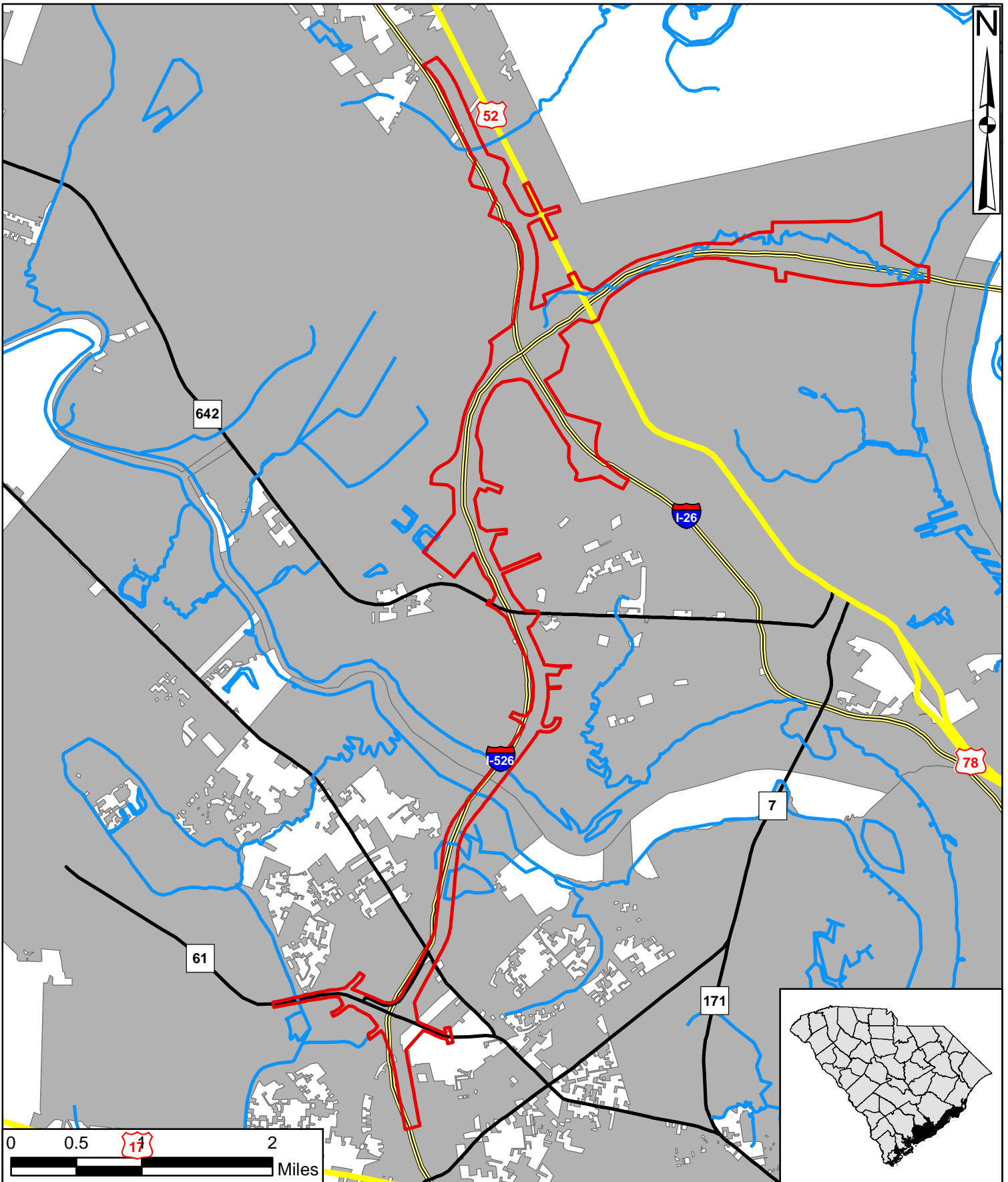
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## **Appendix A**

<b>Figure 1</b>	<b>Project Location Map</b>
<b>Figure 2</b>	<b>SC DHEC Waters Classification</b>
<b>Figure 3</b>	<b>HUC Boundary and Water Quality Monitoring Stations</b>
<b>Figure 4</b>	<b>Shellfish Harvest Classifications</b>





Source:  
Composite County  
Roadway Data







Drawn By: RHH  
QA/QC: KLM

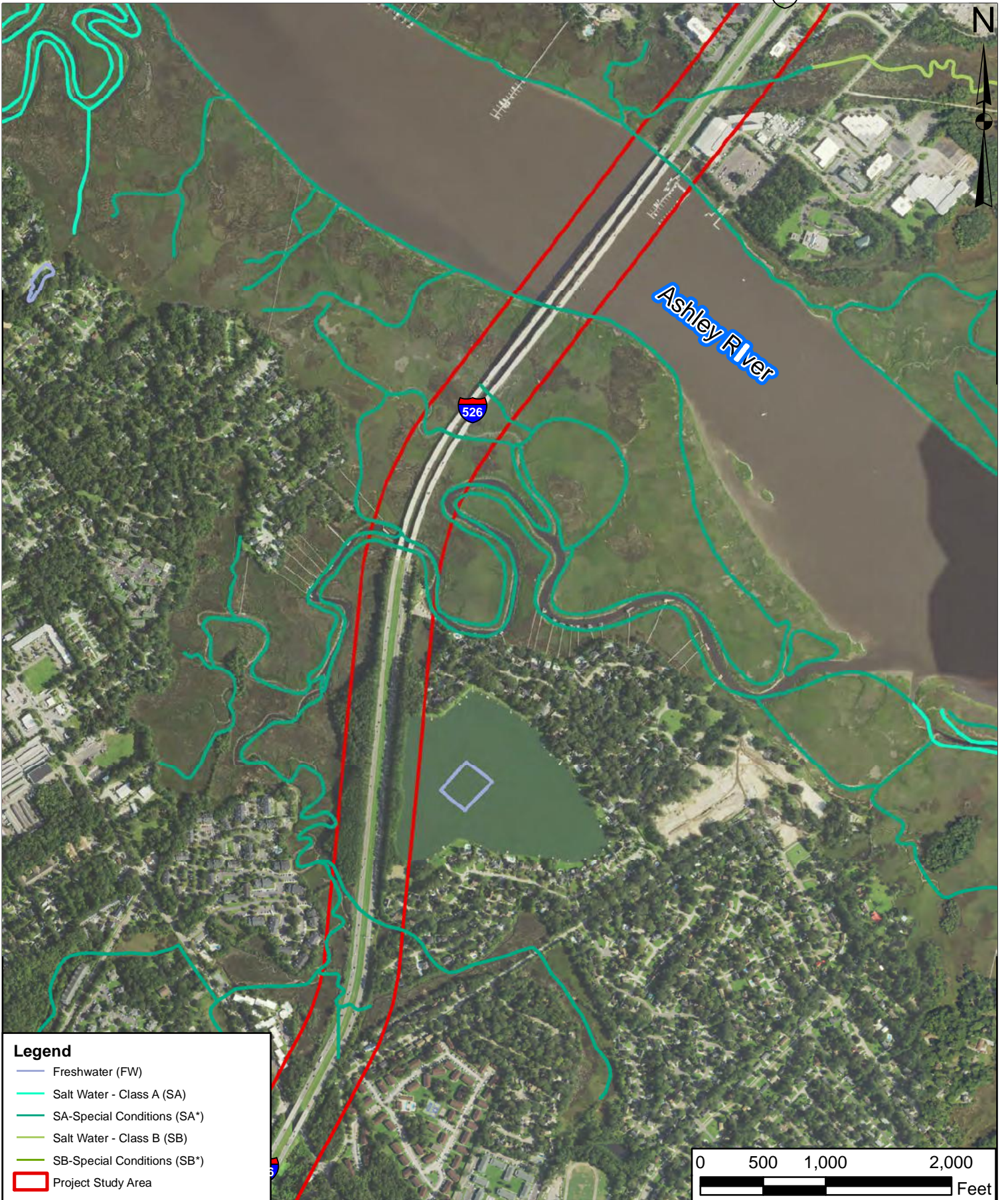
**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

Project Location

Figure 1

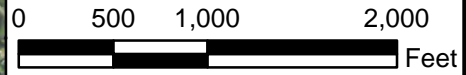
**Legend**

-  Project Study Area
-  Streams
-  SC Route
-  US Route
-  Interstate
-  Incorporated City Limits



**Legend**

- Freshwater (FW)
- Salt Water - Class A (SA)
- SA-Special Conditions (SA\*)
- Salt Water - Class B (SB)
- SB-Special Conditions (SB\*)
- Project Study Area





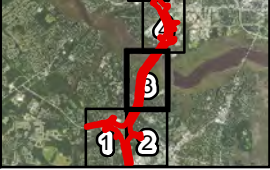
Source:  
 SCDHEC Water Quality Tool  
 2020  
 R.61-69 Effective 6/22/2012

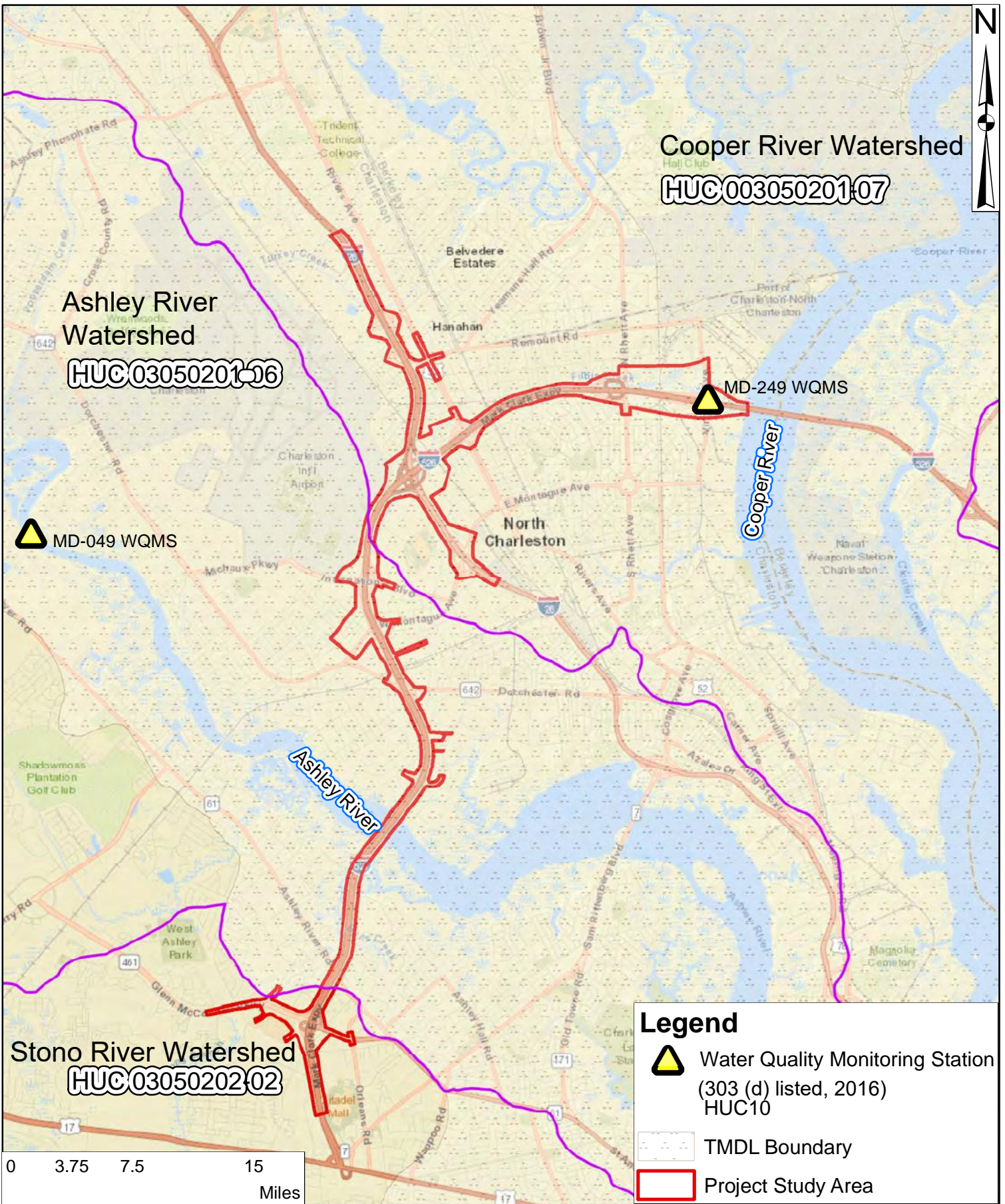
Drawn By: RHH  
 QA/QC: KLM

**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**




Waters Classification

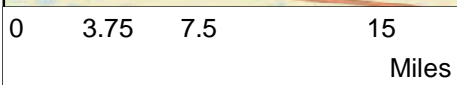
Figure 2



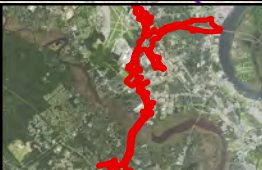




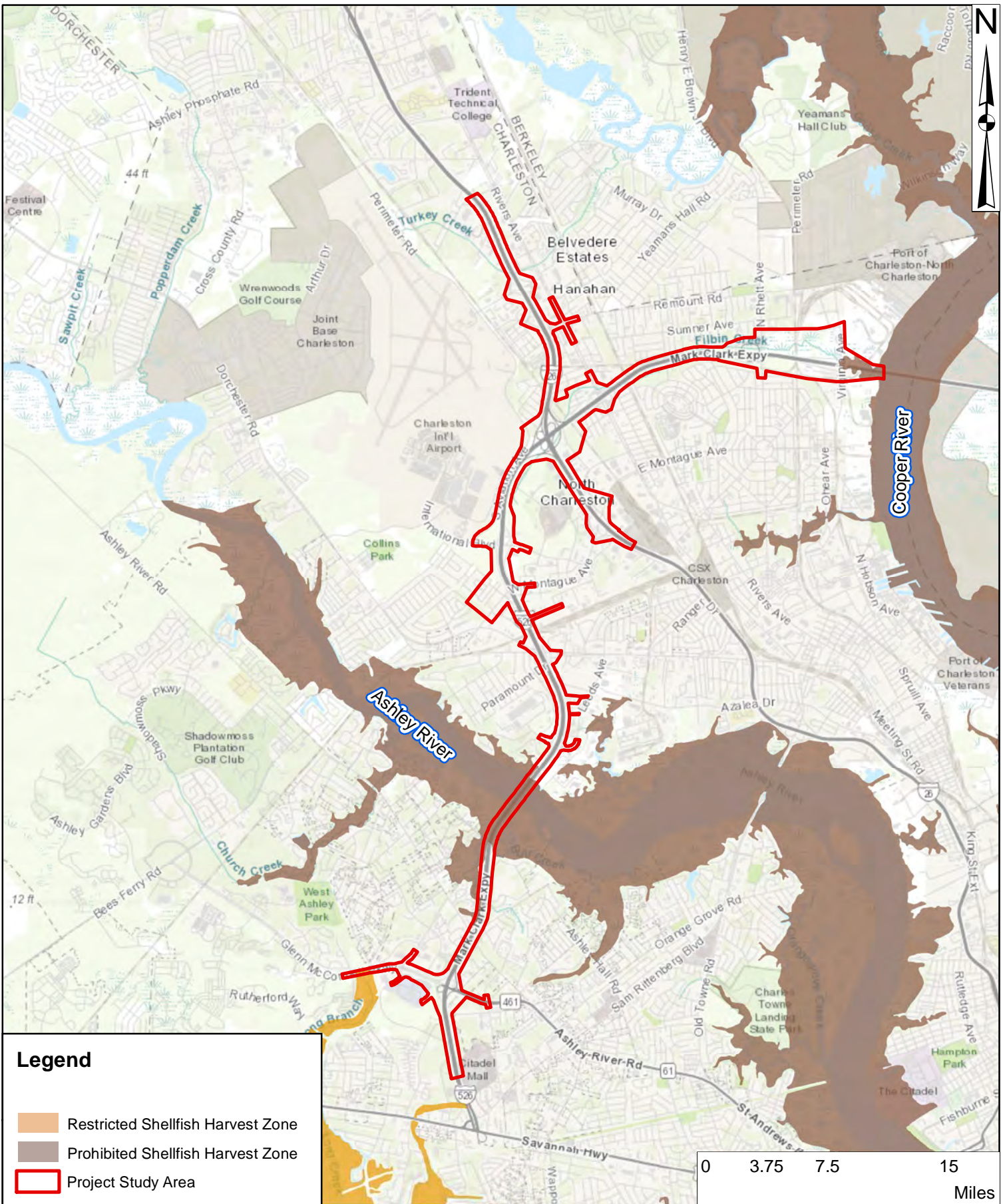
**Legend**

-  Water Quality Monitoring Station (303 (d) listed, 2016) HUC10
-  TMDL Boundary
-  Project Study Area



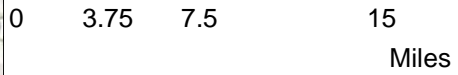
 	Source: USGS NHD January 2020	I-526 Lowcountry Corridor West Charleston County SCDOT P032102 February 2020		
	Drawn By: RHH QA/QC: KLM	HUC Boundary Dataset TMDL Boundary	Figure 3	





**Legend**

- Restricted Shellfish Harvest Zone
- Prohibited Shellfish Harvest Zone
- Project Study Area



Source:  
SCDHEC Water Quality Tool  
2020

**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

Drawn By: RHH  
QA/QC: KLM

Shellfish Harvest  
Classification

Figure 4



# **Appendix B**

## **I-526 Ashley River Conceptual Design Plans and Impact Areas**



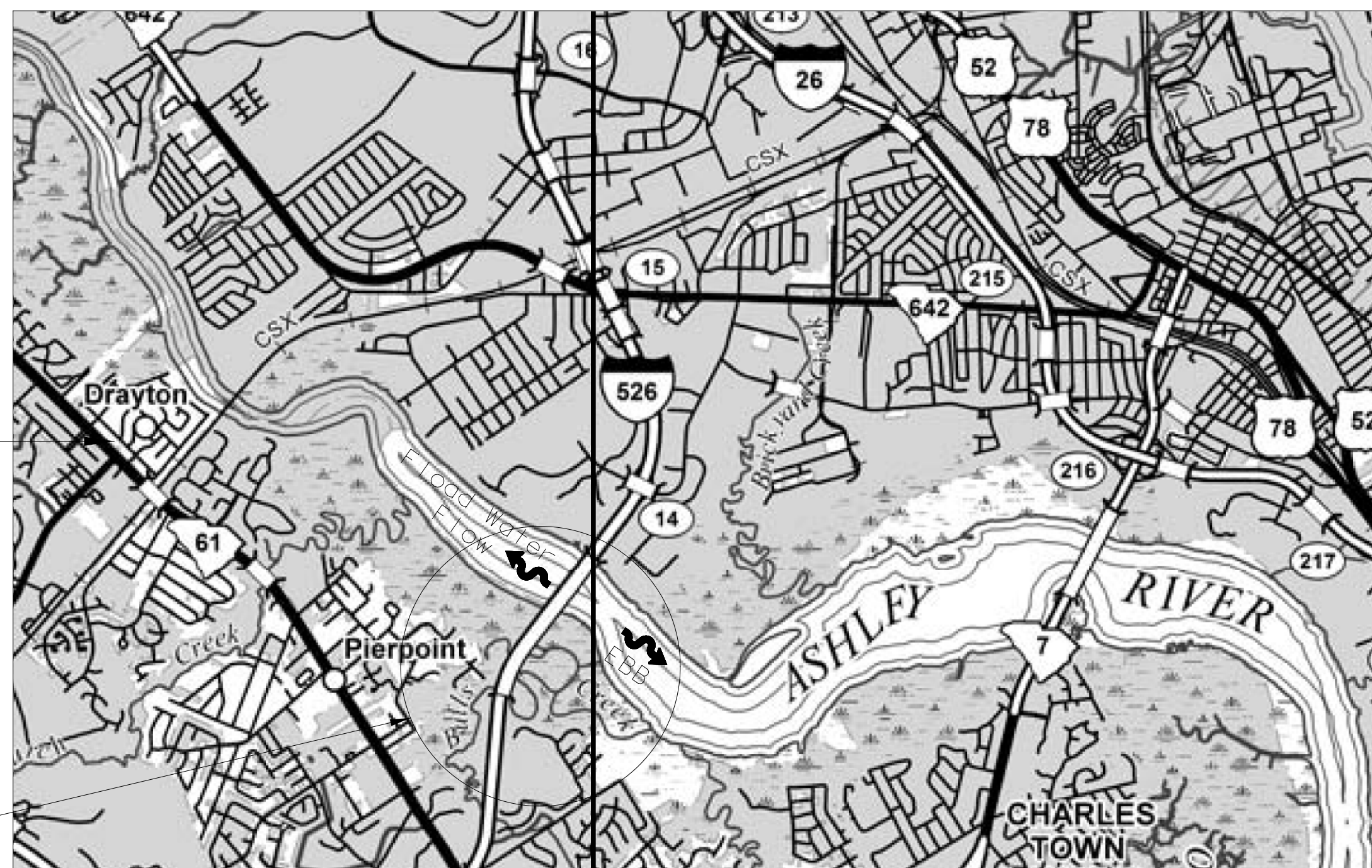
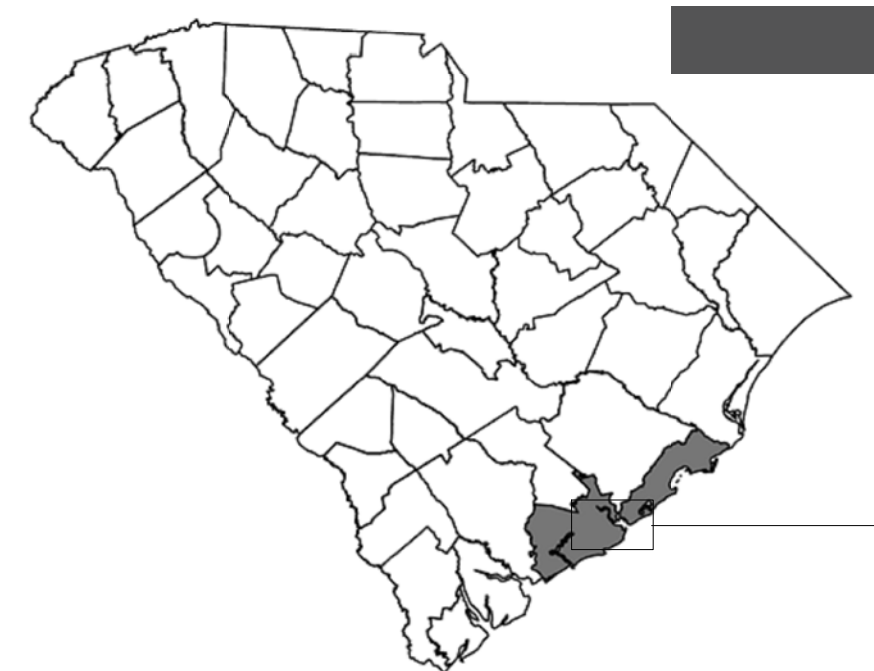
South Carolina Department of Transportation

CONCEPTUAL PLANS  
NOT FOR CONSTRUCTION

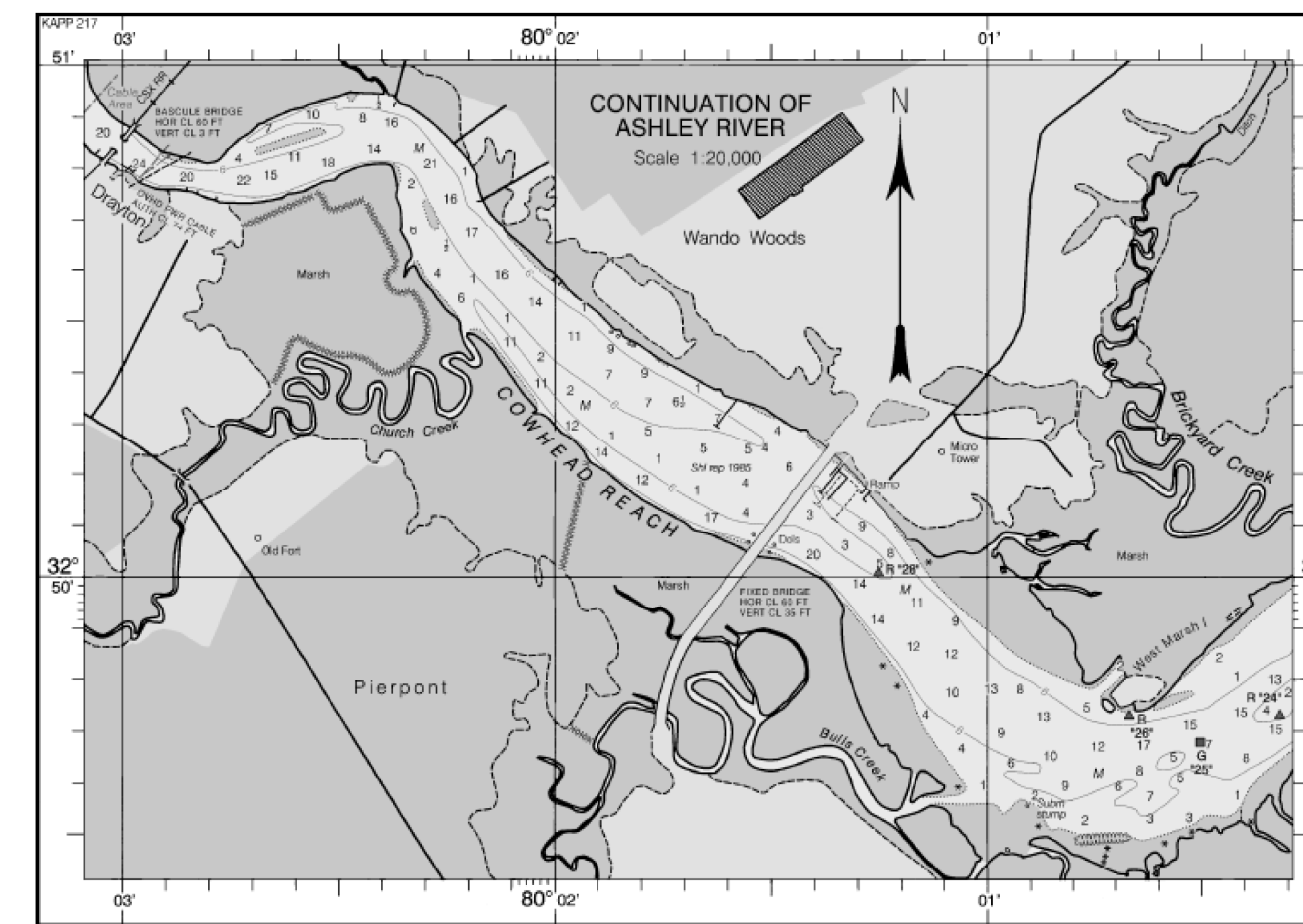
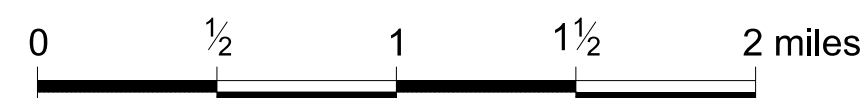
# CONCEPTUAL PLANS UTILIZED TO OBTAIN COAST GUARD BRIDGE PERMIT

## WIDEN TWIN BRIDGES OVER BULLS CREEK AND ASHLEY RIVER ALONG I-526 (MARK CLARK EXPRESSWAY) IN CHARLESTON, CHARLESTON COUNTY, SOUTH CAROLINA

Approximate Location of Bridge is  
Latitude 32°-50'-07" N  
Longitude 80°-01'-28" W



VICINITY MAP



LOCATION MAP

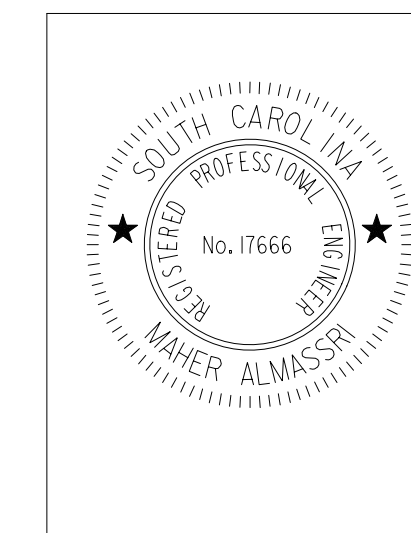
WIDEN 3907.5' TWIN BRIDGES ALONG I-526 (MARK CLARK EXPY) OVER BULLS CREEK & ASHLEY RIVER (GENERAL WILLIAM C. WESTMORELAND BRIDGE)

CE CIVIL ENGINEERING  
CS CONSULTING SERVICES, INC.

SOUTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

WIDEN WESTMORELAND TWIN BRIDGES OVER  
ASHLEY RIVER AND BULL CREEK  
VICINITY/LOCATION MAP

I-526 (MARK CLARK EXPRESSWAY)  
RIVER MILE 10.6 OVER ASHLEY RIVER AND  
RIVER MILE 1.4 OVER BULLS CREEK  
BETWEEN NORTH CHARLESTON AND  
CHARLESTON, CHARLESTON COUNTY, SC



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REVIEWED			
QUAN.			
DR.	MSA	DPM	10-20
DES.			
BY	CHK.	DATE	

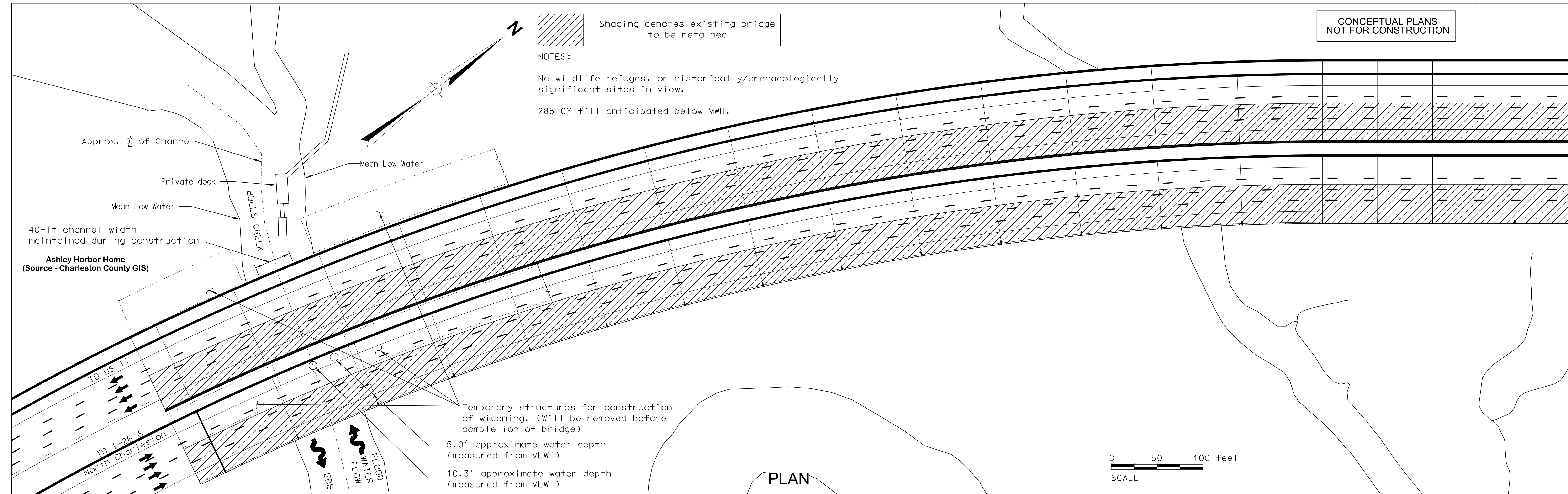
DATE: 10/13/2020

SHEET NUMBER: 1 OF 5

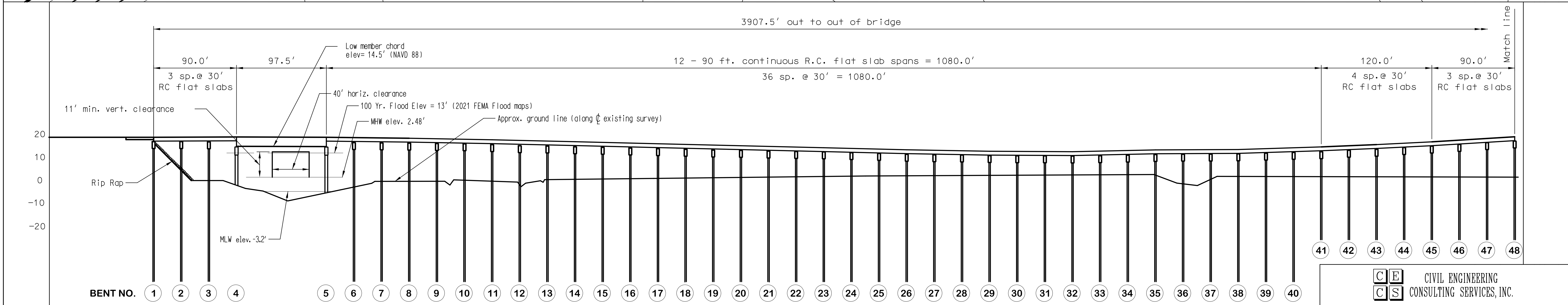
CONCEPTUAL PLANS  
NOT FOR CONSTRUCTION

Shading denotes existing bridge  
to be retained

NOTES:  
No wildlife refuges, or historically/archaeologically  
significant sites in view.  
285 CY fill anticipated below MWH.



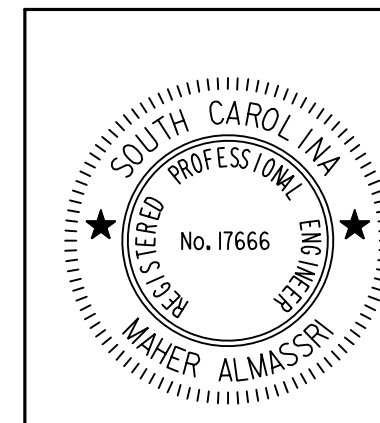
PLAN



ELEVATION VIEW

Water Surface Elevation (WSE) Datum: NAVD 88  
WSE information shown for NOAA Station 8665099, I-526 BRIDGE, ASHLEY RIVER, SC,  
1983-2001 epoch. Datum translation using NOAA VDatum.

CONCEPTUAL SUBSTRUCTURE:  
Bents 1-3 & 6-48 - Driven Prestressed piles  
Bents 4 & 5 - Round Concrete Columns



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REV.			
REVIEWED			
QUAN.			
DR.	MSA	DPM	10-20
DES.			
BY	CHK.	DATE	

CIVIL ENGINEERING  
CONSULTING SERVICES, INC.

SOUTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

WIDEN WESTMORELAND TWIN BRIDGES OVER  
ASHLEY RIVER AND BULL CREEK  
BRIDGE PLAN AND PROFILE 1

I-526 (MARK CLARK EXPRESSWAY)  
RIVER MILE 10.6 OVER ASHLEY RIVER AND  
RIVER MILE 1.4 OVER BULLS CREEK  
BETWEEN NORTH CHARLESTON AND  
CHARLESTON, CHARLESTON COUNTY, SC

DATE: 10/13/2020 SHEET NUMBER: 2 OF 5

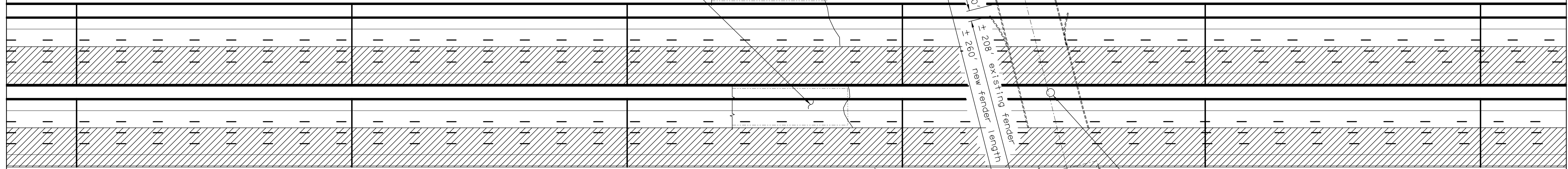
Shading denotes existing bridge to be retained

Holland Charles G.  
(Source - Charleston County GIS)

Temporary structures for construction of widening.  
(Will be removed before completion of bridge)

17.0' approx. water depth  
(measured from MLW)

Existing 208' fender to be extended approx. 52' on same alignment with similar material and configuration (currently timber piling) to approximately 260' total length. Extend on this side of the bridge only. A temporary channel width of 50-ft proposed during construction of fender extensions.



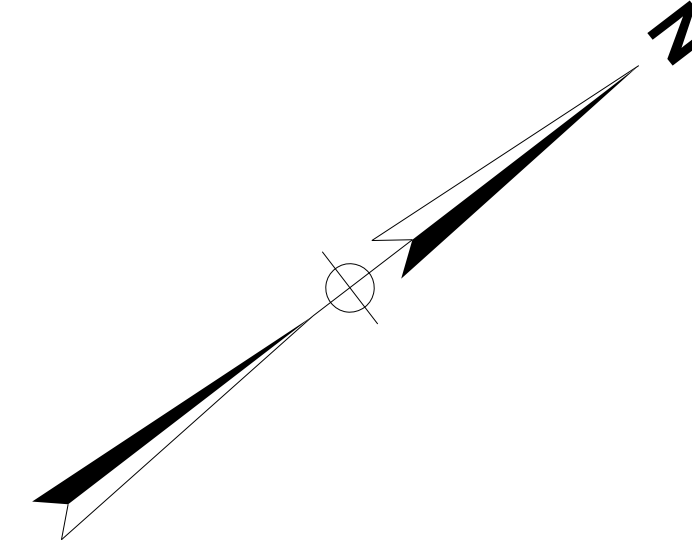
NOTES:

Low chord elevation is to be determined by the designer  
A 35' minimum vertical clearance will be maintained.

Crane barges will be moored in river behind the fenders during fender construction.

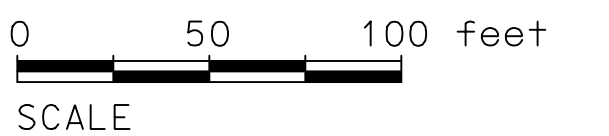
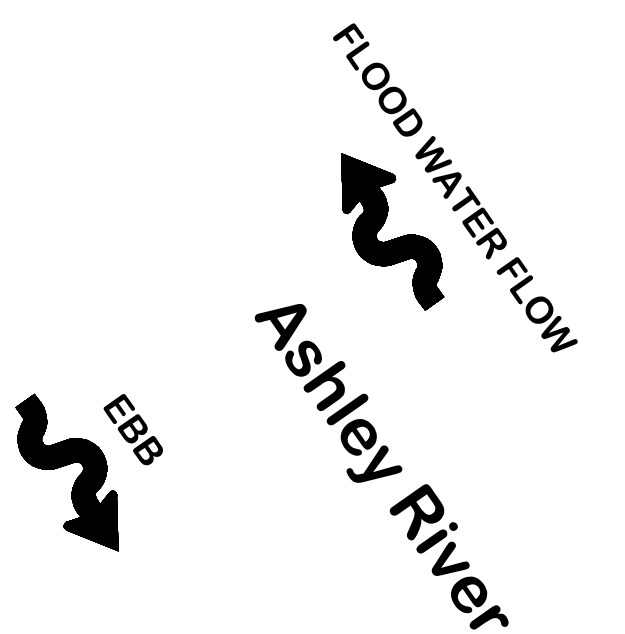
No wildlife refuges, or confirmed historically/archaeologically significant sites in view.

Weatherly Harwood Jr.  
(Source - Charleston County GIS)



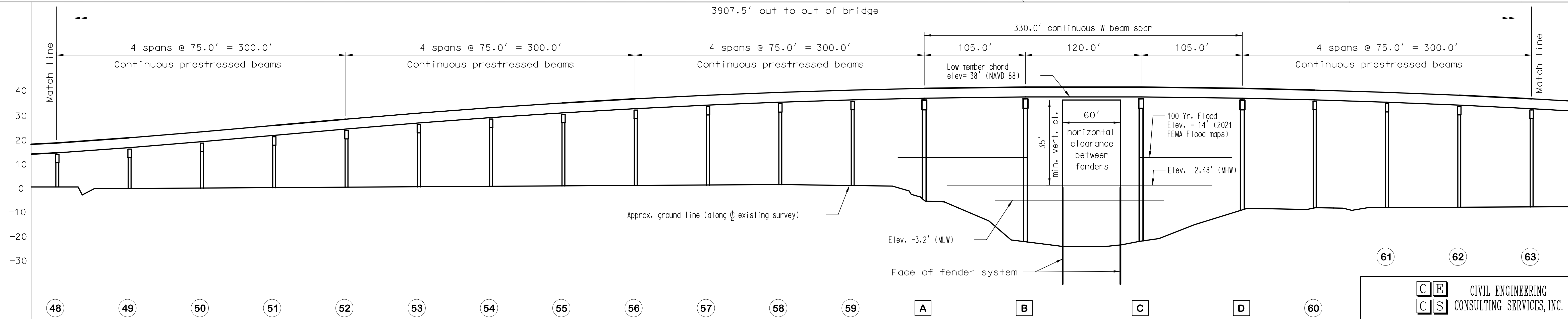
PLAN

ANOMALY 006-1  
(NRHP Eligibility undetermined)



CONCEPTUAL PLANS  
NOT FOR CONSTRUCTION

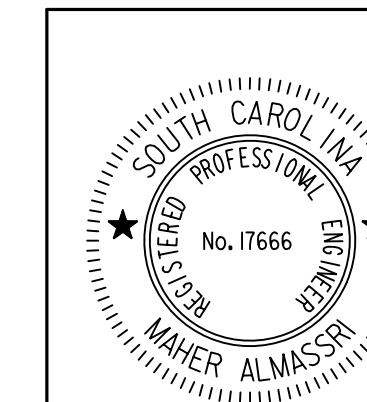
3907.5' out to out of bridge



CONCEPTUAL SUBSTRUCTURE:  
Bents 48-63, A, B, C, and D - Round Concrete Columns

ELEVATION VIEW

Water Surface Elevation (WSE) Datum: NAVD 88  
WSE information shown for NOAA Station 8665099, I-526 BRIDGE, ASHLEY RIVER, SC,  
1983-2001 epoch. Datum translation using NOAA VDatum.



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REVIEWED			
QUAN.			
DR.	MSA	DPM	10-20
DES.			
BY	CHK.	DATE	

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CS CONSULTING SERVICES, INC.

SOUTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

WIDEN WESTMORELAND TWIN BRIDGES OVER  
ASHLEY RIVER AND BULL CREEK  
BRIDGE PLAN AND PROFILE 2

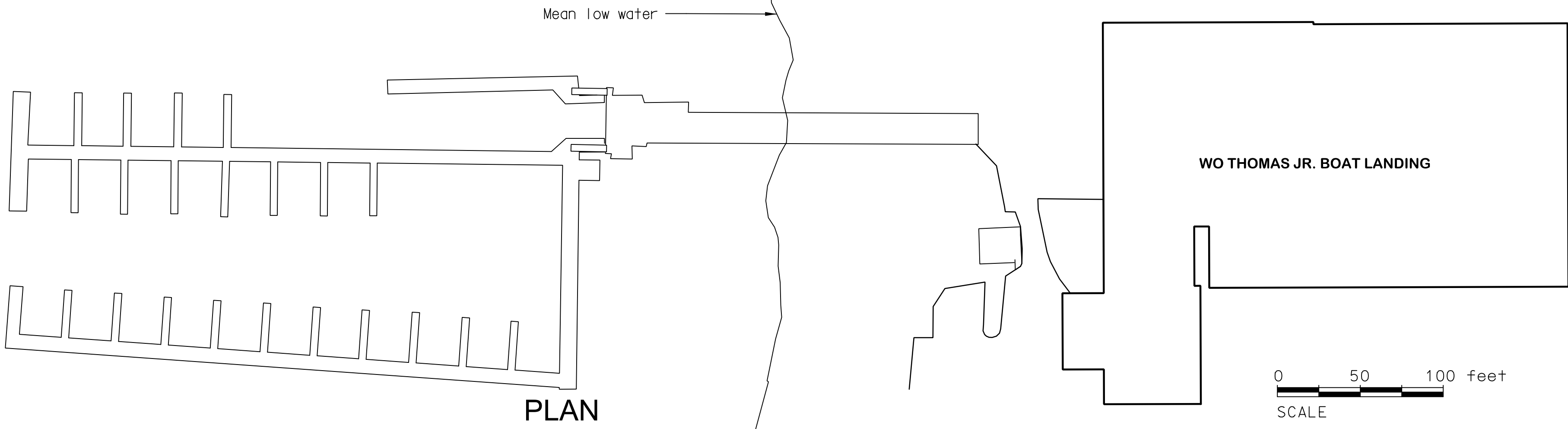
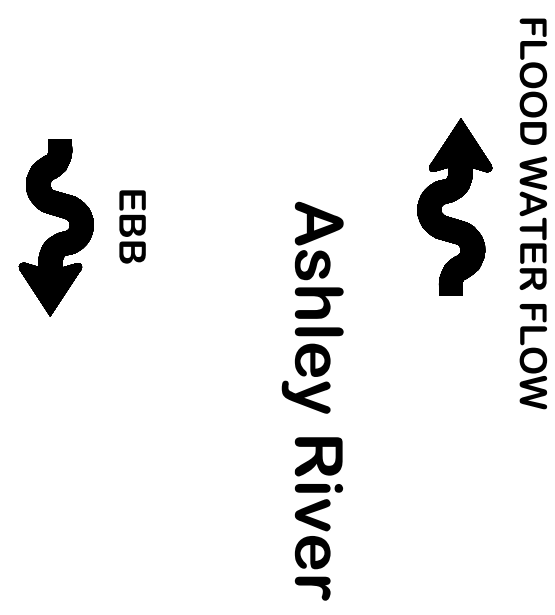
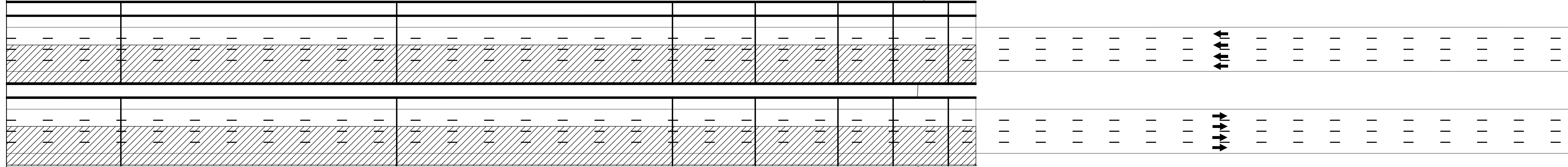
I-526 (MARK CLARK EXPRESSWAY)  
RIVER MILE 10.6 OVER ASHLEY RIVER AND  
RIVER MILE 1.4 OVER BULLS CREEK  
BETWEEN NORTH CHARLESTON AND  
CHARLESTON, CHARLESTON COUNTY, SC

DATE: 10/13/2020 SHEET NUMBER: 3 OF 5

Shading denotes existing bridge to be retained

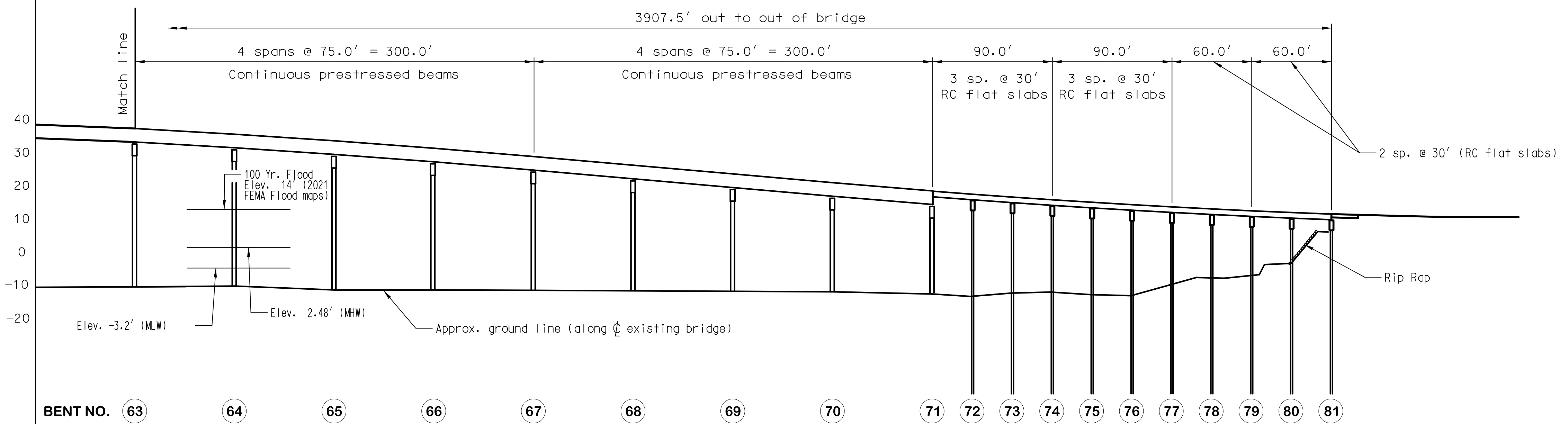
Lowcountry open land  
(Source - Charleston County GIS)

CONCEPTUAL PLANS  
NOT FOR CONSTRUCTION



NOTES:  
No wildlife refuges, or historically/archaeologically significant sites in view.  
281 CY fill anticipated below MWH.

PLAN



ELEVATION VIEW

Water Surface Elevation (WSE) Datum: NAVD 88  
WSE information shown for NOAA Station 8665099, I-526 BRIDGE, ASHLEY RIVER, SC, 1983-2001 epoch. Datum translation using NOAA Vdatum.

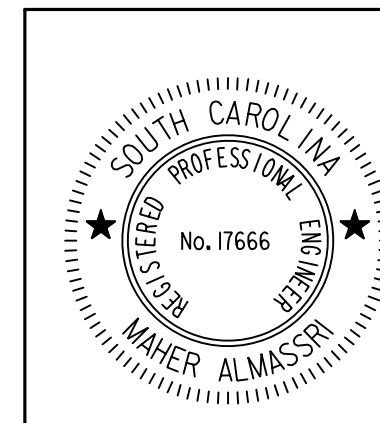
CONCEPTUAL SUBSTRUCTURE:  
Bents 72-81- Driven Prestressed piles  
Bents 63-71 - Round Concrete Columns

CE CIVIL ENGINEERING  
CS CONSULTING SERVICES, INC.

SOUTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

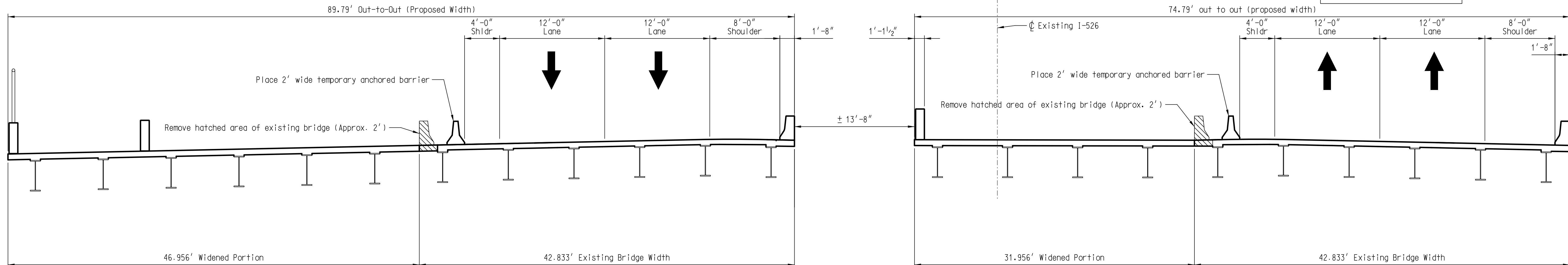
WIDEN WESTMORELAND TWIN BRIDGES OVER  
ASHLEY RIVER AND BULL CREEK  
BRIDGE PLAN AND PROFILE 3

I-526 (MARK CLARK EXPRESSWAY)  
RIVER MILE 10.6 OVER ASHLEY RIVER AND  
RIVER MILE 1.4 OVER BULLS CREEK  
BETWEEN NORTH CHARLESTON AND  
CHARLESTON, CHARLESTON COUNTY, SC



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QUAN.			
DR.	MSA	DPM	10-20
DES.			
BY	CHK.	DATE	

CONCEPTUAL PLANS  
NOT FOR CONSTRUCTION

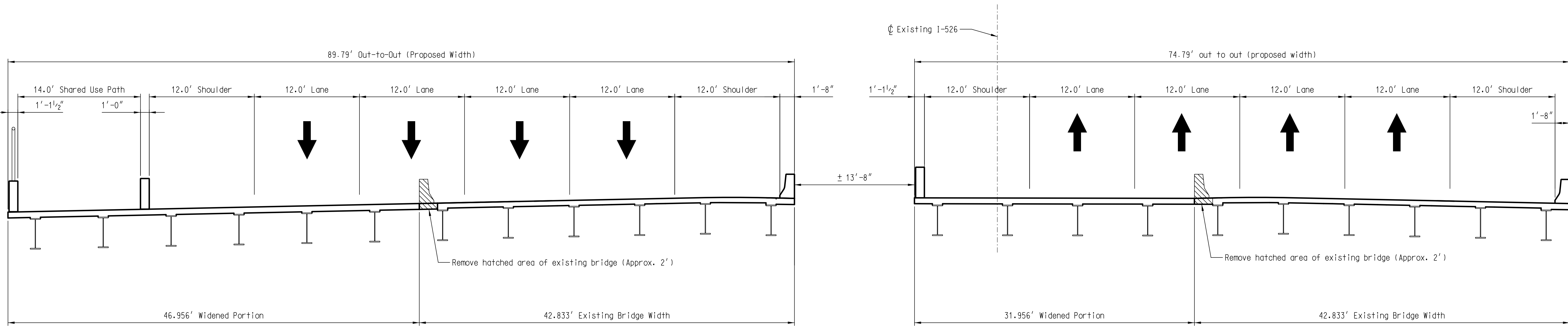


**I-526 WEST BOUND**

**I-526 EAST BOUND**

**WIDENING SCHEMATIC**

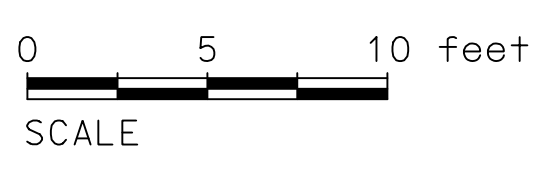
Looking Northbound  
Maintain 2 lanes of traffic in each direction during construction



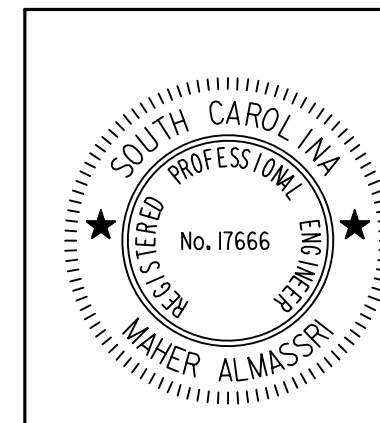
**I-526 WEST BOUND**

**I-526 EAST BOUND**

**FINAL CONFIGURATION**



NOTES:  
See Sheets 2-4 for notes on substructure construction.



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QUAN.			
DR.	MSA	DPM	10-20
DES.			
BY	CHK.	DATE	

**CE** CIVIL ENGINEERING  
**CS** CONSULTING SERVICES, INC.

SOUTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

**WIDEN WESTMORELAND TWIN BRIDGES OVER  
ASHLEY RIVER AND BULL CREEK  
BRIDGE STAGING**

I-526 (MARK CLARK EXPRESSWAY)  
RIVER MILE 10.6 OVER ASHLEY RIVER AND  
RIVER MILE 1.4 OVER BULLS CREEK  
BETWEEN NORTH CHARLESTON AND  
CHARLESTON, CHARLESTON COUNTY, SC

DATE: 10/13/2020 SHEET NUMBER: 5 OF 5

# **Appendix C**

**I-526 Lowcountry Corridor West Natural Resources Technical Memorandum**

**SEE NRTM IN FEIS APPENDIX L.1**



# Appendix D

## SCDOT Best Management Practices (Section 815 Erosion Control Specifications)

## SECTION 815

### EROSION CONTROL

#### 815.1 Description

- 1 This section contains specifications for the materials, equipment, construction, measurement, and payment for the placement of temporary erosion control measures to prevent erosion and water pollution through the use of best management practices including the use of berms, silt basins, silt ditches, sediment dams, fiber roving, rolled erosion control products, silt fences, floating turbidity barriers, brush barriers, sediment tubes, inlet filters, bonded fiber matrix, flexible growth matrix, temporary flexible pipe slope drains, temporary seeding, and stabilized construction entrances in conformity with the Plans the Specifications, *SCDOT Standard Drawings*, or as directed by the RCE.

#### 815.1.1 Erosion Control Device Applications

##### 815.1.1.1 Rolled Erosion Control Products (RECP)

##### 815.1.1.1.1 Temporary Erosion Control Blankets

- 1 Erosion control blanket will be designated on the Plans or by the RCE. The following criteria will be followed to select the type of blanket utilized:
- Install Type A temporary erosion control blankets on slopes 2H:1V or flatter only. For slopes greater than 2H:1V, use turf reinforcement matting (TRM).
  - Install Type B temporary erosion control blankets on channels or concentrated flow areas with a maximum calculated design shear stress less than or equal to 1.75 lbs/ft<sup>2</sup>. For channels and concentrated flow areas with design shear stresses greater than 1.75 lbs/ft<sup>2</sup>, use TRM.
  - Install Type C temporary erosion control blankets on areas where the establishment of temporary erosion control is critical and seeding needs additional reinforcement. Use temporary blankets for anionic polyacrylamide applications on slopes 2H:1V or flatter.

##### 815.1.1.1.2 Turf Reinforcement Matting (TRM)

- 1 Turf reinforcement matting will be designated on the Plans or by the RCE. The following criteria will be followed to select the type of TRM utilized:
- Install a Type 1 TRM on slopes 2H:1V or flatter or in channels where the calculated design shear stress is 4.0 lbs/ft<sup>2</sup> or less and the design flow velocity reaches a value up to 10-ft/sec.
  - Install a Type 2 TRM on slopes 1.5H:1V or flatter or in channels where the calculated design shear stress is 6.0 lbs/ft<sup>2</sup> or less and a design flow velocity reaches a value up to 15-ft/sec.
  - Install a Type 3 TRM on slopes 1H:1V or flatter or in channels where the calculated design shear stress is 8.0 lbs/ft<sup>2</sup> or less and the de-

sign flow velocity reaches a value up to 20-ft/sec.

- Install a Type 4 TRM on slopes 1H:1V or greater or in channels where the calculated design shear stress is up to 12 lbs/ft<sup>2</sup> and the design flow velocity reaches a value up to 25-ft/sec, and when field conditions exist with high loading and/or high survivability requirements.

#### **815.1.1.2 Sediment Tubes**

- 1 Sediment tubes are temporary erosion control devices installed along contours, in drainage conveyance swales, and around drainage inlets to reduce the effects of soil erosion and to retain sediment. Locations for installation will be designated on the Plans or by the RCE.

#### **815.1.1.3 Inlet Structure Filters**

- 1 Inlet structure filters are temporary erosion control devices installed around pipe inlet structures to trap sediment and keep silt, sediment, and construction debris from entering pipe systems through open inlet structures. Additionally, inlet structure filters are used to prevent the silting-in of inlets, storm drainage systems, and receiving channels. Locations for installation will be designated on the Plans or by the RCE.
- 2 The criteria for the use of Inlet Structure Filter Types A, B, D, E, and F are identified in **Subsections 815.1.1.3.1 through 815.1.1.3.5.**

##### **815.1.1.3.1 Type A Low Flow Inlet Filters**

- 1 Install a Type A low flow inlet filter for inlets with a peak flow rate less than 1 ft<sup>3</sup>/sec, the inlet drain area grade is less than 5%, and the immediate drainage area (5-foot radius around the inlet) grade is less than 1%. Do not use for areas receiving concentrated flow.

##### **815.1.1.3.2 Type B Medium Flow, Low Velocity Inlet Filters**

- 1 Install a Type B medium flow, low velocity inlet filter for inlets with a peak flow rate less than 3 ft<sup>3</sup>/sec, the inlet drain area grade is less than 5%, and the flow velocity to the inlet does not exceed 3 ft/sec. Use this type of filter where an overflow capacity is not required to prevent excessive ponding around the structure.

##### **815.1.1.3.3 Type D High Flow, High Velocity Inlet Filters**

- 1 Install a Type D high flow, high velocity inlet filter for a drainage area up to 2 acres with peak flow rates greater than 3 ft<sup>3</sup>/sec, the inlet drain area grade is greater than 5%, and the flow velocity to the inlet may exceed 3 ft/sec. Use Type D1 filters for median applications. Use Type D2 for sump applications. Use Type D1 or D2 filters where an overflow capacity is required to prevent excessive ponding around the structure and to protect inlet structures not associated with curb inlets. Use to protect structure inlets such as Catch Basin Type 9, yard inlets, Drop Inlet 24 inches by 24 inches, Drop Inlet 24 inches by 36 inches, and manholes.

**815.1.1.3.4 Type E Surface Course Curb Inlet Filters**

- 1 Install a Type E surface course curb inlet filter to protect Catch Basin Types 1, 16, 17, and 18 after the road surface course is placed.

**815.1.1.3.5 Type F Inlet Tubes**

- 1 Type F inlet tubes are classified into two categories: weighted and non-weighted. Install a weighted Type F inlet tube to protect Catch Basin Types 1, 9, 12, 14, 15, 16, 17, and 18, Drop Inlet 24 inches by 24 inches, Drop Inlet 24 inches and 36 inches, manholes, and trench drains where drainage areas are less than 1 acre. Place the weighted inlet tube on gravel, concrete, asphalt, or other hard surfaces around drainage inlet. Install a weighted Type F inlet tube where construction traffic may occur around the inlet. All weighted Type F inlet structure filters are applicable as Type E inlet structure filters.
- 2 Use non-weighted Type F inlet tubes as inlet filters for Catch Basins Type 1, 16, 17, and 18 with drainage areas less than 1 acre. Place non-weighted Type F inlet tubes on subgrade and are applicable until the road base course is placed.
- 3 Use both weighted and non-weighted Type F inlet tubes as weep hole inlet filters. Use non-weighted Type F inlet tubes only where stakes can be driven into the ground or subgrade to secure the tube.

**815.1.1.4 Stabilized Construction Entrance**

- 1 Locate a stabilized construction entrance, which is a temporary stone-stabilized pad with a non-woven geotextile fabric underlining, at defined points of vehicular ingress and egress on construction sites to reduce the amount of mud, dirt, and rocks transported onto public roads by motor vehicles, equipment, and runoff. Taper the edges of the entrance out towards the road to prevent tracking of mud at the edge of the entrance, and so that long vehicles do not leave the stabilized area when turning onto or off the paved roadway.

**815.1.1.5 Bonded Fiber Matrix (BFM)**

- 1 Use a bonded fiber matrix (BFM) as an allowable substitution for mulch or in temporary seeding applications and seeding applications as outlined in **Section 810**.
- 2 Install BFMs in the following situations:
  - Enhancement of temporary seeding operations to reduce erosion and expedite seed germination.
  - A high performance mulch is required for permanent seeding.
  - Seeding application takes place on highly erodible soil or slopes.
  - Slopes up to 1H:1V.
  - The required functional longevity of soil protection is 6 months or less.
  - The soil is dry and rain is not expected within 48 hours after application.

### 815.1.1.5

### 815.2.1.1

- There is a high degree of certainty that heavy rains will not follow application.
- 3 Do not use a BFM as Type A temporary erosion control blanket, channel liners, or in areas receiving concentrated flow.

#### 815.1.1.6 Flexible Growth Matrix (FGM)

- 1 Install a flexible growth matrix (FGM) in the following situations:
- As a Type A temporary erosion control blanket,
  - On slopes up to 2H:1V.
  - As an infill for a TRM on slopes greater than 2H:1V.
  - Environmentally sensitive wetlands and other wildlife areas not compatible for products containing netting.
  - The site requires strong mechanical and chemical bonds to withstand greater surface flow and/or severe slopes.
  - The required functional longevity of soil protection is up to 1-year.
  - The site requires immediate erosion protection and there is a risk of impending weather.
  - Fast vegetation establishment is required.
  - A high factor of design safety is required.
- 3 Do not use an FGM as a channel liner or for areas receiving concentrated flow.

## 815.2 Materials

### 815.2.1 Rolled Erosion Control Products (RECP)

#### 815.2.1.1 Temporary Erosion Control Blankets

- 1 When not used with polyacrylamide slope applications, provide temporary erosion control blankets with a core composed primarily of biologically, photochemically or otherwise degradable constituents such as wheat straw, coconut fiber, straw-coconut blends, or aged curled excelsior wood fiber with longevity of approximately 1 to 3 years.
- 2 Ensure that the core is enclosed in double netted matting (i.e., matting with netting on both sides of the blanket) composed of non-organic, photodegradable, or biodegradable polypropylene netting. Ensure that the top netting consists of degradable polypropylene with a maximum mesh opening of 0.75 inch by 0.75 inch, and the bottom netting consists of degradable polypropylene with a maximum mesh opening of 0.50 inch by 0.50 inch. Ensure that netting is stitched together at not more than 2 inches on center. For blankets composed of aged curled excelsior wood fiber, ensure that both the top and bottom netting consist of degradable polypropylene with a maximum mesh opening of 1.0 inch by 1.0 inch and that it consists of aged curled excelsior wood interlocking fibers with 80% of the fibers a minimum of 6 inches long. Ensure that the netting is stitched together at not more than 2 inches on cen-

ter. Do not use jute netting.

- 3 Provide Class A and Class B temporary erosion control blankets with physical properties derived from quality control testing performed by a laboratory accredited by the Geosynthetic Accreditation Institute – Laboratory Accreditation Program (GAI-LAP) and conforming to the following Minimum Average Roll Values (MARV) shown in the following table.

<b>Temporary Erosion Control Blankets</b>	
<b>Physical Properties</b>	<b>MARV</b>
Minimum mass per unit area (ASTM D 6475)	6 oz/yd <sup>2</sup>
Minimum thickness (ASTM D 6525)	0.25 inch
Minimum initial grab tensile strength (ASTM D 6818)	75 x 75 lbs/ft
Minimum roll width	48 inches
Note: For Class B channel applications, a minimum unvegetated shear stress of 1.0 lbs/ft <sup>2</sup> based on short-term peak flow duration of 0.5 hour is required.	

**815.2.1.2 Temporary Erosion Control Blankets for Polyacrylamide Slope Applications**

- 1 Provide a Class C temporary erosion control blanket for anionic polyacrylamide slope application that is a uniform organic temporary erosion control blanket composed of jute netting or curled excelsior wood fiber or coconut fiber blankets. Do not use blankets containing straw or straw/coconut blends. Ensure that slopes are 2H:1V or flatter for this application.
- 2 For a polyacrylamide slope application, provide a Type C temporary erosion control blanket with physical properties derived from quality control testing performed by a GAI-LAP accredited laboratory and conforming to the following Minimum Average Roll Values (MARV) shown in the following tables.

<b>Jute Netting</b>	
Uniform, open, plain weave netting using un-dyed and unbleached loosely twisted construction yarn that does not vary in thickness by more than 0.5 its normal diameter.	
Minimum roll width	48-inches
Minimum thickness (ASTM D 1777)	0.25 inch
Yarn Warp Count (ASTM D 3775)	19.5 minimum per 1 foot of width
Yarn Weft Count (ASTM D 3775)	14.0 minimum per 1 foot of width

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<b>Jute Netting</b>	
Minimum mass per unit area (ASTM D 3776)	6 oz/yd <sup>2</sup>
Minimum dry grab tensile strength (ASTM D 4632)	300 x 175 lbs/ft
Minimum wet grab tensile strength (ASTM D 4632)	125 x 65 lbs/ft
Minimum open area	50%
Minimum openings	Approx. 0.5 to 1.0 inch in width and length
<b>Excelsior Blankets</b>	
Double-netted blanket consisting of curled excelsior wood interlocking fibers with 80% of the fibers a minimum of 6-inches long forming a degradable netting with a maximum mesh opening of 1.0 inch by 1.0 inch.	
Minimum roll width	48 inches
Minimum thickness (ASTM D 6525)	0.25 inches
Minimum mass per unit area (ASTM D 6475)	6 oz/yd <sup>2</sup>
MD-Tensile strength (ASTM D 5035)	120 lbs/ft
TD-Tensile strength (ASTM D 5035)	70 lbs/ft
Maximum MD-Elongation (ASTM D 5035)	30%
Maximum TD-Elongation (ASTM D 5035)	20%
<b>Coconut Blankets</b>	
Double-netted blanket consisting of 100% coconut fiber forming degradable netting with a maximum mesh opening of 0.75 inch by 0.75 inch.	
Minimum roll width	48 inches
Minimum thickness (ASTM D 6525)	0.25 inches
Minimum mass per unit area (ASTM D 6475)	6 oz/yd <sup>2</sup>
MD-Tensile strength (ASTM D 4595)	190 lbs/ft
TD-Tensile strength (ASTM D 4595)	190 lbs/ft
Maximum MD-Elongation (ASTM D 4595)	20%
Maximum TD-Elongation (ASTM D 4595)	20%

### **815.2.1.3 Turf Reinforcement Matting (TRM)**

#### **815.2.1.3.1 Type 1**

- 1 Provide a Type 1 TRM consisting of a web of mechanically or melt bonded polymer netting, monofilaments or fibers entangled to form a strong three-dimensional stable net structure utilizing bonding methods including polymer welding, thermal or polymer fusion or the placement of fibers between two high-strength biaxial oriented nets mechanically bound by parallel stitching with polyolefin thread. The RCE may allow a degradable fiber matrix to be used to provide immediate coverage for bare soil.

#### **815.2.1.3.2 Type 2**

- 1 Provide a Type 2 TRM consisting of a web of mechanically or melt bonded polymer netting, monofilaments or fibers that are entangled to form a strong three-dimensional stable net structure utilizing bonding methods including polymer welding, thermal or polymer fusion or the placement of fibers between two high-strength biaxial oriented nets mechanically bound by parallel stitching with polyolefin thread. The RCE may allow a degradable fiber matrix to provide immediate coverage for bare soil.

#### **815.2.1.3.3 Type 3**

- 1 Provide a Type 3 TRM consisting of a web of mechanically or melt bonded polymer netting, monofilaments or fibers that are entangled to form a strong three-dimensional stable net structure utilizing bonding methods including polymer welding, thermal or polymer fusion or the placement of fibers between two high-strength biaxial oriented nets mechanically bound by parallel stitching with polyolefin thread. Do not use a TRM manufactured from discontinuous or glued netting in this category. Ensure that the material is 100% synthetic and resistant to biological, chemical, and ultraviolet degradation.

#### **815.2.1.3.4 Type 4 (High Survivability)**

- 1 Provide a Type 4 TRM consisting of a geosynthetic matrix that exhibits a very high interlock and reinforcement capacities with both soil and root systems, demonstrates a high tensile modulus, and is specially designed for erosion control applications on steepened slopes and vegetated waterways. Do not use a TRM manufactured from discontinuous netting, netting loosely held together by stitches or glue, or composites. Ensure that the material is 100% synthetic and resistant to biological, chemical, and ultraviolet degradation. Furnish a Type 4 TRM with high loading and/or high survivability capabilities for field conditions such as long term maintenance, structural backfills protecting critical structures, utility cuts, and traffic areas with the potential for high abrasion, higher required factors of safety, and/or general durability concerns.

#### **815.2.1.3.5 Physical Properties**

- 1 Ensure that TRM materials have Minimum Average Roll Values (MARV) derived from quality control testing performed by a GAI-LAP accredited labo-



ratory and conforming to the values shown in the following table.

Turf Reinforcement Matting					
Property	Test Method	MARV for Type 1	MARV for Type 2	MARV for Type 3	MARV for Type 4 <sup>(5)</sup>
Mass per Unit Area	ASTM D 6475	6-8 oz/yd <sup>2</sup>	8-10 oz/yd <sup>2</sup>	10-12 oz/yd <sup>2</sup>	12-14 oz/yd <sup>2</sup>
Thickness	ASTM D 6525	0.25 inches	0.35 inches	0.40 inches	0.40 inches
Grab Tensile Strength <sup>(1)</sup>	ASTM D 6818	145 x 110 lbs/ft	170 x 130 lbs/ft	400 x 300 lbs/ft	3100 x 1500 lbs/ft
Tensile Elongation <sup>(1)</sup>	ASTM D 6818	50% (max)	50% (max)	50% (max)	55% (max)
UV Resistance <sup>(2)</sup>	ASTM D 4355	80 % @ 1000 hrs	80 % @ 1000 hrs	80% @ 1000 hrs	90 % @ 1000 hrs
Ground Cover Factor <sup>(3)</sup>	Light Projection Analysis	60%	70%	70%	75%
Slopes	--	2H:1V or Flatter	1.5H:1V or Flatter	1H:1V or Flatter	1H:1V or Greater
Short-term Vegetated Velocity <sup>(4)</sup>	--	< 10 ft/sec	10 to 15 ft/sec	15 to 20 ft/sec	20 to 25 ft/sec
Shear Stress <sup>(4)</sup>	--	0 – 4 lbs/ft <sup>2</sup>	4 – 6 lbs/ft <sup>2</sup>	6 – 8 lbs/ft <sup>2</sup>	8 – 12 lbs/ft <sup>2</sup>
<p>Notes:</p> <ol style="list-style-type: none"> <li>1. Values of both machine and cross machine directions, respectively, under dry or saturated conditions.</li> <li>2. Tensile strength retained of structural components after exposure.</li> <li>3. Ground cover factor represents "% shade" from lumite light projection test.</li> <li>4. Maximum permissible design values based on short-term (0.5-hr), vegetated data obtained at SCDOT-approved independent hydraulics testing facility on an erodible soil bed and/or by Colorado state university hydraulics laboratory or the Texas DOT's Texas Transportation Institute (TTI) hydraulics and erosion control laboratory for "flexible channel liner applications."</li> <li>5. High factor of safety and high survivability required.</li> </ol>					

**815.2.1.4 Quality Assurance Sampling, Testing, and Acceptance**

- 1 Ensure that the RECP meets the requirements of the standards given in this specification or the approved industry equivalent.
- 2 Sample and test the RECP to verify conformance with this specification. Sample in accordance with ASTM D 4354.
- 3 Acceptance of the RECP is granted in accordance with ASTM D 4759 based on testing performed by GAI-LAP accredited laboratory of either conformance samples obtained using Procedure A of ASTM D 4354 or based on the manufacturer’s certification and testing of quality control samples obtained using Procedure B of ASTM D 4354.
- 4 Quality Assurance sampling and testing is waived for products manufactured at an ISO 9002 certified manufacturing facility. Provide documentation of ISO 9002 certification upon request.
- 5 Provide an RECP from the list in the most recent edition of **SCDOT Qualified Product Lists 55** and **56** in the appropriate category.

**815.2.1.5 Manufacturing Quality Control**

- 1 For TRM Types 1, 2, 3 and 4, perform the Manufacturing Quality Control (MQC) testing at a GAI-LAP accredited laboratory at the frequency in ASTM D 4354 with the exceptions indicated by the following minimum acceptable testing frequency in the following table.

Testing Requirements for TRM Type 1, 2, 3, and 4		
Property	Test Method	Test Frequency tests/m <sup>2</sup> (tests/yd <sup>2</sup> ) of production
Mass Per Unit Area	ASTM D 6475	1/20,000 (1/24,000)
Tensile Strength	ASTM D 6818	1/20,000 (1/24,000)
Tensile Elongation	ASTM D 6818	1/20,000 (1/24,000)
Ground Cover Factor	Light Projection Analysis	1/20,000 (1/24,000)

- 2 Obtain and furnish to the RCE a certification signed by a responsible representative of the manufacturer within 24 hours of each truckload or shipment of material delivered to the construction site.

**815.2.2 Fiber Roving**

**815.2.2.1 Type A Fiberglass Roving**

- 1 Provide fiberglass roving consisting of fiberglass material formed from continuous fibers drawn from molten glass, coated with a chrome-complex sizing compound, collected into strands, and lightly bound together into a roving without the use of a binding agent or other deleterious substances. Ensure that the roving is wound into a package such that the material can be continu-

**815.2.2.1**

**815.2.3.1**

ously withdrawn using a compressed air ejector to expand the fiber roving into a mat on the soil surface.

- 2 Furnish an electrical grade fiberglass roving material meeting the requirements indicated in the following table.

<b>Requirements for Type A Fiberglass Roving</b>		
<b>Physical Property</b>	<b>Limits</b>	<b>Test Methods</b>
Strands / Rove	50 - 70	End Count
Fiber Diameter, inches (Nominal)	0.00035 - 0.00045	ASTM D 578
Yards/lb. of Rove	170 - 300	ASTM D 578

**815.2.2.2 Type B Polymer Roving**

- 1 Provide material formed from continuous strands of fibrillated polymer yarns, collected into a roving without the use of a binding agent or other deleterious substances. Fibrillation is defined as a net-like physical structure of the yarn created by splitting the yarn in a precise pattern during the manufacturing process. Provide roving that is packaged so that it can be continuously withdrawn using a compressed air ejector to expand the roving into a mat of polymer fibers on the soil surface.
- 2 Furnish Type B polymer roving that meets the physical property requirements indicated in the following table.

<b>Requirements for Type B Polymer Roving</b>		
<b>Physical Property</b>	<b>Limits</b>	<b>Test Methods</b>
Strands/Rove	20 - 30	End Count
Yards/lbs of Rove	170 - 520	ASTM D 1907
Organic Content % Max.	1.0	ASTM D 1907
UV Stability	70% Strength Retained	ASTM D 4355

**815.2.3 Sediment Tubes**

**815.2.3.1 Sediment Tubes for Ditch Checks**

- 1 Provide a sediment tube for ditch checks produced by a manufacturer experienced in sediment tube manufacturing. Ensure that the sediment tube is composed of compacted geotextile, curled excelsior wood fiber, natural coconut fiber, hardwood mulch, or a mixture of these materials enclosed by a flexible netting material and utilize an outer netting that consists of seamless, high-density polyethylene, photodegradable material treated with ultraviolet stabilizers or a seamless, high-density polyethylene, non-degradable material.

**815.2.3.1**

**815.2.3.2**

- 2 Do not use straw, straw fiber, straw bales, pine needles and/or leaf mulch.
- 3 Do not use curled excelsior wood fiber or natural coconut fiber rolled erosion control products (RECP) rolled up to create a sediment tube device.
- 4 Furnish steel posts minimum of 48 inches long and meeting the minimum physical requirements specified in **Subsection 815.2.12**.
- 5 Provide sediment tubes for ditch check applications that meet the following minimum performance requirements indicated in the following table.

<b>Minimum Performance Requirements for Sediment Tubes</b>		
<b>Property</b>	<b>Test Method</b>	<b>Value</b>
Diameter	Field Measured	18.0 inch minimum 24.0 inch maximum
Mass per Unit Length	Field Measured	3.0 lbs/ft ± 10% for 18-inch diameter or 4.0 lbs/ft ± 10% for 24-inch diameter
Fiber Length	Field Measured	80% of the fiber materials at least 4 inches in length
Length per Tube	Field Measured	10 foot minimum *
Netting Unit Weight	Certified	0.35 oz/ft minimum
* Select a length to minimize the number of sediment tubes needed. If the ditch check length (perpendicular to the water flow) is 15 feet, then one 15-foot sediment tube is preferred over two overlapped 10-foot sediment tubes.		

**815.2.3.2 Quality Assurance**

- 1 Before installation of sediment tubes, provide the following information from the manufacturer:
  - Written Quality Control program conforming to the requirements of **Subsection 815.2.3.3**.
  - Documentation of field and/or laboratory testing that quantifies the erosion control and sediment retention performance of the products conforming to the requirements of **Subsection 815.2.3.3**.
  - Guarantee that the products perform to the minimum performance standards under the specific conditions stated in this specification.
- 2 Ensure that each sediment tube bears complete identification including, but not limited to, the following:
  - Manufacturer’s name and location,
  - Manufacturer’s telephone number and fax number,
  - Manufacturer’s e-mail address and web address, and

### 815.2.3.2

### 815.2.4.2.1

- Sediment tube name, model, and/or serial number.

3 Furnish sediment tubes from the most recent edition of *SCDOT Qualified Product List 57*.

#### 815.2.3.3 Quality Control

1 Before installation of sediment tubes, provide the following information from the manufacturer:

- Written description of the manufacturer's Quality Control program of field and/or laboratory testing that quantifies the performance of the product. Performance testing must take place at a laboratory accredited to perform tests required for the product tested.
- Instructions on the proper installation and maintenance of the sediment tube.
- Certification of the testing requirements upon request.

2 Provide verification of conformance with manufacturer's published specifications, the certification, which at a minimum, identifies the following:

- Independent qualified test facility,
- Manufacturer,
- Product ID,
- Test ID, and
- Test date.

### 815.2.4 Inlet Filters

#### 815.2.4.1 Type A Low Flow Inlet Filters

##### 815.2.4.1.1 Filter Fabric Inlet Protection

1 Provide filter fabric from the most recent edition of *SCDOT Qualified Product List 34*.

2 Furnish steel posts a minimum of 60 inches long and meeting the minimum physical requirements specified in **Subsection 815.2.12**.

3 Provide heavy-duty plastic ties to attach the fabric to posts.

##### 815.2.4.1.2 Sediment Tubes

1 Refer to the **Subsection 815.2.3** for sediment tube material and performance requirements. Provide sediment tubes from the most recent edition of *SCDOT Qualified Product List 57*.

#### 815.2.4.2 Type B Medium Flow, Low Velocity Inlet Filters

##### 815.2.4.2.1 Hardware Fabric and Stone Inlet Protection

1 Provide hardware fabric or comparable wire mesh with maximum openings of 0.5 inch x 0.5 inch as the supporting material.

- 2 Furnish steel posts a minimum of 36 inches long and meeting the minimum physical requirements for steel post specified in **Subsection 815.2.12**.
- 3 Provide heavy-duty plastic ties to attach the wire mesh material to posts. Place aggregate No. 5 washed stone against the hardware fabric on all sides.

**815.2.4.3 Type D High Flow, High Velocity Inlet Filters**

- 1 Provide a Type D high flow, high velocity inlet filter composed of a geotextile fabric connected to a rigid structure that completely surrounds the inlet, where the geotextile fabric is non-biodegradable and resistant to degradation by ultraviolet exposure and to contaminants commonly encountered in storm water. Ensure that the rigid structure is composed of high molecular weight, high-density polyethylene copolymer with a UV inhibitor. Provide a rigid structure that is reusable and recyclable.
- 2 Provide an inlet filter using filter fabric constructed of 100% continuous polyester non-woven engineering fabric and conforms to the guidelines in ASTM D 1117. Ensure that the filter fabric is fabricated to provide a direct fit adjacent to the associated rigid structure and is capable of reducing effluent sediment concentrations by not less than 80% under typical sediment migration conditions.
- 3 Provide a Type D high flow, high velocity inlet filter that has a two-stage design. Ensure that the first stage conveys normal flows at a minimum clean water flow rate of 100 gallons per minute per square foot, and the second stage conveys high flow rates with a minimum apparent opening of 0.5 inch per square inch (No. 12 standard sieve opening). Ensure that the Type D1 inlet structure filter has a first stage with a minimum height of 9 inches and a maximum height of 12 inches in order to allow greater overflow capacity and to prevent ponding in the median.
- 4 Provide a filter fabric with the following Minimum Average Roll Values (MARV) properties as shown in the following table.

Type D Inlet Filters			
Property	Test Method	Units	MARV
Weight	ASTM D 3776	oz/yd <sup>2</sup>	3.0
Grab Tensile Strength	ASTM D 4632	lbs	80
Grab Tensile Elongation	ASTM D 4632	%	50
Puncture Strength	ASTM D 4833	lbs	40

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<b>Type D Inlet Filters</b>			
<b>Property</b>	<b>Test Method</b>	<b>Units</b>	<b>MARV</b>
Mullen Burst Strength	ASTM D 3786	psi	150
Trapezoid Tear Strength	ASTM D 4533	lbs	30
Fabric Opening Size	ASTM D 4751	US Std Sieve (max)	50
Permittivity	ASTM D 4491	sec <sup>-1</sup>	1.5
Water Flow Rate	ASTM D 4491	gal/min/ft <sup>2</sup>	100
Ultraviolet Resistance	ASTM D 4355 (500 hrs)	%	70

- 5 Provide a high-flow, high-velocity inlet filter that has lifting devices or structures to assist in the installation and to allow inspection of the storm water system.

#### **815.2.4.4 Type E Surface Course Inlet Filters**

- 1 Furnish a Type E surface course inlet filter that has a minimum height or diameter of 9 inches and a minimum length 2 feet longer than the length of the curb opening. Do not completely block the inlet opening with surface course inlet filters.
- 2 Provide a Type E surface course inlet filter constructed with a synthetic material that allows storm water to freely flow through while trapping sediment and debris. Ensure that the geotextile is non-biodegradable, resistant to degradation by ultraviolet exposure, and resistant to contaminants commonly encountered in storm water. Do not use straw, straw fiber, straw bales, pine needles, or leaf mulch as filter materials.
- 3 Provide a Type E surface course inlet filter with aggregate compartments for stone, sand, or other weighted materials or mechanisms to hold the unit in place.
- 4 Ensure that the filter fabric of the curb inlet filter is capable of reducing effluent sediment concentrations by no less than 80% under typical sediment migration conditions and has the following Minimum Average Roll Values (MARV) for physical properties shown in the following table.

Filter Fabric Properties for Curb Inlet Filters			
Property	Test Method	Units	MARV
Weight	ASTM D 3776	oz/yd <sup>2</sup>	3.0
Grab Tensile Strength	ASTM D 4632	lbs	80
Grab Tensile Elongation	ASTM D 4632	%	50
Puncture Strength	ASTM D 4833	lbs	40
Mullen Burst Strength	ASTM D 3786	psi	150
Trapezoid Tear Strength	ASTM D 4533	lbs	30
Apparent Opening Size	ASTM D 4751	US Std Sieve (max)	50
Permittivity	ASTM D 4491	second <sup>-1</sup>	1.5
Water Flow Rate	ASTM D 4491	gal/min/ft <sup>2</sup>	100
Ultraviolet Resistance	ASTM D 4355 (500 hrs)	%	70

#### 815.2.4.5 Type F Inlet Tubes

##### 815.2.4.5.1 Weighted Inlet Tubes

- 1 Provide a Type F weighted inlet tube produced by a manufacturer experienced in sediment tube manufacturing. Provide an inlet tube composed of compacted geotextile, age curled excelsior wood fiber, natural coconut fiber, hardwood mulch, or a mix of these materials, and enclosed by a flexible netting material. Do not use straw, straw fiber, straw bales, pine needles, or leaf mulch.
- 2 Ensure that the outer netting consists of seamless, high-density polyethylene, photodegradable material treated with ultraviolet stabilizers or seamless, high-density polyethylene, non-degradable material.
- 3 Do not use a curled wood excelsior fiber or a natural coconut fiber rolled erosion control product (RECP) rolled up to create an inlet tube device.
- 4 Provide a Type F weighted inlet tube that is a sediment tube capable of staying in place without external stabilization measures and has a weighted inner core or other weighting mechanism to keep it in place. Provide a weighted inlet tube that meets the minimum requirements shown in the following table.



Minimum Requirements for Weighted Inlet Tubes		
Property	Test Method	Value
Diameter	Field Measured	6.0 inch to 12.0 inch
Mass per Unit Length	Field Measured	6 inch = 6 lbs/ft min. 12 inch = 12 lbs/ft min.
Fiber Length	Field Measured	80% of the fiber materials at least 4-inches in length
Length per Tube	Field Measured	6 foot minimum
Netting Unit Weight	Certified	0.35 oz/ft minimum

#### 815.2.4.5.2 Non-Weighted Inlet Tubes

- 1 Provide a Type F non-weighted inlet tube that is produced by a manufacturer experienced in sediment tube manufacturing, composed of compacted geotextile, curled excelsior wood fiber, natural coconut fiber, hardwood mulch, or a mixture of these materials, and enclosed by a flexible netting material. Do not use straw, straw fiber, straw bales, pine needles, or leaf mulch.
- 2 Provide a non-weighted inlet tube with outer netting that consists of seamless, high-density polyethylene, photodegradable material treated with ultraviolet stabilizers or seamless, high-density polyethylene, non-degradable material.
- 3 Do not use curled wood excelsior fiber or natural coconut fiber rolled erosion control products (i.e., RECP) rolled up to create an inlet tube device.
- 4 Provide stakes or other means to stabilize non-weighted inlet tubes to keep them safely in place. Secure non-weighted inlet tubes with wooden stakes (1 inch x 1 inch) or steel posts (1.25 lbs/linear ft) a minimum of 3 feet in length placed on 2-foot centers. Provide Type F non-weighted inlet tubes that meet the minimum requirements shown in the following table.

Minimum Requirements for Non-weighted Inlet Tubes		
Property	Test Method	Value
Diameter	Field Measured	6.0 inch to 12.0 inch
Mass per Unit Length	Field Measured	6.0 inch = 1.0 lbs/ft minimum 12.0 inch = 2.0 lbs/ft minimum
Fiber Length	Field Measured	80% of the fiber materials at least 4 inches in length
Length per Tube	Field Measured	6 feet minimum
Netting Unit Weight	Certified	0.35 oz/ft minimum

**815.2.4.6 Quality Assurance**

- 1 Before installation of inlet structure filters, provide the RCE with the following information from the manufacturer:
  - Written Quality Control program conforming to the requirements of **Subsection 815.2.4.7**.
  - Documentation of field and/or laboratory testing that quantifies the erosion control and sediment retention performance of the product conforming to the requirements of **Subsection 815.2.4.7**.
  - Guarantee that the product performs to the minimum performance standards under the specific conditions as stated in this specification.
- 2 Ensure that each inlet structure filter bears complete identification including, but not limited to, the following:
  - Manufacturer's name and location,
  - Manufacturer's telephone number and fax number,
  - Manufacturer's e-mail address and web address, and
  - Inlet structure filter, BMP, or Sediment Tube name, model, and/or serial number.
- 3 Provide an inlet structure filter from a manufacturer with a minimum of 3 years experience at manufacturing inlet structure filters for use as sediment control equipment and experienced in the installation of equivalent applications. Provide a list of at least 20 references of installations if requested by the RCE.
- 4 Provide inlet structure filters from the most recent edition of *SCDOT Qualified Product List 58* in the appropriate category.

**815.2.4.7 Quality Control**

- 1 Before installation of sediment tubes, provide the RCE with the following information from the manufacturer:
  - Written description of the manufacturer's Quality Control program of field and/or laboratory testing that quantifies the performance of the product. Performance testing must be at a laboratory accredited to perform such tests required for the product tested.
  - Instructions on the proper installation and maintenance of the inlet structure filter.
  - Certification of the testing requirements upon request.
- 2 Provide certification of the product's conformance with the required performance specifications, which at a minimum, identifies the following:
  - Independent qualified test facility,
  - Manufacturer,
  - Product ID,
  - Test ID, and

- Test date.

**815.2.5 Silt Fences**

- 1 Provide material for silt fence complying with the requirements specified herein, on the Plan details, or as approved by the RCE.

**815.2.5.1 Posts**

- 1 Furnish steel posts a minimum of 60 inches long and meeting the minimum physical requirements specified in **Subsection 815.2.12**.
- 2 When heavy clay soils are present on site, use the steel posts specified above with the addition of a metal plate welded near the bottom so that when the post is driven to the proper depth, the plate is below the ground level for added stability. In areas where conditions warrant, larger posts or reduced post spacing may be required to provide an adequate fence to handle the stress from sediment loading.

**815.2.5.2 Filter Fabric**

- 1 Provide a filter fabric from the most recent edition of *SCDOT Qualified Product List 34*. Ensure that the filter fabric is composed of fibers consisting of long chain, synthetic polymers composed of at least 85% by weight of polyolefins, polyesters, or polyamides. Ensure that the fibers are formed into a network so that the filaments or yarns retain dimensional stability relative to each other. Do not treat or coat the filter fabric, which might adversely alter its physical properties after installation. Do not use fabric with defects or flaws that significantly affect its physical and/or filtering properties. Provide a filter fabric with a minimum width of 36 inches.
- 2 Protect the filter fabric with a suitable wrapping for protection against moisture and extended ultraviolet exposure before placement.
- 3 Provide filter fabric meeting the following minimum physical requirements in the following table.

Minimum Requirements for Filter Fabric		
Physical Property *	Test Method	Required Value
Tensile Strength	ASTM D 4632	90 lbs.
Elongation	ASTM D 4632	<50% - fabric self supporting
Maximum Apparent Opening Size (AOS)	ASTM D 4751	0.60 mm maximum
Permittivity	ASTM D 4491	0.05 per second
Ultraviolet Stability (retained strength after 500 hrs of ultraviolet exposure)	ASTM D 4355	70%
* Unless otherwise indicated, numerical values represent the MARV.		

### 815.2.6 Floating Turbidity Barriers

- 1 Provide floating turbidity barrier for sediment protection for fill placed in water or areas affected by tidal flow. Provide floating turbidity barrier meeting the requirements in the following table.

Minimum Requirements for Floating Turbidity Barriers			
	Light Duty	Medium Duty	Heavy Duty
Fabric – Polyester Reinforced Vinyl (oz/yd <sup>2</sup> )	18	22	22
Flotation <sup>(1)</sup> (lbs/ft)	13	22	22
Top Load Cable	---	---	10,000 lbs ( <sup>5</sup> / <sub>16</sub> inch, galvanized)
Stress Plates	---	---	<sup>5</sup> / <sub>8</sub> inch Polypropylene
Rope Retainer	<sup>5</sup> / <sub>8</sub> inch Polypropylene	<sup>5</sup> / <sub>8</sub> inch Polypropylene	<sup>5</sup> / <sub>8</sub> inch Polypropylene
Grommets	#4 Brass	#4 Brass	#4 Brass
Seams Heat Welded	Yes	Yes	Yes
Bottom Load Chain	0.63 lbs/ft (min) ( <sup>1</sup> / <sub>4</sub> inch, galvanized)	0.95 lbs/ft (min) ( <sup>5</sup> / <sub>16</sub> inch, galvanized)	0.95 lbs/ft (min) ( <sup>5</sup> / <sub>16</sub> inch, galvanized)
Connecting Hardware	Galvanized Steel	Galvanized Steel	Galvanized Steel
Standard Depth	5 ft.	5 ft.	5 ft.
Standard Length <sup>(2)</sup>	50 & 100 ft.	50 & 100 ft.	50 & 100 ft.
Notes:			
(1) Flotation for barriers of depths greater than 10 feet is to be 60 pounds per foot. Flotation must be sufficient to maintain the top of the barrier at an elevation 3 inches above the water.			
(2) The maximum length for barriers of depth greater than 10 feet is 50 feet.			

- 2 If specified, provide buoys complying with the South Carolina Department of Natural Resources *Marine Law Enforcement Buoy Specifications* in conjunction with the floating turbidity barrier.

**815.2.7 Corrugated Metal Pipe for Sediment Dams**

- 1 Provide corrugated metal pipe complying with the applicable requirements of **Section 714**.

**815.2.8 Temporary Seeding**

- 1 Provide materials conforming to the applicable requirements of **Section 810**.

**815.2.9 Stabilized Construction Entrance**

- 1 Provide a stabilized construction entrance composed of the following materials:
- Non-woven geotextile fabric.
  - No. 1 aggregate (see ASTM C 33) with the gradation in the following table.

<b>Gradation Table for Stabilized Construction Entrance Material</b>	
<b>Nominal Size (Sieves With Square Openings)</b>	<b>Percent Passing</b>
4 inch	100
3½ inch	90 to 100
2½ inch	25 to 60
1½ inch	0 to 15
¾ inch	0 to 5

- 2 Provide a non-woven geotextile fabric that meets the requirements of **Subsection 804.2.11**.

**815.2.10 Bonded Fiber Matrix (BFM)**

- 1 Provide a bonded fiber matrix (BFM) from the most recent edition of *SCDOT Qualified Product List 65* and is composed of long non-toxic, degradable, strand fibers held together by cross-linked hydrocolloid bonding agents that upon drying become insoluble and non-dispersible to eliminate direct raindrop impact on soil. Use a BFM that does not form a water-insensitive crust that can inhibit plant growth. Provide a BFM that is completely photodegrade or biodegrade. Do not use materials listed or used for hydro-mulching applications, or organic and mineral bonding agents such as dry polyacrylamide, starch, guar, and plantago mixed with fibers. Seed, lime, and fertilizer may be added to the BFM mixture according to the requirements of **Section 810**.
- 2 Provide a BFM meeting the following requirements:
- Passed a free liquid quality control test when mixed as liquid slurry (liquids separate from fibrous solids no greater than 1-inch per minute as measured on a standard test board).

- Does not dissolve or disperse upon re-wetting.
- Has no holes greater than 1 mm in size.
- Has no gaps between the BFM and the soil.
- Has minimum water holding capacity of 1000g per 100g (1000%).
- Has no germination or growth inhibiting factors and does not form a water-resistant crust.

3 Furnish BFM components pre-packaged by the manufacturer to assure material performance and compliance with the following typical values in the following tables when applied at a rate of 3500 pounds per acre.

<b>BFM Properties</b>	
<b>Property</b>	<b>Required Value</b>
Wood Fiber by Weight	85% ± 5%
Bonding Agent/Crosslinked Hydro-Colloid Polymer Tackifiers	10% ± 1%
Moisture Content	12% ± 3%
Organic Matter	95% minimum
pH Range	4.8 ± 2
Color	Colored to contrast application area, does not stain concrete or painted surfaces

<b>BFM Properties and Test Methods</b>		
<b>Property</b>	<b>Test Method</b>	<b>Required Value</b>
Mass Per Unit Area	ASTM D 6566	11.5 oz/yd <sup>2</sup>
Thickness	ASTM D 6525	0.10 inch minimum
Ground Cover	ASTM D 6567	99%
Water Holding Capacity	Proposed ASTM	1000%
Functional Longevity	Observed	Up to 6 months
Cover Factor (6 in/hr event)	ECTC Test Method #2	0.10 maximum
% Effectiveness	ECTC Test Method #2	90% minimum
Cure Time	ECTC Test Method #2	98% effective 48 hours after application
Vegetation Establishment	ECTC Test Method #4	350% minimum

4 Provide BFM from manufacturer listed on the most recent edition of *SCDOT Qualified Product List 65* and provide documentation of testing at an

approved independent laboratory demonstrating performance based on reduced water runoff, reduced soil loss, and enhanced plant germination.

#### 815.2.11 Flexible Growth Matrix (FGM)

- 1 Provide a flexible growth matrix (FGM) that combines both chemical and mechanical bonding techniques to lock the engineered matrix in place. Provide a FGM that is hydraulically applied and is a flexible erosion control matrix composed of long strands of thermally processed wood fibers, crimped man-made and organic interlocking fibers, and performance enhancing additives that forms a lofty, interlocking matrix, which creates air space and water-absorbing cavities that improves seed germination, reduces the impact of raindrop energy, and minimizes soil loss.
- 2 Furnish a FGM that requires no curing period and, when applied, uses water insoluble tackifiers and flocculants to form an intimate bond with the soil surface to create a continuous erosion resistant matrix that allows rapid germination and accelerated plant growth. Do not use materials listed or used for hydro-mulching applications. Do not use organic and mineral bonding agents such as dry polyacrylamides, starch, guar, and plantago mixed with fiber.
- 3 Seed, lime, and fertilizer may be added to the FGM mixture according to **Section 810**. Furnished FGM components pre-packaged by the manufacturer to assure material performance and compliance with the following typical values when applied at a rate of 3500 pounds per acre.
- 4 Ensure that the FGM provided meets the requirements in the following tables.

Flexible Growth Matrix	
Property	Value
Wood Fiber by Weight	85% ± 3%
Cross-linked Hydro-Colloid Polymer Tackifiers	10% ± 1%
Crimped Inter-Locking Fibers	5% ± 1%
Moisture Content	12% ± 3%
Color	Colored to contrast application area, does not stain concrete or painted surfaces

Flexible Growth Matrix Properties and Test Methods		
Property	Test Method	Value
Mass Per Unit Area	ASTM D 6566	11.5 oz/yd <sup>2</sup>

(table continued on the next page)

(table continued from the previous page)

<b>Flexible Growth Matrix Properties and Test Methods</b>		
<b>Property</b>	<b>Test Method</b>	<b>Value</b>
Thickness	ASTM D 6525	0.15 inch minimum
Ground Cover	ASTM D 6567	99%
Water Holding Capacity	Proposed ASTM	1500%
Flexural Rigidity (wet)	ASTM D 6575	5 oz-yd maximum
Functional Longevity	Observed	Up to 1 year
Cover Factor (6 in/hr event)	ECTC Test Method #2	0.01 maximum
% Effectiveness	ECTC Test Method #2	99% minimum
Cure Time	ECTC Test Method #2	98% effective 2 hours after application
Shear Stress	ECTC Test Method #3	0.75 lbs/ft <sup>2</sup> minimum
Vegetation Establishment	ECTC Test Method #4	500% minimum

- 5 Provide a FGM from a manufacturer listed on the most recent edition of *SCDOT Qualified Product List 66* and provide documentation of testing at an approved independent laboratory demonstrating performance based on reduced water runoff, reduced soil loss, and enhanced plant germination.

#### **815.2.12 Steel Posts**

- 1 Provide steel posts for use with inlet structure filters, sediment tubes, and silt fences meeting the following minimum physical requirements:
- Composed of high strength steel with minimum yield strength of 50,000 psi.
  - Standard "T" cross-section with a nominal face width of 1.38 inches and nominal "T" length of 1.48 inches.
  - Weighs 1.25 pounds per foot ( $\pm 8\%$ )
  - Painted with water based baked enamel paint.

#### **815.2.13 Temporary Pipe Slope Drains**

- 1 Ensure that pipe for slope drains conforms to the requirements of **Subsection 803.2**.

#### **815.3 Equipment**

- 1 Ensure that the equipment necessary for the proper construction of the work is on site, in acceptable working condition, and approved by the RCE as to both type and condition before the start of work under this section. Provide sufficient equipment to enable prosecution of the work in accordance with the project schedule and completion of the work in the specified time.



- 2 Use the following equipment for applying fiber roving and asphalt:
  - Pneumatic ejector capable of applying fiber roving at the rate of 2 pounds per minute (approximately 8 square yards per minute),
  - Air compressor capable of applying 40 cubic feet per minute at 80 to 100 psi and acceptable air base for supplying air to areas inaccessible to compressor, and
  - Asphalt distributor with hoses and hand spray bar for areas inaccessible to distributor.

## **815.4 Construction**

### **815.4.1 General**

- 1 Promptly install temporary erosion control measures when problem conditions exist or when potential problems are anticipated in certain areas in order to minimize soil erosion and siltation. Properly maintain the temporary erosion control measures until permanent erosion control features are functioning properly.
- 2 Coordinate the temporary erosion control provisions with the permanent erosion control features provided elsewhere in these specifications to the extent practical to assure economical, effective, and continuous erosion control during construction. Permanent seeding, sodding, riprap, concrete gutter, asphalt gutter, slope drains, and concrete slope protection are considered permanent erosion control items and are covered in other sections of these specifications.
- 3 Coordinate erosion control measures with the grading operations throughout the duration of the project in accordance with **Subsection 107.26**.
- 4 Use temporary erosion control measures to correct conditions where problems are anticipated or to correct conditions that develop during construction.
- 5 Remove temporary erosion control items if no longer needed in an area after establishment of permanent vegetation and completion and proper functioning of other permanent erosion control items as directed by the RCE. Restore these areas to a condition similar to the surrounding areas after removal.

### **815.4.2 Rolled Erosion Control Products (RECP)**

#### **815.4.2.1 Site Preparation**

- 1 Grade areas to be treated with RECP and compact as indicated or as directed by the RCE or the manufacturer's representative.
- 2 Remove large rocks, soil clods, vegetation, and other sharp objects that could keep the RECP from intimate contact with subgrade.
- 3 Prepare seedbed by loosening the top 2 to 3 inches of soil above final grade.

**815.4.2.1**

**815.4.2.2.2**

- 4 Select and apply soil amendments, lime, fertilizer, and seed required by the seeding plan or by the RCE or the manufacturer’s representative to a scarified soil surface prior to the installation of the RECP.

**815.4.2.2 Installation of RECP**

**815.4.2.2.1 General**

- 1 Follow the manufacturer’s installation procedures included with each RECP. If requested by the RCE, arrange for a manufacturer’s representative to be on-site to oversee and approve the initial installation. Provide a letter from the manufacturer approving the installation when requested by the RCE.
- 2 Install the RECP at the elevation and the alignment indicated on the Plans.
- 3 Use stakes, pins, or staples with a minimum length of 6 inches to secure temporary erosion control blankets. Use 12-inch anchors for specific erosion control blankets in sandy, loose, or wet soils or as directed by the RCE or the manufacturer’s representative.
- 4 Use stakes, pins, or staples with a minimum length of 12 inches to secure permanent TRM. Use longer anchors for specific permanent TRM in sandy, loose, or wet soils or as directed by the RCE or the manufacturer’s representative.
- 5 Use the following table to determine the minimum anchoring frequency.

<b>TRM Anchoring Requirements</b>	
<b>Slope Grade</b>	<b>Anchoring Frequency</b>
Up to 3H:1V	1 anchor/square yard
3H:1V to 2H:1V	1.5 anchors/square yard
2H:1V to 1H:1V	2 anchors/square yard
Steeper than 1H:1V and Channel Bottoms	2.5 anchors/square yard

- 6 Obtain RCE and manufacturer’s representative approval before execution of alternate installation methods to those specified herein.

**815.4.2.2.2 Slope Installation**

- 1 At the top of the slope, construct a 6-inch (deep) x 12-inch (wide) anchor trench to inhibit undermining from stray surface water. Extend the upslope terminal end of the RECP 30 inches past the anchor trench.
- 2 Use stakes or staples to fasten the RECP material into the upslope anchor trench on 12-inch centers. Backfill the trench with soil and compact. Apply seed to the backfill soil surface and cover this area with the remaining 12 inches of the RECP terminal end. Stake or staple the terminal end down slope of the anchor trench on 12-inch centers.

- 3 Securely fasten all RECP materials to the soil by installing stakes or staples at a minimum rate of 1.5 stakes per square yard. Select anchors that have sufficient ground penetration to resist pullout. Increase the anchoring frequency if the RCE or the manufacturer's representative deems it necessary due to site conditions (i.e., loose or wet soils).
- 4 Unroll the RECP parallel to the primary direction of water flow and place in direct contact with the soil surface. Do not stretch or allow the material to bridge over surface inconsistencies. Overlap the edges of adjacent (vertically down the slope) RECP a minimum of 3 inches with the upslope roll overlapping on top of the down slope roll in shingle style.
- 5 Overlap the edges of parallel (horizontal across the slope) blankets 3 to 6 inches depending on the type of RECP used.

#### **815.4.2.2.3 Channel Installation**

- 1 Excavate anchor trenches and/or staple check slots perpendicular to the flow direction across the entire width of the channel at 25-foot intervals and at the terminal end of the channel reach.
- 2 Construct a 6-inch (deep) x 12-inch (wide) beginning anchor trench. Extend the downstream end of the RECP 30 inches past the anchor trench and use the slack RECP material to cover the backfilled soil. Fasten the RECP material into the anchor trench on 12-inch centers.
- 3 Excavate 6 inch x 6 inch check slots every 25 feet along the length of the channel.
- 4 If directed by the RCE, replace excavated check slots with a double row of staples or stakes. For staple or stake check slots, place the two rows of stakes or staples 4 inches apart and install each row of staples or stakes on 12-inch centers. Drive all stakes and staples flush with the soil surface.
- 5 Beginning at the downstream end in the center of the channel, place the initial end of the first RECP in the anchor trench, and secure it with ground anchor devices at 12-inch intervals.
- 6 Position adjacent rolls in the anchor trench in the same manner, overlapping the proceeding roll a minimum 3 inches. Secure the RECP at 12-inch intervals along the anchor trench, backfill and compact with specified soil or as directed by the RCE or the manufacturer's representative.
- 7 Unroll center strip of RECP upstream over compacted trench. Stop at next check slot or terminal anchor trench. Unroll adjacent rolls of RECP upstream in similar fashion, maintaining a 3-inch overlap.
- 8 Fold and secure the RECP snugly into transverse check slots. Lay material in bottom of the slot, then fold the material back against itself. Anchor through both layers of RECP at 12-inch intervals. Backfill with soil and compact. Continue unrolling the RECP widths upstream over compacted slot to next check slot or terminal anchor trench.

- 9 Secure RECP to channel bottom with ground anchoring devices at a frequency of 2.5 anchors per square yard. Select anchors that have sufficient ground penetration to resist pullout. Increase the anchoring frequency if the RCE or the manufacturer's representative deems it necessary due site conditions (i.e., loose or wet soils).
- 10 Cut longitudinal anchor slots 4 inches x 4 inches at the top of each slope. Fasten the RECP material into the longitudinal anchor slots on 12-inch centers.

#### **815.4.2.3 Delivery, Storage, and Handling**

- 1 Follow the requirements of ASTM D 4873 for RECP labeling, shipment and storage. Ensure that product labels clearly show the manufacturer or supplier name, style name, and roll number. Include with each shipping document a notation certifying that the material is in accordance with the manufacturer's certificate.
- 2 Wrap each RECP roll with a material that protects the geotextile from damage due to shipment, water, sunlight, and contaminants. Maintain the protective wrapping during shipment and storage.
- 3 During storage, elevate the RECP rolls off the ground and adequately cover to protect them from the following: site construction damage, extended exposure to ultraviolet (UV) radiation, precipitation, strong acids or strong bases, flames including welding sparks, temperatures in excess of 160°F, and other environmental conditions that can damage the physical properties of RECP.

#### **815.4.2.4 Inspection and Maintenance of RECP**

- 1 Check areas protected by RECP for dislocation or failure every 7-calendar days.
- 2 Ensure that the pinning or stapling pattern is consistent with that shown on the manufacturer's installation sheet. If there is evidence that the RECP is not securely fastened to the soil, install extra pins or staples to inhibit the RECP from becoming dislodged.
- 3 Inspect regularly until grass or vegetation is firmly established.
- 4 Repair damaged areas immediately by restoring the soil on slopes or channels to its finished grade, re-applying fertilizer and seed, and replacing the appropriate RECP material as needed.

#### **815.4.2.5 Acceptance**

- 1 Obtain RCE acceptance and approval for RECP installations.

#### **815.4.3 Brush Barriers**

- 1 Install brush barriers as shown on the Plans or as directed by the RCE. Construct brush barriers from selected materials from the clearing and grubbing operation.

### 815.4.3

### 815.4.5.2

- 2 Construct brush barriers for erosion control measures as soon as brush is readily available from the clearing operation. Do not use the barriers in residential or commercial areas, or in areas where development is anticipated within the next few years. Construct brush barriers parallel to the toes of slopes of embankments constructed of erodible material to heights of 15 feet or more. Use brush barriers when natural ground is level or sloping away from project. Leave the brush barriers in place. Do not construct barriers at any site that has high visibility and detracts from the appearance of either the adjacent property or the completed highway.
- 3 Form the brush barriers by placing brush, limbs, small trees, and other vegetative growth in a small continuous ridge or piles as close as practicable not more than 15 feet outside of and generally parallel to the toe of the proposed embankment. Place some of the heavier material on top to secure the barrier. Intermingle the brush logs and tree limbs to prevent the formation of a solid dam and allow water to filter through it. If a gutter is proposed as a permanent erosion control measure along the toe of an embankment, place the brush barrier outside the construction limits of the gutter. Construct the barrier with mechanical equipment and "walk down" with a bulldozer to produce a barrier that is dense with relatively uniform height between 3 to 5 feet and width between 5 to 10 feet.

#### 815.4.4 Fiber Roving

- 1 Place the fiber roving within 24 hours after performing seeding operations in accordance with **Section 810**, except do not apply mulch to the area where fiber roving is being placed.
- 2 Spread Type A fiberglass roving uniformly over the designated areas at a minimum rate of 0.30 pounds per square yard. Spread Type B polymer roving uniformly over the designated areas at a minimum rate of 0.15 pounds per square yard.
- 3 Immediately after placing the roving, anchor it to the ground with the same type asphalt material used in the seeding operation and meeting the requirements of **Section 810**. Apply the asphalt uniformly over the specified fibers at a rate of 0.25 to 0.35 gallons per square yard. At the upgrade and downgrade ends, bury the roving to a depth of 1 foot to ensure that water does not pass under the roving.

#### 815.4.5 Sediment Tubes

##### 815.4.5.1 Site Preparation

- 1 Remove all rocks, clods, vegetation, or other obstructions that would prevent the installed sediment tube from having direct contact with the underlying soil or surface.

##### 815.4.5.2 Installation

- 1 If requested by the RCE, provide a manufacturer's representative on-site to oversee and approve the initial installation of sediment tubes. Provide a letter

from the manufacturer approving the installation if requested by the RCE.

- 2 Install the sediment tube by laying it flat on the ground. Construct a small trench to a depth that is 20% of the sediment tube diameter. Lay the sediment tube in the trench and compact the upstream sediment tube-soil interface. Do not completely bury the sediment tube during installation. Review all project specifications for special installation requirements. Install sediment tubes ensuring that no gaps exist between the soil and the bottom of the sediment tube. Lap the ends of adjacent sediment tubes a minimum of 6 inches to prevent flow and sediment from passing through the field joint. Never stack sediment tubes on top of one another.
- 3 Avoid damage to the sediment tube during installation. If a sediment tube becomes damaged during installation, place a stake on both sides of the damaged area, terminating the tube segment, and install a new tube segment. Perform field monitoring to verify that installation procedures do not damage sediment tubes. Replace sediment tubes damaged during installation as directed by the RCE or the manufacturer's representative at no expense to the Department.
- 4 Install sediment tubes in swales or drainage ditches perpendicular to the flow of water and extend them up the side of the slopes a minimum of 1-foot above the design flow depth. Space sediment tubes according to the following table.

Sediment Tube Spacing	
Slope	Maximum Sediment Tube Spacing
Less than 2%	150 feet
2%	100 feet
3%	75 feet
4%	50 feet
5%	40 feet
6%	30 feet
Greater than 6%	25 feet

- 5 Install sediment tubes using wooden stakes (1-inch x 1-inch) or steel posts specified in **Subsection 815.2.3.1**. Space posts or stakes 2-foot centers and drive them into the ground to a minimum depth of 2.0 feet leaving less than 1-foot of stake above the exposed sediment tube.
- 6 Intertwine the posts or stakes with the outer mesh on the downstream side
- 7 An acceptable alternative installation is driving stakes on 2-foot centers on each side of the sediment tube and connecting them with natural fiber twine or steel wire to inhibit the sediment tube from moving vertically. Sediment

tubes can also be secured by installing the stakes on 2-foot centers in a crossing manner ensuring direct soil contact at all times.

- 8 Select the sediment tube length to minimize the number of sediment tubes needed to span the width of the drainage conveyance. If the required ditch check length (perpendicular to the water flow) is 15 feet, then one 15-foot sediment tube is preferred compared to two overlapping 10-foot sediment tubes.
- 9 Install sediment tubes for ditch checks over bare soil, mulched areas or erosion control blankets. Keep sediment tubes for ditch checks in place until fully established vegetation and root systems have completely developed and can survive on their own.

#### **815.4.5.3 Delivery, Storage, and Handling**

- 1 Follow the manufacturer's written storage and handling procedures for sediment tube labeling, shipment, and storage. Clearly show the manufacturer or supplier name, sediment tube diameter and length on product labels.
- 2 Store and cover sediment tubes off the ground and cover adequately to protect them from the following: construction damage, precipitation, extended exposure to ultraviolet radiation including sunlight, on-site chemicals, flames including welding sparks, excessive temperatures, and other environmental conditions that can damage the physical properties of sediment tubes.

#### **815.4.5.4 Inspection and Maintenance of Sediment tubes**

- 1 Inspect sediment tubes after installation to ensure that no gaps exist under the sediment tubes or between the joints of adjacent ends of the sediment tubes. Inspect sediment tubes every 7 days. Repair rills, gullies, and undercutting near the sediment tubes.
- 2 Remove sediment deposits that impair the filtration capability of a sediment tube when the sediment reaches one-third of the height of the exposed sediment tubes. Remove and/or replace installed sediment tubes as required to adapt to changing construction site conditions.
- 3 When the functional longevity of the sediment tubes is exceeded as determined by the RCE or the manufacturer's representative, remove them from the site. Gather and dispose of them in regular means as non-hazardous, inert material. Before final stabilization, backfill all trenches, depressions or all other ground disturbances caused by the removal of sediment tubes.

#### **815.4.5.5 Acceptance**

- 1 Obtain RCE acceptance and approval of sediment tube installations. When requested by the RCE, ensure that a manufacturer's representative is on site to oversee and approve the initial installation of sediment tubes. Obtain a letter from the manufacturer approving the installation when requested by the RCE.

**815.4.6 Silt Fences**

- 1 Construct the silt fence in accordance with Plans or *SCDOT Standard Drawings* or as approved by the RCE. Place silt fences before the major construction in an area is started.
- 2 Maintain the silt fence until its capacity has been reached or erosion activity in the area has stabilized. Remove sediment accumulated along the fence when it reaches approximately one-third of the height of the fence, especially if heavy rains are expected. Remove trapped sediment or stabilize on site.
- 3 Inspect the silt fence every 7 days. Immediately correct any deficiencies. Remove filter fabric and replace whenever it has deteriorated to such extent that it reduces the effectiveness of the silt fence. In addition, review daily the location of silt fences in areas where construction activities have changed the natural contour and drainage runoff to ensure that the silt fences are properly located for effectiveness. Install additional silt fences as directed by the RCE where deficiencies exist.
- 4 If a silt fence or portion of a fence is located in an area where removing the sediment is not possible, then install a second silt fence, if necessary, at the discretion of the RCE. In this case, payment for both silt fences and portions involved is made at the unit price for silt fence.
- 5 Remove silt fence within 30 days after final stabilization is achieved or after temporary Best Management Practices (BMP) are no longer needed. Permanently stabilize disturbed areas resulting from fence removal. The fence materials remains the property of the Contractor and may be used at other locations provided the materials meet the appropriate requirements contained in this specification and/or on the Plans.

**815.4.7 Floating Turbidity Barriers**

- 1 Place floating turbidity barrier at the location shown on the Plans and in accordance with the manufacturer's recommendations. Anchor the ends on the undisturbed shoreline with sufficient support to secure the barrier in place during turbulent conditions. Place vertical supports and/or anchors along the barrier as necessary to prevent the barrier from drifting. Maintain the floating turbidity barrier until all disturbed areas have stabilized sufficiently to control erosion.

**815.4.8 Silt Basins**

- 1 Construct silt basins by excavating in berm ditches, parallel roadway ditches, at culvert inlets and outlets, and other locations as directed by the RCE. Construct in accordance with the Plans and the *SCDOT Standard Drawings*. Remove sediment as necessary to ensure that the basin functions properly.

**815.4.9 Silt Ditches**

- 1 Construct temporary silt ditches in accordance with the Plans and the *SCDOT Standard Drawings* at locations shown on the Plans or as directed by



the RCE. Silt ditches are generally constructed adjacent and parallel to the toe of the slope in relatively rolling areas where there is a possibility of property damage from sheet-type erosion. This type ditch is not intended to carry large volumes of water, but to catch sediment from runoff.

#### **815.4.10 Sediment Dams**

- 1 Construct temporary sediment dams in accordance with the Plans and **the SCDOT Standard Drawings** at locations shown on the Plans or as directed by the RCE.

#### **815.4.11 Inlet Structure Filters**

##### **815.4.11.1 Site Preparation**

- 1 Remove all rocks, clods, vegetation, or other obstructions so that the installed pre-fabricated inlet protection BMP has direct contact with the underlying surface.

##### **815.4.11.2 Installation**

###### **815.4.11.2.1 General**

- 1 Install inlet structure filters in accordance with the manufacturer's written installation instructions, in compliance with these specifications and with all OSHA, local, state, and federal codes and regulations.

###### **815.4.11.2.2 Type A - Low Flow Inlet Filters**

###### **815.4.11.2.2.1 Filter Fabric Inlet Protection**

- 1 Excavate a trench 6 inches deep around the outside perimeter of the inlet unless the fabric is pneumatically installed. Extend the filter fabric a minimum of 12 inches into the trench. Backfill the trench with soil or crushed stone and compact over the filter fabric unless the fabric is pneumatically installed.
- 2 Install steel posts specified in **Subsection 815.2.4.1.1**. Space the posts around the perimeter of the inlet a maximum of 3 feet apart and drive them into the ground a minimum of 24 inches.
- 3 Install the filter fabric to a minimum height of 24 inches above grade. Cut the filter fabric from a continuous roll to the length of the protected area to avoid the use of joints. When joints are necessary, wrap filter fabric together only at a support post with both ends securely fastened to the post, with a minimum 6-inch overlap. Attach fabric to the posts with heavy-duty plastic ties. Attach four evenly spaced ties in a manner to prevent sagging or tearing of the fabric. In all cases, affix ties in not less than four places.

###### **815.4.11.2.2.2 Sediment Tubes**

- 1 Install sediment tubes in accordance with **Subsection 815.4.5.2**.

###### **815.4.11.2.3 Type B - Medium Flow, Low Velocity Inlet Filters**

###### **815.4.11.2.3.1 Hardware, Fabric, and Stone Inlet Protection**

- 1 Excavate a trench 6 inches deep around the outside perimeter of the inlet.

Use hardware fabric or comparable wire mesh with maximum openings 0.5 inch x 0.5 inch as the supporting material. Extend the fabric a minimum of 6 inches into the ground. Backfill the trench with soil or crushed stone and compact over the fabric.

- 2 Install steel posts specified in **Subsection 815.2.4.2.1**. Space the posts a maximum of 3 feet apart around the perimeter of the inlet and drive them into the ground a minimum of 18 inches.
- 3 Install the wire mesh fabric above grade a minimum of 18 inches without exceeding 24 inches. Use heavy-duty wire ties spaced a maximum of 6 inches apart to attach the wire mesh material to the steel posts. Place Aggregate No. 5 washed stone to a minimum height of 12 inches and a maximum height of 24 inches against the hardware fabric on all sides.

#### **815.4.11.2.4 Type D - High Flow, High Velocity Inlet Filters**

##### **815.4.11.2.4.1 Rigid Inlet Filters**

- 1 Install rigid inlet filters in accordance with the manufacturer's written installation instructions. Properly install rigid inlet protection so that the inlet is completely enclosed.

##### **815.4.11.2.5 Type E - Surface Course Curb Inlet Filters**

- 1 Use surface course inlet filters in conjunction with Catch Basin Types 1, 16, 17, and 18 after the placement of the road surface course. Place surface course inlet filters where sediment may spill over sidewalks and curbs.
- 2 Install surface course inlet filters in front of curb inlet openings. Ensure that the filter has a minimum height or diameter of 9 inches and a minimum length 2 feet longer than the length of the curb opening to allow sufficient length to cover the inlet with at least 1-foot of clearance beyond the inlet on both ends. Do not completely block the inlet opening with surface course inlet filters. Install surface course inlet filters in a manner to allow overflows to enter the catch basin. Fill the aggregate compartment to a level (at least half full) that keeps the surface course inlet filter in place and creates a seal between the surface course inlet filter and the road surface.

#### **815.4.11.2.6 Type F - Inlet Tubes**

##### **815.4.11.2.6.1 Weighted Inlet Tubes**

- 1 Weighted inlet tubes do not require posts or additional techniques to keep them in place. Install weighted inlet tubes lying flat on the ground with no gaps between the soil or underlying surface and the inlet tube. Never stack weighted inlet tubes on top of one another. Do not completely block inlets with weighted inlet tubes. Install weighted inlet tubes so that all overflow or overtopping water has the ability to enter the inlet unobstructed. To avoid possible flooding, two or three concrete blocks may be placed between the weighted inlet tubes and the inlet.

**815.4.11.2.6.2 Non-Weighted Inlet Tubes**

- 1 Install non-weighted inlet tubes immediately after grading and construction of Catch Basin Types 1, 16, 17, and 18 boxes. Maintain non-weighted inlet tubes during subgrade and base preparation until the base course is placed. Review all project specifications for special installation requirements. Install non-weighted inlet tubes using 1-inch x 1-inch wooden stakes or 1.25 lb./linear ft. steel posts a minimum of 36 inches in length, placed on 2-foot centers. Intertwine the stakes with the outer mesh on the downstream side of the inlet tube. Drive stakes in the ground to a minimum depth of 12 inches, leaving less than 12 inches of stake exposed above the non-weighted inlet tube.
- 2 An acceptable alternative installation is driving stakes on 2-foot centers on each side of the non-weighted inlet tubes and connecting them with a natural fiber twine or steel wire to inhibit the non-weighted sediment tube from moving vertically. Another acceptable alternative installation for non-weighted inlet tubes is installing stakes on 2-foot centers in a crossing manner maintaining direct soil contact at all times. Install non-weighted inlet tubes so that the top is below the top of the installed curb line to ensure that all overflow or over-topping water has the ability to enter the inlet unobstructed.

**815.4.11.3 Delivery, Storage, and Handling**

- 1 Follow the manufacturer's written procedures for inlet structure filter labeling, shipment, and storage. Ensure that the manufacturer or supplier name, the structure size, shape, and weight clearly show on product labels.
- 2 Store inlet structure filters off the ground and cover adequately to protect them from the following: construction damage, precipitation, extended exposure to ultraviolet radiation including sunlight, on-site chemicals, flames, including welding sparks, excessive temperatures, and other environmental conditions that can damage the physical properties of the inlet filters.

**815.4.11.4 Inspection and Maintenance of Inlet Structure Filters****815.4.11.4.1 General**

- 1 Inspect inlet structure filters after installation for gaps that may permit sediment to enter the storm drainage system. Inspect inlet filters every 7 days. Immediately handle all damage or necessary repairs. Remove all accumulated sediment and debris from the surface and vicinity of inlet filters after each rainfall event or as directed by the RCE or the manufacturer's representative. Remove sediment when it reaches approximately one-third of the height of the inlet filter. If a sump is used, remove sediment when it fills approximately one-third of the depth of the hole. Maintain the pool area, always providing adequate sediment storage volume for the next storm event.
- 2 Remove, move, and/or replace inlet filters as required to adapt to changing construction site conditions. Remove inlet structure filters from the site when the functional longevity is exceeded as determined by the RCE or the manufacturer's representative. Dispose of inlet filters no longer in use at an appro-

appropriate recycling or solid waste facility. Before final stabilization backfill and repair trenches, depressions, and all other ground disturbances caused by the removal of inlet filters. Remove all construction material and sediment and dispose of them properly. Grade the disturbed areas to the elevation of the inlet structure crest. Stabilize all bare areas immediately.

#### **815.4.11.4.2 Type A - Low Flow Inlet Filters**

##### **815.4.11.4.2.1 Filter Fabric Inlet Protection**

- 1 Replace the fabric if it becomes clogged, or as directed by the RCE. Take care not to damage or undercut the fabric when removing the sediment.

##### **815.4.11.4.2.2 Sediment Tubes**

- 1 Inspect sediment tubes after installation for gaps under the sediment tubes and for gaps between the joints of adjacent ends of sediment tubes. Repair rills, gullies, and all undercutting near sediment tubes. Remove and/or replace installed sediment tubes as required to adapt to changing construction site conditions. Remove all sediment tubes from the site when the functional longevity is exceeded as determined by the RCE or the manufacturer's representative. Dispose of sediment tubes as non-hazardous, inert material.

#### **815.4.11.4.3 Type B - Medium Flow Low Velocity Inlet Filters**

##### **815.4.11.4.3.1 Hardware, Fabric, and Stone Inlet Protection**

- 1 If the stone becomes clogged with sediment, pull the stones away from the inlet and clean or replace them. Because cleaning gravel at a construction site may be difficult, an alternative approach would be to use the clogged stone as fill and put fresh stone around the inlet.

#### **815.4.11.4.4 Type D - High Flow, High Velocity Inlet Filters**

##### **815.4.11.4.4.1 Rigid Inlet Protection Device**

- 1 Inspect Type D inlet filters after installation to ensure that no gaps exist that may permit sediment to enter the storm drain system. Remove and/or replace rigid inlet filters to adapt to changing construction site conditions. Clean the rigid inlet protection filter material when it becomes covered or clogged with deposited sediment. Replace the rigid inlet protection filter material as directed by the RCE.

#### **815.4.11.4.5 Type E - Surface Course Curb Inlet Filters**

- 1 Because ponding is likely if sediment is not removed regularly, inspect surface course curb inlet filters on a regular basis and immediately after major rain events. Clean the surface course curb inlet filter if a visual inspection shows silt and debris build up around the filter.

#### **815.4.11.4.6 Type F - Inlet Tubes**

##### **815.4.11.4.6.1 Weighted Inlet Tubes**

- 1 Weighted inlet tubes may be temporarily moved during construction as needed. Replace weighted inlet tubes damaged during installation as di-

rected by the RCE or the manufacturer's representative at no expense to the Department.

#### **815.4.11.4.6.2 Non-Weighted Inlet Tubes**

- 1 Non-weighted inlet tubes may be temporarily moved during construction as needed. Replace non-weighted inlet tubes damaged during installation as directed by the RCE or the manufacturers' representative at no expense to the Department.

#### **815.4.11.5 Acceptance Criteria**

- 1 Obtain RCE approval of inlet structure filter installations. When requested by the RCE, ensure that a manufacturer's representative is on-site to oversee and approve the initial installation of inlet structure filters. Obtain a letter from the manufacturer approving the installation when requested by the RCE.

#### **815.4.12 Temporary Pipe Slope Drains**

- 1 Construct optional temporary pipe slope drains as required or as directed by the RCE. Ensure that the flexible pipe is of sufficient size to carry the anticipated volume of water, but in no case less than 8 inches in diameter. Ensure that pipe conforms to the requirements of **Section 803**.
- 2 Install temporary slope drains as a part of the grading operation where applicable and adjust as directed by the RCE.
- 3 Construct an earth berm at the top of cut or fill sections to channel the water into the slope drain and to prevent collected water from spilling over the edge of the slope.
- 4 When the temporary slope drains are removed, dress and seed the area in accordance with **Section 810**. The removed pipe drain becomes property of the Contractor, and it may be used again at other temporary locations if the pipe is in a condition acceptable to the RCE.

#### **815.4.13 Temporary Seeding**

- 1 Perform Temporary Seeding in accordance with **Section 810** as applicable.

#### **815.4.14 Stabilized Construction Entrance**

##### **815.4.14.1 Application**

- 1 Install a stabilized construction entrance at all defined points where traffic enters or leaves a construction site and moves directly off or onto a public road. Use construction entrances in conjunction with the stabilization of construction roads to reduce the amount of mud picked up by vehicles.
- 2 Ensure that the stabilized construction entrance is a minimum of 24 feet wide by 100 feet long and modify as necessary to accommodate site constraints. Taper the edges of the entrance out towards the road to prevent tracking of mud at the edge of the entrance.
- 3 If washing is used, make provisions to intercept the wash water and trap the sediment before it is carried offsite. Require washdown facilities as

needed. In general, establish washdown facilities with crushed stone and drain into a sediment trap or sediment basin.

- 4 Remove all vegetation and any objectionable material from the foundation area. Divert all surface runoff and drainage from the stones to a sediment trap or basin. Install a non-woven geotextile fabric before placing any stone. If necessary, install a culvert pipe across the entrance to provide positive drainage. Place the aggregate at a minimum depth of 6 inches uniform on top of the geotextile fabric.

#### **815.4.14.2 Inspection and Maintenance of Stabilized Construction Entrances**

- 1 Inspect stabilized construction entrances every 7 days. Check for mud and sediment build-up and pad integrity. Wash, replace, or add stone whenever the entrance fails to perform effectively or as directed by the RCE. Wash or replace the stone in the entrance whenever the entrance fails to reduce the amount of mud being carried offsite by vehicle tires. Wash frequently to extend the useful life of the stone.
- 2 Re-shape stone pad as needed for drainage and runoff control. Brush or sweep up soil that has been tracked offsite immediately and properly dispose of it. Use flushing only when the water can be discharged to a sediment trap or basin. Maintain the stabilized construction entrance until the remainder of the construction site has been fully stabilized. Repair any broken pavement immediately.
- 3 For sites with wash racks at each site entrance, construct and maintain sediment traps for the life of the project.
- 4 If the aggregate material is being tracked offsite, limit larger vehicles from the construction site or use a larger diameter stone. If excessive sediment is being tracked onto the roadway, increase the length of the stabilized construction entrance.

#### **815.4.14.3 Acceptance Criteria**

- 1 Obtain RCE acceptance and approval for stabilized construction entrance installations and for the replacement of stone.

### **815.4.15 Bonded Fiber Matrix (BFM)**

#### **815.4.15.1 Application**

- 1 Use BFM with all components pre-packaged by the manufacturer to assure material performance. Do not field mix materials, additives, or components.
- 2 Examine substrates and conditions before applying materials. Do not proceed with installation until unsatisfactory conditions are corrected. Apply BFM to geotechnically stable slopes that are constructed to divert runoff water away from the face of the slope eliminating damage to the slope face caused by the surface flow from above the slope.

- 3 Use personnel or subcontractors certified and trained by the manufacturer in the proper procedures for mixing and applying the BFM. Strictly comply with the manufacturer's mixing recommendations and installation instructions. Use approved hydraulic seeding/mulching machines with fan-type nozzle (50-degree tip) for BFM applications. Apply BFM from opposing directions to the soil surface in successive layers, reducing the "shadow effect" to achieve maximum coverage of all exposed soil. Do not apply the BFM immediately before, during, or after rainfall. Allow the BFM a minimum of 24 hours to dry after installation.
- 4 Do not exceed maximum slope length of 100 feet when slope gradients are steeper than 4H:1V. Install BFMs at a general application rate of 3500 pounds per acre.

#### **815.4.15.2 Delivery, Storage, and Handling**

- 1 Have BFM components delivered in factory labeled packages. Store and handle in strict compliance with the manufacturer's instructions and recommendations. Ensure that packaging is composed of UV resistant bags with a UV resistant pallet cover. Protect stored BFM from damage caused by weather, excessive temperatures, and construction operations. Clean all spills promptly.

#### **815.4.15.3 Maintenance**

- 1 Prepare a maintenance plan that includes the following:
  - Reapplication of BFM as directed by the RCE to disturbed areas that require continued erosion control.
  - Maintenance of equipment to provide uniform application rates.
  - Rinsing of all BFM mixing and application equipment thoroughly with water to avoid formation of residues and appropriate discharge of all rinse water.
- 2 Degradation of BFM can be expected to occur as a result of mechanical degradation, chemical, and biological hydrolysis, sunlight, salt, and temperature. Where necessary, reapply BFM in accordance with manufacturer's instructions. Reapplication is not required unless BFM treated soils are disturbed or turbidity or water quality shows the need for an additional application. If BFM-treated soils are left undisturbed, the necessity of reapplication will be determined by the RCE.

#### **815.4.15.4 Acceptance Criteria**

- 1 Obtain RCE acceptance and approval of BFM installations. When requested by the RCE, ensure that a manufacturer's representative is on-site to oversee and approve the initial installation of BFM. Obtain a letter from the manufacturer approving the installation when requested by the RCE.

**815.4.16 Flexible Growth Matrix (FGM)**

**815.4.16.1 Application**

- 1 Use flexible growth matrix (FGM) with components pre-packaged by the manufacturer to assure material performance. Do not field mix materials, additives, or components.
- 2 Examine substrates and conditions before materials are applied. Apply FGM to geotechnically stable slopes that constructed to divert runoff away from the face of the slope. Do not proceed with installation until satisfactory conditions are established.
- 3 Use personnel or subcontractor certified and trained by the manufacturer in the proper procedures for mixing and application of the FGM. Strictly comply with the manufacturer’s mixing recommendations and installation instructions. Use approved hydraulic seeding/mulching machines with fan-type nozzles (50-degree tip) for FGM applications. Apply FGM from opposing directions to the soil surface in successive layers, reducing the "shadow effect" to achieve maximum coverage of all exposed soil. FGM does not require a cure time and is effective immediately; therefore, FGM may be applied before, during or after a rainfall event. Install FGM materials at the general application rates in the following table.

<b>Flexible Growth Matrix Application Rates</b>	
<b>Condition</b>	<b>Application Rate</b>
Slope Applications	3500 pounds per acre
Below TRM	1500 pounds per acre

**815.4.16.2 Delivery, Storage, Handling**

- 1 Use FGM with components pre-packaged by the manufacturer to assure material performance. Have materials and products delivered in UV and weather resistant factory labeled packages. Store and handle in strict compliance with manufacturer’s instructions and recommendations. Protect from damage from weather, excessive temperatures, and construction operations. Clean all spills promptly.

**815.4.16.3 Maintenance**

- 1 Prepare a maintenance plan that includes the following:
  - Reapplication of FGM as directed by the RCE to disturbed areas that require continued erosion control.
  - Maintenance of equipment to provide uniform application rate.
  - Rinsing all FGM mixing and application equipment thoroughly with water to avoid formation of residues and appropriate discharge of rinse water.
- 2 Degradation of FGM can be expected to occur because of mechanical and chemical degradation and biological hydrolysis, sunlight, salt, and tempera-



ture. Reapply FGM in accordance with the manufacturer's instructions. Reapplication is not required unless FGM treated soils are disturbed or turbidity or water quality shows the need for an additional application. If FGM-treated soils are left undisturbed, the necessity of reapplication will be determined by the RCE.

#### 815.4.16.4 Acceptance Criteria

- 1 Obtain RCE acceptance and approval of FGM installations. When requested by the RCE, ensure that a manufacturer's representative is on-site to oversee and approve the initial installation of the FGM. Obtain a letter from the manufacturer approving the installation when requested by the RCE.

#### 815.5 Measurement

- 1 The quantity of the pay item Fiber Roving Type (A or B) is the surface area covered by the roving including in anchor trenches and is measured by the square yard (SY) of fiber roving in-place, complete, and accepted.
- 2 The quantity of the pay item Turf Reinforcement Matting (TRM) Type (1, 2, 3, or 4) or Temporary Erosion Control Blanket (ECB) Class (A, B, or C) is the surface area covered by the rolled erosion control product, including seams, overlaps, anchor trenches, and wastage and is measured by the one-thousand square yard (MSY) unit of material in-place, complete, and accepted. Products damaged by the Contractor's operations are not included in the measurement.
- 3 The quantity for the pay item Sediment Tube is the length of sediment tube installed, including overlaps and wastage and is measured by the linear foot (LF) of sediment tube in-place, complete, and accepted. Sediment tubes damaged by the Contractor's operations are not included in the measurement. The installation of the sediment tubes may require written acceptance by the manufacturer's representative before the quantity is accepted.
- 4 The quantity for the pay item Silt Fence is the length of silt fence installed and maintained and is measured by the linear foot (LF) of silt fence in-place, complete, and accepted.
- 5 The quantity for the pay item Removal of Silt Retained by Silt Fence is the length of silt fence in front of which silt deposit was removed as ordered by the RCE and is measured by the linear foot (LF) along the line of the silt fence, complete, and accepted.
- 6 The quantity for Replace/Repair of Silt Fence is the length of silt fence repaired or replaced because of failure of the silt fence not the fault of the Contractor and is measured by the linear foot (LF) along the line of the silt fence, complete, and accepted.
- 7 The quantity for the item Floating Turbidity Barrier (Light, Medium, or Heavy Duty) is the length of floating turbidity barrier if the depth is specified in the Contract, or if the depth is not specified, then by the surface area of the floating turbidity barrier furnished, installed, maintained and is measured by either the linear foot (LF) or the square foot (SF) as applicable for type of barrier in-

place, complete, and accepted. Measurement of accumulated material removed and disposed of each time the device is cleaned out is included in the quantity for Cleaning Silt Basins.

- 8 The quantity for the pay item Silt Basins is the volume of material excavated for the construction and backfilling of silt basins and is measured by the cubic yard (CY) of material moved during each operation, complete, and accepted. Each operation is measured separately.
- 9 The quantity for the pay item Cleaning Silt Basins is the volume of sediment deposits removed from silt ditches and silt basins as directed by the RCE, measured by the cubic yard (CY) of material removed, complete, and accepted. The quantity also includes sediment deposits removed from erosion control devices as directed and approved by the RCE, except from in front of silt fences. Measurements will be taken each time sediment is removed. Proper disposal of the sediment removed is considered incidental work in this item and is not measured for payment.
- 10 The quantity for the pay item Silt Ditches is of material excavated for the construction and backfilling of silt ditches and is measured by the cubic yard (CY) of material moved, complete, and accepted. Each operation is measured separately.
- 11 The quantity for the pay item Inlet Structure Filter Type (B, D1, D2, E CBT-1, E CBT-16, E CBT-17, or E CBT-18) is measured by the each (EA) filter furnished and installed, complete, and accepted. The quantity for Inlet Structure Filter Type A, F (Weighted), or F (Non-weighted) is the length of inlet structure filter furnished and installed, including overlaps and wastage and is measured by the linear foot (LF) of filter in-place, complete, and accepted. Inlet structure filters damaged by the Contractor's operations are not included in the quantity. The proper removal and disposal of deposited sediment around inlet structure filters is included in the quantity for Cleaning Silt Basins.
- 12 The quantity for the pay item Filter Material for Inlet Structure Filter Type D1 or Filter Material for Inlet Structure Filter Type D2 is measured by each (EA) inlet structure filter around which the filter fabric is replaced not due to the fault of the Contractor's operations, complete, and accepted. This measurement only includes replacement filter fabric, not the replacement of the frame for the Type D1 or Type D2 inlet structure filters.
- 13 The quantity for the pay item Temporary Flexible Pipe Slope Drains - (di- ameter in inches) is the length of the flexible pipe drains furnished and installed, measured by the linear foot (LF) along of pipe in-place, complete, and accepted. This item includes any excavation necessary for the installation of the pipe drains; and therefore, no measurement is made for the excavation work.
- 14 The quantity for the pay item Stabilized Construction Entrance is the surface area of the stabilized construction entrance in-place and is measured by the square yard (SY), complete, and accepted. When replacement stone is authorized by the RCE, the area of replacement stone in the stabilized construction entrance is measured and added to the quantity for this item.

- 15 The quantity for the pay item Bonded Fiber Matrix (BFM) is the surface area covered by the bonded fiber matrix applied at the recommended rate and is measured by the one-thousand square yard (MSY) units of matrix in-place, complete, and accepted. The installation of the BFM may require written acceptance by the manufacturer's representative before acceptance for payment.
- 16 The quantity for the pay item Flexible Growth Matrix (FGM) is the surface area covered by the flexible growth matrix applied at the recommended rate and is measured by the one-thousand square yard (MSY) units of matrix in-place, complete, and accepted. The installation of the FGM may require written acceptance by the manufacturer's representative before acceptance for payment.
- 17 Brush barriers are not measured for payment. The material and labor to construct brush barriers are considered incidental to the clearing and grubbing operations.
- 18 The quantity for Temporary Seeding is measured in accordance with **Subsection 810.5**.
- 19 Temporary pipe slope drains installed are considered incidental to work of the erosion control items; and therefore, they are not measured for payment.

#### **815.6 Payment**

- 1 Unless otherwise noted, payment for the accepted quantity for each pay item, measured in accordance with **Subsection 815.5**, is determined using the contract unit bid price for the applicable item, and the payment includes all direct and indirect costs and expenses required to complete the work.
- 2 Payment for Fiber Roving Type (A or B) is full compensation for installing fiber roving as specified or directed and includes furnishing, spreading and maintaining fiber roving; application of asphalt tackifier; and all other materials, labor, equipment, tools, supplies, transportation, and incidentals necessary to fulfill the requirements of the pay item in accordance with the Plans, the Specifications, and other terms of the Contract.
- 3 Payment for Turf Reinforcement Matting (TRM) Type (1, 2, 3, or 4) or Temporary Erosion Control Blanket (ECB) Class (A, B, or C) is full compensation for installing TRM or ECB as specified or as directed and includes furnishing, placing, and maintaining the erosion control matting or blankets; providing anchor devices and trenches; quality control testing; and all other materials, labor, equipment, tools, supplies, transportation, and incidentals necessary to fulfill the requirements of the pay item in accordance with the Plans, the Specifications, and other terms of the Contract.
- 4 Payment for Sediment Tubes is full compensation for installing the sediment tubes as specified or directed and includes furnishing, placing, maintaining, inspecting, removing, and disposing of the sediment tubes; providing wooden stakes, steel posts, proper storage facilities, documentation of Quality Control and Quality Assurance programs; and all other materials, labor,

equipment, tools, supplies, transportation, and incidentals necessary to fulfill the requirements of the pay item in accordance with the Plans, the Specifications, and other terms of the Contract.

- 5 Payment for Silt Fence is full compensation for installing silt fence as specified or directed and includes furnishing, placing, maintaining, inspecting, removing, and disposing of silt fences; providing filter fabric, posts, and ties; and all other materials, labor, equipment, tools, supplies, transportation, and incidentals necessary to fulfill the requirements of the pay item in accordance with the Plans, the Specifications, and other terms of the Contract.
- 6 Payment for Replace/Repair of Silt Fence is full compensation for repairing or replacing damaged or malfunction silt fences as specified or directed and includes furnishing or repairing filter fabric, posts, and ties, and all other materials, labor, equipment, tools, supplies, transportation, and incidentals necessary to fulfill the requirements of the pay item in accordance with the Plans, the Specifications, and other terms of the Contract.
- 7 Payment for Floating Turbidity Barrier (*Light, Medium, or Heavy Duty*) is full compensation for installing floating turbidity barriers as specified or directed and includes furnishing, installing, maintaining, removing and disposing of the floating turbidity barriers; providing attachments to the shore, anchors, vertical supports, anchor buoys, buoyed warning signs, and lighted buoys; and all other materials, labor, equipment, tools, supplies, transportation, and incidentals necessary to fulfill the requirements of the pay item in accordance with the Plans, the Specifications, and other terms of the Contract.
- 8 Payment for Silt Basins is full compensation for constructing silt basins as specified or directed and includes excavating, grading, and backfilling of silt basins; disposing of surplus material; and all other materials, labor, equipment, tools, supplies, transportation, and incidentals necessary to fulfill the requirements of the pay item in accordance with the Plans, the Specifications, and other terms of the Contract.
- 9 Payment for Cleaning Silt Basins is full compensation for removing and disposing of sediment deposits accumulated in silt basins as well as other sediment retention devices as specified or directed and includes all materials, labor, equipment, tools, supplies, transportation, and incidentals necessary to fulfill the requirements of the pay item in accordance with the Plans, the Specifications, and other terms of the Contract.
- 10 Payment for Silt Ditches is full compensation for constructing silt ditches as specified or directed and includes excavating, grading, and backfilling of silt ditches; disposing of surplus material; and all other materials, labor, equipment, tools, supplies, transportation, and incidentals necessary to fulfill the requirements of the pay item in accordance with the Plans, the Specifications, and other terms of the Contract.
- 11 Payment for Inlet Structure Filter (of the type required) is full compensation for installing the inlet structure filters as specified or directed and includes furnishing, installing, maintaining, inspecting, removing and disposing of the

inlet structure filters; providing posts, fabric, ties, anchor trenches, proper storage facilities, and documentation of Quality Control and Quality Assurance programs; and all other materials, labor, equipment, tools, supplies, transportation, and incidentals necessary to fulfill the requirements of the pay item in accordance with the Plans, the Specifications, and other terms of the Contract.

- 12 Payment for Stabilized Construction Entrance is full compensation for constructing stabilized construction entrances as specified or directed and includes furnishing, installing, inspecting, maintaining, reshaping, removing, and disposing of the stabilized construction entrance (and exit); providing wash-down facilities, drainage, and geotextile under the aggregate; sweeping adjacent roadway as necessary or directed; and all other materials, labor, equipment, tools, supplies, transportation, and incidentals necessary to fulfill the requirements of the pay item in accordance with the Plans, the Specifications, and other terms of the Contract.
- 13 Payment for Bonded Fiber Matrix (BFM) or Flexible Growth Matrix (FGM) is full compensation for installing BFM or FGM as specified or directed and includes furnishing, applying, and maintaining the erosion control matrix including testing and documentation of Quality Control and Quality Assurance programs and all other materials, labor, equipment, tools, supplies, transportation, and incidentals necessary to fulfill the requirements of the pay item in accordance with the Plans, the Specifications, and other terms of the Contract.
- 14 Brush barriers are not paid for directly, but are considered incidental to the clearing and grubbing operation. The cost for brush barriers is included in the contract lump sum bid price for Clearing and Grubbing.
- 15 The payment for Temporary Seeding is made in accordance with the applicable provisions of **Subsection 810.6**.
- 16 Pay items under this section include the following:

Item No.	Pay Item	Unit
8151000	Fiber Roving	SY
8151010	Bonded Fiber Matrix (BFM)	MSY
8151020	Flexible Growth Matrix (FGM)	MSY
8151101	Turf Reinforcement Matting (TRM) Type 1	MSY
8151102	Turf Reinforcement Matting (TRM) Type 2	MSY
8151103	Turf Reinforcement Matting (TRM) Type 3	MSY
8151104	Turf Reinforcement Matting (TRM) Type 4	MSY

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Item No.	Pay Item	Unit
8151111	Temporary Erosion Control Blanket (Class A)	MSY
8151112	Temporary Erosion Control Blanket (Class B)	MSY
8151113	Temporary Erosion Control Blanket (Class C)	MSY
8152004	Inlet Structure Filter - Type F (Weighted)	LF
8152006	Inlet Structure Filter - Type F (Non-Weighted)	LF
8152007	Sediment Tube	LF
8153000	Silt Fence	LF
8153090	Replace/Repair Silt Fence	LF
8153100	Floating Turbidity Barrier - Light Duty	SF
81531XX	Floating Turbidity Barrier - Light Duty (( <del>X</del> )' Deep)	LF
8153200	Floating Turbidity Barrier -Medium Duty	SF
81532XX	Floating Turbidity Barrier - Medium Duty (( <del>X</del> )' Deep)	LF
8153300	Floating Turbidity Barrier - Heavy Duty	SF
81533XX	Floating Turbidity Barrier - Heavy Duty (( <del>X</del> )' Deep)	LF
8154000	Silt Basins	CY
8154010	Cleaning Silt Basins	CY
8154050	Removal of Silt Retained by Silt Fence	LF
8155000	Silt Ditches	CY
8156205	Inlet Structure Filter - Type D1	EA
8156207	Filter Material for Inlet Structure Filter - Type D1	EA
8156210	Inlet Structure Filter - Type B	EA
8156211	Inlet Structure Filter - Type E (Catch Basin Type 1)	EA
8156212	Inlet Structure Filter - Type E (Catch Basin Type 16)	EA

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<b>Item No.</b>	<b>Pay Item</b>	<b>Unit</b>
8156213	Inlet Structure Filter - Type E (Catch Basin Type 17)	EA
8156214	Inlet Structure Filter - Type E (Catch Basin Type 18)	8156214
8156215	Inlet Structure Filter - Type D2	EA
8156217	Filter Material for Inlet Structure Filter - Type D2	EA
8156219	Inlet Structure Filter - Type A	LF
8156490	Stabilized Construction Entrance	SY



# **Appendix L.3**

## **Biological Assessment**

for US Fish and Wildlife Service





BIOLOGICAL ASSESSMENT  
FOR US FISH AND WILDLIFE SERVICE

Prepared For:



Prepared By:



Civil Engineering  
Consulting Services, Inc.

March 27, 2020

## Table of Contents

1. Project Overview.....	5
1.1 Federal Nexus.....	5
1.2 Project Description.....	5
1.3 Project Area and Setting .....	5
1.4 Consultation History .....	6
2. Federally Proposed & Listed Species & Designated Critical Habitat.....	6
2.1 American wood stork.....	8
2.2 Bachman’s warbler .....	8
2.3 Eastern Black rail.....	9
2.4 Piping plover .....	9
2.5 Northern long-eared bat.....	9
2.6 West Indian Manatee.....	10
2.7 Canby’s Dropwort .....	10
2.8 Pondberry .....	11
3. Environmental Baseline .....	11
3.1 Aquatic and open water habitats:.....	12
3.1.1 Ashley River: .....	12
3.1.2 Filbin Creek.....	14
3.1.3 Other Streams .....	14
3.1.4 Open Ponds .....	14
3.2 Terrestrial and mixed aquatic habitats: .....	15
3.2.1 Maintained Development.....	15
3.2.2 Mixed Pine/Hardwood Forest .....	15
3.2.3 Scrub/ Shrub.....	15
3.2.4 Bottomland Hardwood Forest.....	16
3.2.5 Tidal Wetlands .....	16
3.2.6 Brackish Marsh .....	16

3.2.7 Freshwater Herbaceous Wetlands..... 16

3.2.8 Forested Wetlands ..... 17

3.2.9 Cypress-tupelo Wetlands ..... 17

4. Project Details ..... 17

4.1 Construction..... 17

4.1.1 Roadway Construction ..... 17

4.1.2 Ashley River Bridge Construction ..... 18

4.1.3 Project Timeline..... 20

4.1.4 Site Preparation..... 20

4.1.5 Construction Access and Staging..... 20

4.1.5 Potential Impacts on Water Quality ..... 20

4.2 Operations and Maintenance ..... 21

5. Project Action Area ..... 21

5.1 Project Action Area ..... 21

5.2 Limits of an Action Area ..... 21

6. Effects Analysis..... 22

6.1 Direct and Indirect Effects ..... 22

6.2 Interrelated and Interdependent Actions and Activities ..... 25

7. Effect Determinations ..... 25

8. Conservation Measures and Environmental Commitments..... 26

9. References ..... 28

## Tables

<b>Table 1</b>	Species Protected under the Federal ESA.
<b>Table 2</b>	Protected Species Effect Determinations.

## Appendices

### Appendix A

Figure 1	Project Location Map
Figure 2	SC DHEC Waters Classification
Figure 3	HUC Boundary and Water Quality Monitoring Stations
Figure 4	Shellfish Harvest Classifications

**Appendix B** UFWS LOI Response Letter and USFWS Charleston County Protected Species List

**Appendix C** I-526 Ashley River Conceptual Design Plans and Impact Areas

**Appendix D** Northern Long-Eared Bat 4(d) Rule Streamlined Consultation Form

**Appendix E** West Indian Manatee Protection Guidelines

**Appendix F** I-526 Lowcountry Corridor West Natural Resources Technical Memorandum

# 1. Project Overview

## 1.1 Federal Nexus

The purpose of this Biological Assessment (BA) is to address the effect of the I-526 Lowcountry Corridor West project on U.S. Endangered Species Act (ESA) listed species, listed as endangered or threatened, or their designated critical habitat, under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS). Those species under the jurisdiction of the National Oceanic and Atmospheric Administration-National Marine Fisheries Service (NOAA-NMFS) are addressed in a separate BA.

The South Carolina Department of Transportation (SCDOT), on behalf of the Federal Highway Administration (FHWA), is pursuing informal consultation under Section 7 of the ESA on the impacts to species that will result from the proposed I-526 West project. Section 7 of the ESA assures that, through consultation with USFWS, federal actions do not jeopardize the continued existence of any threatened, endangered, or proposed species, or result in the destruction or adverse modification of critical habitat.

## 1.2 Project Description

The proposed I-526 Lowcountry Corridor West project extends approximately 11.4 miles from near Paul Cantrell Boulevard in West Ashley to Virginia Avenue in North Charleston in Charleston County, SC. SCDOT currently ranks the segment of I-526 between I-26 and Virginia Avenue as the most congested segment of interstate highway in the state. The remainder of the I-526 LCC West project, from I-26 to Paul Cantrell Boulevard, ranks among the top ten of the state's existing most congested corridors. Traffic forecasts show that segments of that corridor will continue to be among the state's most congested in 2040. The interchange of I-526 and I-26 is the major source of the congestion.

Through various reasonable build alternatives, SCDOT proposes to add two travel lanes in each direction along I-526 and to upgrade the interchange of I-526 and I-26. Improvements to access I-526 from Paul Cantrell Boulevard, North Rhett Avenue, and Virginia Avenue are also proposed. Proposed improvements to I-526 would include providing additional travel lanes over the Ashley River, through widening the existing bridges. An Environmental Impact Statement (EIS) is being completed that outlines alternatives to satisfy the purpose and need of the project.

## 1.3 Project Area and Setting

The area surrounding the project study area (PSA) is a densely populated region to the west of the City of Charleston, South Carolina (Appendix A, Figure 1). Based on the size of this project and the density of development in greater Charleston, the land use with this vicinity varied greatly. A large portion of the land within this PSA has been developed for residential, commercial, and industrial uses. Undeveloped

land primarily consists of maintained rights of way, landscaped lawns, wooded forests, and tidal marshes. Filbin Creek and its floodplain parallel and cross through the PSA, flowing to the Cooper River; this area is largely undeveloped forested wetlands. The Ashley River flows through the PSA and is surrounded by tidal mudflats and vegetated marshes. Numerous streams and wetlands are present in the PSA, including forested wetlands, emergent wetlands, tidally influenced streams, and freshwater streams.

### 1.4 Consultation History

A Letter of Intent (LOI) was sent to the USFWS and NOAA-NMFS by SCDOT on January 27, 2016. The USFWS provided a response to the LOI on February 1, 2016 (Appendix B). A Notice of Intent was published in the Federal Register on November 11, 2019. The project has been discussed at several Agency Coordination Effort meetings with the USFWS, NOAA-NMFS, U.S. Environmental Protection Agency (EPA), FHWA, U.S. Army Corps of Engineers (USACE), South Carolina Department of Natural Resources (SCDNR), and FHWA on March 14, 2019; April 23, 2019; July 10, 2019; September 11, 2019; October 9, 2019; November 13, 2019; December 11, 2019; January 8, 2020; February 12, 2020; and March 11, 2020.

## 2. Federally Proposed & Listed Species & Designated Critical Habitat

The PSA is located within the range of twenty-four species listed under the ESA within the jurisdiction of USFWS (Table 1). One of these twenty-four species, Eastern black rail, is listed as “proposed” threatened for the ESA. Proposed species are those candidate species that were found to warrant listing as either threatened or endangered, after completion of a status review and consideration of other protective conservation measures. Two additional listed species (shortnose sturgeon and Atlantic sturgeon) fall within the jurisdiction of NOAA-NMFS. These species are being coordinated directly with NOAA – NMFS. There is no Critical Habitat within the PSA.

**Table 1. Species Protected under the Federal ESA.**

Species	Federal Protection Status
Flatwoods salamander ( <i>Ambystoma cingulatum</i> )	Threatened
American wood stork ( <i>Mycteria americana</i> )	Threatened
Bachman's warbler ( <i>Vermivora bachmanii</i> )	Endangered
Eastern Black rail ( <i>Laterallus jamaicensis</i> )	Threatened (proposed)
Piping plover ( <i>Charadrius melodus</i> )	Threatened

Species	Federal Protection Status
Red-cockaded woodpecker ( <i>Picoides borealis</i> )	Endangered
Red knot ( <i>Calidris canutus rufa</i> )	Threatened
Atlantic sturgeon ( <i>Acipenser oxyrinchus oxyrinchus</i> )	Endangered
Shortnose sturgeon ( <i>Acipenser brevirostrum</i> )	Endangered
Finback whale ( <i>Balaenoptera physalus</i> )	Endangered
Humpback whale ( <i>Megaptera novaengliae</i> )	Endangered
Northern long-eared bat ( <i>Myotis septentrionalis</i> )	Threatened
Right whale ( <i>Balaena glacialis</i> )	Endangered
Sei whale ( <i>Balaenoptera borealis</i> )	Endangered
Sperm whale ( <i>Physeter macrocephalus</i> )	Endangered
West Indian manatee ( <i>Trichechus manatus</i> )	Threatened
American chaff seed ( <i>Schwalbea americana</i> )	Endangered
Canby's dropwort ( <i>Oxypolis canbyi</i> )	Endangered
Pondberry ( <i>Lindera melissifolia</i> )	Endangered
Seabeach amaranth ( <i>Amaranthus pumilus</i> )	Threatened
Green sea turtle ( <i>Chelonia mydas</i> )	Threatened
Kemp's ridley sea turtle ( <i>Lepidochelys kempii</i> )	Endangered
Leatherback sea turtle ( <i>Dermochelys coriacea</i> )	Endangered
Loggerhead sea turtle ( <i>Carretta carretta</i> )	Threatened

NOAA-NMFS has sole jurisdiction over the Atlantic sturgeon and shortnose sturgeon; these species are evaluated under a separate BA that has been provided to NOAA-NMFS. The bald eagle (*Haliaeetus leucocephalus*) is also protected under the Bald and Golden Eagle Protection Act (BGEPA) and Migratory Bird Treaty Act (MBTA). The following sections detail the eight species that were noted to have suitable

habitat within the PSA. Additional detail regarding remaining species can be found within the “I-526 Lowcountry Corridor West Natural Resources Technical Memorandum” (Appendix F).

## 2.1 American wood stork

American wood storks (*Mycteria americana*) are the largest wading bird and only stork species that breeds in the United States. These birds are large, long legged with a head to tail length of up to 45 inches and a wingspan of up to 65 inches. Adult wood storks are white except for the primary and secondary wing feathers and the tail feathers, which are black with a greenish sheen. Adults also



*American wood stork foraging in the I-526 PSA.*

have an unfeathered head and neck with a long, thick black bill. The breeding range of the wood stork extends down the southeastern coast of the United States, including South Carolina. American wood storks are colonial nesters with colonies ranging from less than 12 to more than 500 in size. Nesting occurs in small to large trees typically on small islands surrounded by standing water, or in extensive forested and flooded wetlands. The species generally forages in water six to ten inches deep. They feed in freshwater marshes, narrow tidal creeks, or flooded tidal pools. Suitable habitat and foraging habitat exists within the forested wetlands near open water located within the PSA including open ponds, wetlands, the Ashley River, and other smaller streams. During surveys, American wood storks were documented foraging in freshwater wetlands near Faber Place Drive and I-526. No active nesting rookeries were found during surveys. The closest known nesting population is approximately 3 miles north of the PSA.

## 2.2 Bachman’s warbler

Bachman’s warbler (*Vermivora bachmanii*) is presumed to be extinct, historically occurring in the southeastern U.S. during its breeding season. Historically, the bird inhabited seasonally flooded swamp forests, especially with cane thickets and containing variable amounts of water, but usually with some permanent water. The Bachman's warbler is a small bird with olive-green upperparts, yellow forehead, throat, and underparts, and a faint white eye-ring and black crown and bib. The bird was last observed in



the United States in 1962 near Charleston, South Carolina. Suitable habitat for Bachman's warbler exists within the PSA. Small areas of cane thickets and seasonally flooded swamp forests with variable amounts of water were observed. Evidence of Bachman's warbler was not noted within the PSA.

### 2.3 Eastern Black rail

The Eastern black rail (*Laterallus jamaicensis*) is currently proposed by USFWS for listing as a threatened species. No critical habitat is proposed for designation. In addition to proposing threatened species status for the eastern black rail, USFWS is also proposing a special rule under Section 4(d) of the ESA that would tailor protections for the bird. If finalized, this 4(d) rule would exempt certain activities such as mowing from the take prohibitions of the ESA. The Eastern black rail is a small rail species that is usually grey or black-grey in color. It breeds in a wide diversity of habitats such as fresh and saline marshes, wet meadows, and savannas. Eastern black rail habitat can be tidally or non-tidally influenced, and range in salinity from salt to brackish to fresh. Its natural history is the best known in its genus due to work in temperate North America where it primarily feeds on small aquatic and terrestrial invertebrates. Suitable habitat for Eastern black rail exists in the marshes associated with the Ashley River and with other smaller stream systems. No black rails were identified during field surveys and there are no known populations within the PSA.

### 2.4 Piping plover

The piping plover (*Charadrius melodus*) is a small and stocky sparrow sized bird that is pale or sandy white with a black breast band and yellow bill and legs. Breeding birds have a prominent black collar and black band that runs across the forehead. The piping plover inhabits sandy beaches, mudflats and sandbars along rivers and lakes. In South Carolina, the piping plover occurs from August to April and generally overwinters in the southern United States from North Carolina to the Gulf of Mexico. Suitable foraging habitat for piping plover may exist on mudflats and sandbars associated with the Ashley and the Cooper Rivers. No piping plovers were identified during field surveys and there are no known populations within the PSA.

### 2.5 Northern long-eared bat

The northern long-eared bat (*Myotis septentrionalis*) is a medium-sized bat that is medium to dark brown on the back and tawny to pale-brown on the underside. The species is distinguished by its long ears. During the winter months, the northern long-eared bat can be found hibernating in caves and mines. They use areas in various sized caves or mines with constant temperatures, high humidity, and no air currents. During the summer, northern long-eared bats roost underneath bark and in cavities or in crevices of both

live trees and dead trees. Individuals of the species have also been found rarely roosting in structures, like barns and sheds. Habitat conducive to seasonal occupation for northern long-eared bat is located within the PSA. The PSA contains potentially suitable summer roosting and foraging habitat for this species within forested areas. The preferred winter hibernation habitat for this species does not exist within the PSA or its immediate vicinity. While the forested areas onsite could be considered suitable habitat, the narrow nature of these areas is a limiting factor for the suitability of this habitat. No northern long-eared bats were identified during pedestrian field surveys and there are no known populations or hibernacula within the PSA.

## 2.6 West Indian Manatee

The West Indian manatee (*Trichechus manatus*) is a large gray to brown aquatic mammal, averaging about ten feet in length and 1,000 pounds in weight. This mammal has no hind limbs, and the forelimbs are modified flippers. West Indian manatees have flattened horizontal and rounded tails used for locomotion. Manatees inhabit both fresh and salt water, including canals, rivers, estuarine habitats and saltwater bays, throughout their range. West Indian manatees concentrate in areas of warm water, primarily the Florida Gulf Coast waters, from October to April. In the summer months, the West Indian manatee will migrate as far north as coastal Virginia on the east coast and coastal Louisiana on the Gulf of Mexico. Suitable habitat for the West Indian manatee exists in the PSA within the Ashley River. West Indian manatees migrate into estuarine waters off the coast of South Carolina during the warmer, summer months and early fall from May to September, typically when water temperatures exceed 70 degrees Fahrenheit. Particular care and consideration should be taken during construction in summer months or early fall as this is when the waterways provide favorable habitat. There are known occurrences of manatees within the Cooper River near the WestRock paper facility located just outside the PSA, as well as within the Ashley River.

## 2.7 Canby's Dropwort

Canby's dropwort (*Oxypolis canbyi*) is a perennial herbaceous plant with tuberous roots and pale, fleshy rhizomes and erect stems up to 39 inches tall. The flowers are small and white with five petals and grow in umbels or flat-topped clusters. Canby's dropwort grows in moist areas in the coastal plain and sandhills, including wet meadows, wet pineland savannas, ditches, sloughs, and around the edges of Cypress-pine ponds. The plant seems to be more prolific when the habitat has been burned. Suitable habitat for Canby's dropwort exists within ditches and other open wet areas (i.e., grass and sedge fields) located within the PSA. Surveys were conducted during the flowering period and this species was not observed.

## 2.8 Pondberry

Pondberry is a deciduous shrub that grows up to six feet tall and spreads by underground stolons. The leaves are ovately to elliptically shaped, thin, membranaceous and drooping and have a strong sassafras-like odor when brushed. The flowers are pale yellow and bloom in the spring before the appearance of leaves. Fruits are bright red and oval-shaped and mature in the fall. Pondberry generally occupies wetland habitats that are normally flooded or saturated during the dormant season, but infrequently flooded during the growing season for extended periods. The plant is typically associated with bottomland hardwoods in the inner coastal plain, and margins of sinks, ponds, and other depressions in the outer coastal plain. Suitable habitat for pondberry exists within freshwater depressional wetlands and along the margins of ponds located within the PSA. Surveys were conducted during the flowering period and this species was not observed.

## 3. Environmental Baseline

The majority of PSA is comprised of existing roadway. Areas which are not developed were classified based upon vegetation and land form types. Vegetative terrestrial communities within the PSA were distinguished by dominant plant species and community types, location in the landscape, past disturbances, and hydrologic characteristics. Only those habitats which were located directly within the PSA are characterized. The PSA was examined through current and historical Google Earth imagery, USDA ortho imagery, and USGS topographic maps to discern areas with similar signatures, and the data were verified and classified through on-site field review. Essential Fish Habitat (EFH) is also present within the PSA and is addressed in a separate EFH Assessment.

Specific surveys for commonly occurring wildlife species were not conducted; however, wildlife readily observed and documented during the field reviews, or those likely to occur within the PSA, are summarized below.

Common bird species either observed during field reviews or known to occur within the PSA include Carolina chickadee, northern mockingbird, blue jay, northern cardinal, brown thrasher, common grackle, American crow, American goldfinch, American robin, eastern towhee, Carolina wren, eastern bluebird, chipping sparrow, red-bellied woodpecker, barred owl, red-tailed hawk, red-shouldered hawk, turkey vulture, and osprey. Wading birds and waterfowl include Canada goose, Muscovy duck, mallard, great egret, green heron, and great blue heron.

Some crayfish, common fishes, and other aquatic organisms were readily observed in the PSA in both brackish and freshwater areas. Those species, as well as others that are likely to be present in the PSA include marsh fiddler crab, periwinkle snail, eastern mudsnail, mosquito fish, channel catfish, sailfin molly, bluegill, silver perch, Atlantic menhaden, and bay anchovy.

There are many common reptile and amphibian species that could occur in the PSA including American alligator, green tree frog, various leopard frog species, skink, Carolina anole, eastern glass lizard, eastern garter snake, eastern king snake, black racer, pond sliders, eastern box turtle, snapping turtle, and American toad.

Common mammal species likely to occur in the PSA include white-tailed deer, striped skunk, river otter, raccoon, bats, cotton mouse, opossum, eastern gray squirrel, and eastern cottontail rabbit. Bottlenose dolphin are likely to occur within the Ashley River.

### 3.1 Aquatic and open water habitats:

#### 3.1.1 Ashley River:

The Ashley River is a tidally influenced river within the headwaters originating in Dorchester County. The river runs for approximately 30 miles, eventually joining the Cooper River to form the Charleston Harbor before discharging eastward into the Atlantic Ocean. The entire drainage of the Ashley River system, including its headwaters in Cypress and Wassamassaw swamps, extends approximately 60 river miles. At the project site, the width of the main deeper-water navigational channel of the Ashley River is approximately 15 feet wide. The full width of the Ashley River at the project site is approximately 1,500 feet wide. Water depths in the river range from approximately 0 to 20 feet. The Ashley River is a designated State Scenic River, largely in part to numerous historic properties located along the riverbanks. Per the NOAA Ashley River bridge station (Station ID 8665099) the mean tidal range is 5.68 feet and the diurnal range is 6.23 feet. Mean high water is approximately 3.08 feet and mean low water is -3.16 feet at the center of the channel. Salinity at the PSA ranges from 12 to 17 parts per thousand (ppt).

The South Carolina Department of Health and Environmental Control (SCDHEC) has classified the waterbodies (streams and rivers) of South Carolina based on the desired uses of each waterbody. SCDHEC has established standards for various parameters to protect all uses within each waterbody classification. The Ashley River is classified as salt water (Appendix A, Figure 2). Monitoring station MD-049 is located upstream of the PSA, along the Ashley River (Appendix A, Figure 3). Aquatic life uses are not supported at MD-049 based on pH and turbidity. The term pH is a measure of the hydrogen ion concentration of

water, and is used to indicate degree of acidity. The pH scale ranges from 0 to 14. A pH of 7 is considered neutral, with values less than 7 being acidic, and values greater than 7 being basic. Low pH values are found in natural waters rich in dissolved organic matter, especially in coastal plain swamps and black water rivers. Turbidity is an expression of the scattering and absorption of light through water. The presence of clay, silt, fine organic and inorganic matter, plankton, and other microscopic organisms increases turbidity. Increasing turbidity can be an indication of increased runoff from land. Recreation is only partially supported at this same site (MD-049), based on elevated fecal coliform levels. A fish consumption advisory due to elevated mercury levels in certain types of fish is in place for the Ashley River, including the area at the I-526/General William C. Westmoreland Bridge and northwards/upstream of the project to SC 165.

A Total Maximum Daily Load (TMDL) has been developed for the Charleston Harbor, Cooper, Ashley, and Wando Rivers and approved by the EPA to identify opportunities to increase dissolved oxygen (DO) in the watershed<sup>1</sup>. Many coastal waters in South Carolina have DO levels below the established DO criteria. Wastewater dischargers and other anthropogenic influences may contribute to low DO in coastal waters. Natural factors such as organic loading and reduced oxygen levels from wetlands and marshes and estuarine dynamics in the mixing zone where freshwater and saltwater come together can create naturally low DO conditions. The waters in and around Charleston Harbor are considered to be both naturally low in DO and further impacted by wastewater dischargers. Potential sources of oxygen demand loading that were considered include National Pollutant Discharge Elimination System (NPDES) wastewater discharges (continuous point sources), NPDES stormwater discharges (noncontinuous point sources), non-point sources, and natural background sources.

A large portion of the PSA is within Shellfish Growing Area 10B (Appendix A, Figure 4). This area encompasses the Charleston Harbor, Ashley River, Cooper River, and their tributaries that support shellfish. Waters within this management area in the PSA have been given the classification of “prohibited” and as such, these areas are closed to all human consumption. Prohibited areas are those that are administratively closed for the harvesting of shellfish for any purposes related to human consumption. These closures are established adjacent to permitted wastewater discharges, marina facilities, or areas containing multiple point sources of pollution. This classification is not based upon violation of a bacteriological standard.

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<sup>1</sup> [https://www.scdhec.gov/sites/default/files/docs/HomeAndEnvironment/Docs/Chas\\_Hbr\\_DO\\_TMDL.pdf](https://www.scdhec.gov/sites/default/files/docs/HomeAndEnvironment/Docs/Chas_Hbr_DO_TMDL.pdf)

There are various types of navigational activities by numerous vessel types that occur along the Ashley River. To determine the types and extents of activity in the channel, existing documentation was reviewed regarding known vessel use. This included a review of bridge opening records of a nearby moveable downstream facility, the T. Allen Legare bridges, located at mile points 2.4 and 2.5. A large portion of marine traffic in the area surrounding the proposed project constitutes recreational and commercial (fishing) boating.

### 3.1.2 Filbin Creek

Filbin Creek is another major drainage located within the PSA. Within the PSA this tributary flows along I-526 between the Charleston International Airport and Tanger Outlets, a commercial shopping center. Filbin Creek flows southwest to northeast crossing the project corridor in several locations and terminating at the Cooper River. This feature flows along I-526 for approximately 4.5 miles of the over 11 mile project corridor. It is an urban stream that has been channelized in portions, and suffers from low water quality as a result of proximity to heavy development and runoff. An SCDHEC water quality monitoring station is located at the mouth of Filbin Creek where it flows into the Cooper River (MD-249). The latest reported data from this station notes that aquatic life uses are partially supported due to dissolved oxygen excursions. There is a significant increasing trend in pH. Recreational uses are not supported due to fecal coliform bacteria excursions.

### 3.1.3 Other Streams

Additional named and unnamed streams traverse the PSA. Over 37,900 linear feet (7.18 miles) of streams were identified and delineated within the project area. Additionally, 9,559.21 (1.81 miles) linear feet of tidally influenced stream were identified and delineated within the project area. Project activities such as roadway fill and culvert extension would result in impacts to a portion of these streams.



*Bulls Creek*

### 3.1.4 Open Ponds

Open freshwater communities within the PSA include man-made ponds and naturalized borrow pits. These areas typically consist of open and deeper water within the central portion and vegetated, shallow water along the outer portion of the pond. Several man-made freshwater ponds exist throughout the study area and are often hydrologically connected to other wetlands, streams, and ditches. Plant species

common to the shallow, vegetated portions of the ponds and borrow pits include black willow (*Salix nigra*), wax myrtle (*Morella cerifera*), duckweed (*Lemna* sp.), and various species of cattail (*Typha* sp.).

## 3.2 Terrestrial and mixed aquatic habitats:

### 3.2.1 Maintained Development

Maintained developments were classified as areas or regions which have altered the native state of the land for consumptive human use. Man-maintained and disturbed communities within the PSA also include roadside shoulders and utility rights of way. Most of the naturally-occurring plants associated with these maintained or disturbed communities have been eliminated and/or replaced with cultivated grasses or taken over by naturally occurring opportunistic species characteristic of disturbed areas. These areas encompassed land uses such as residential homes, commercial developments, roadway surfaces, and parking lots. Most of the disturbed roadway edges are comprised of herbaceous species and sparse shrubs, including various grasses such as common fescue (*Festuca* sp.), ryegrass (*Lolium perenne*), bahia grass (*Paspalum notatum*), and bluegrass (*Poa* sp.).

### 3.2.2 Mixed Pine/Hardwood Forest

Mixed pine/hardwood forest is a dominant community type located throughout the majority of the PSA. Dominant vegetation consists of pine species including loblolly pine (*Pinus taeda*), long-leaf pine (*Pinus palustris*), and pond pine (*Pinus serotina*). Hardwood species observed include sweetgum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), water oak (*Quercus nigra*), and tulip poplar (*Liriodendron tulipifera*). Smaller hardwood/ sapling species include eastern red cedar (*Juniperus virginiana*), American holly (*Ilex opaca*), and wax myrtle. Groundcover and vine strata include saw palmetto (*Serenoa repens*), blueberry (*Vaccinium* sp.), greenbrier (*Smilax* sp.), and partridge berry (*Michella repens*).

### 3.2.3 Scrub/Shrub

Scrub shrub habitat is characterized as being cleared within the past five years. These areas do not have the established species found in the mixed hardwood forest but are not frequently mowed like roadsides and lawns. Notable areas include dry drainages, areas beneath overpasses and interchanges, and spaces that have been maintained in the past but have been allowed to lie fallow. These communities often include ruderal and non-native species. These species tend to be more widespread and occupy numerous habitat types. These areas include an early diverse array of herbaceous species within the initial phases of disturbance and transition towards the climax community, replacing primary colonizers. Species observed in the PSA include sweetgum, Chinese tallow tree (*Triadica sebifera*), blackberry (*Rubus* sp.),

eastern baccharis (*Baccharis halimifolia*), Chinese privet (*Ligustrum sinense*), Autumn olive (*Eleagnus umbellata*), honey suckle (*Lonicera japonica*), and broomsedge (*Andropogon sp.*).

#### 3.2.4 Bottomland Hardwood Forest

Bottomland hardwood forest habitat is present in small locations within the limits of the PSA. These areas are confined to the floodplain zones of creeks and perennial tributaries where out of bank flooding seasonally inundates benches and terraces. These areas are typically mapped within flood zones of waterways. This community type within the PSA is comprised of dominant vegetation of hardwood tree species that includes red maple, tulip poplar, sweetgum, and water oak. Mid canopy species comprise a low-density layer of younger individuals where gaps within the upper canopy allow for sunlight to penetrate. Shrub components within the community may be comprised of Chinese privet and giant cane (*Arundinaria gigantea*). Herbaceous ground cover is sparse to bare, with a dense duff layer holding moisture within the soil column for extended periods.

#### 3.2.5 Tidal Wetlands

The tidal wetland communities are characterized by being periodically inundated in correlation with ocean tides. Soils consist of soft organics and alluvial deposits and support a variety of herbaceous vegetation. Species observed include smooth cordgrass (*Spartina alterniflora*), black needlerush (*Juncus roemerianus*), and saltmeadow cordgrass (*Spartina patens*), occurring in tidally flooded areas. Along the banks, Eastern baccharis and wax myrtle were observed.

#### 3.2.6 Brackish Marsh

Brackish marshes are representative of an estuarine transition zone where a mixture of fresh and saltwater occurs, resulting in brackish water with lower salinity levels, and thereby allowing the presence of both fresh and saltwater plant species. Other species that may be found in the brackish marsh community include big cordgrass (*Spartina cynosuroides*), narrow-leaf cattail (*Typha angustifolia*), saltmeadow cordgrass, bulrush (*Scirpus spp.*), salt grass (*Distichlis spicata*), annual wildrice (*Zizania aquatica*), and Jamaica sawgrass (*Cladium mariscus*).

#### 3.2.7 Freshwater Herbaceous Wetlands

This habitat type does not support woody vegetation but is characterized by a mix of herbaceous species often growing in standing or perennially moist soils. These areas are not tidally influenced and within the project area were commonly noted along margins of larger water bodies or as stormwater retention areas. Cattail, wool grass (*Scirpus s*), sedges (*Carex sp.*), rushes (*Juncus sp.*, *Eleocharis sp.*) were common in these



areas. Margins of these open areas are often lined with sapling woody species such as alder (*Alnus serrulata*), birch (*Betula nigra*), and black willow.

### 3.2.8 Forested Wetlands

This is the most common wetland type throughout the site. These features have hydric soils and may or may not have evidence of periodic standing surface water. Canopy species are mixed hardwood with a sapling and shrub stratum. Ground cover may or may not be present. Notable species include: sweet gum, red maple and southern magnolia (*Magnolia grandiflora*) as canopy species with water oak, yaupon (*Ilex vomitoria*) and cabbage palmetto (*Sabal palmetto*) composing a sampling stratum. Shrubs include Chinese privet, fetterbush (*Lyonia lucida*), and giant cane. Herbaceous species include rushes, and a mix of sedges. Vines such as greenbrier and honey suckle were often observed in this habitat type.

### 3.2.9 Cypress-tupelo Wetlands

This is a mature forested habitat type characterized by an overstory of bald cypress (*Taxodium distichum*) and water tupelo (*Nyssa aquatica*). Other species present include swamp tupelo (*Nyssa biflora*), red maple, swamp cottonwood (*Populus eterophylla*), and Carolina ash (*Fraxinus caroliniana*). Shrub and herbaceous layers are less diverse or absent. This habitat type is open and may have standing water for all or part of the year.

## 4. Project Details

### 4.1 Construction

This project is expected to be delivered either via the design build or bid build process and final construction and design plans would be determined by the contractor and/or SCDOT. To maintain competitiveness during the bid process, means and methods of construction may not be final, giving contractors the ability to propose specific methods and equipment. The following is an outline of the likely construction activities and project designs. This may vary slightly depending on the selected contractor and bid process. Any modifications from those proposed in this document that could impact effects to listed species would require additional coordination with SCDOT and federal agencies.

#### 4.1.1 Roadway Construction

Road construction generally entails the addition of two 12-foot lanes of paved roadway and additional right-of-way. Improvements to local connecting streets, interstate on and off ramps, and roadway drainage would also be constructed. In many areas these impacts would occur to upland maintained habitat that is already disturbed. In some areas, such as bridge approaches, additional habitat would be converted to road right of way.

#### 4.1.2 Ashley River Bridge Construction

The widened bridge structures would each be approximately 32 feet, 5.5 inches wide (Appendix B, Conceptual Design Plans). During construction of the widened bridge, traffic would be maintained on the existing facility. Maintenance and improvements would be made to the existing Westmoreland bridges and the structure would be retained at its existing height and length.

The proposed minimum horizontal clearance for the main navigational opening would be 60 feet between fenders. This configuration will be similar to the existing bridge, or would be less restrictive. The vertical clearance of the proposed fixed span bridge would be a minimum of 35 feet from the MHW datum to meet the needs of mariners in the area.

Generally, the project improvements would consist of the following components:

- Widening of the northbound and southbound roadway approaches to the Westmoreland Bridges.
- Construction of temporary access areas to include matting, barges, and work trestles.
- Construction of a new structure to the south, or downstream side, of the existing Westmoreland Bridges on a mix of concrete prestressed piles and drilled shafts with poured concrete support.
- Construction of a new structure within the center of the existing northbound and southbound Westmoreland Bridges on a mix of concrete prestressed piles and drilled shafts.
- Extension of the existing fender system to the south of the existing Westmoreland Bridge.
- Painting existing and new bridge structures.
- Lighting to be installed for navigation and to meet SCDOT urban interstate lighting requirements (“Roadway Lighting on Interstate Routes in South Carolina”).

##### 4.1.2.1 *Temporary Bridge Access*

Temporary work trestles would be placed in marsh and wetland areas for construction access outside of the existing eastbound bridge (Appendix B, Conceptual Design Plans). Temporary trestle would be approximately 30 feet wide and would be supported by steel pipe piles. The steel piles would be approximately 24-inches in diameter and would be installed using a vibratory hammer. It is estimated that 240 24-inch steel pipe piles would be needed for temporary work trestle. With one work crew performing installation, approximately 4 piles would be driven per day with an average of 350 impact hammer strikes per pile. If additional crews are utilized, more piles would be driven per day.

For access over marsh areas between the existing bridges either trestle or a combination of barge, barge mats, and timber mats would be needed due to the limited space between the structures. Deeper water and the main channel of the Ashley River would be accessed via barges for construction. Barges may be delivered and moved via water and transport vessels or via land on flatbed trucks with cranes and other heavy equipment. At no point would barges in the Ashley River block more than 50% of the channel.

#### *4.1.2.2 Prestressed Concrete Pile Installation*

Prestressed concrete piles will be installed outside of the main channel of the Ashley River. These piles would have an H-pile steel “stinger” at the end of the concrete pile to prevent damage to the pile as it is driven into hard subsurface materials. Piles would be installed with a hammer or vibratory hammer. Within the Ashley River, Bents 72 through 79 would be supported by prestressed concrete piles. Additional concrete piles would be installed in the adjacent marshes, outside of the boundaries of the Ashley River. It is estimated that 580 24-inch prestressed concrete piles would be needed for bridge widening. With one work crew performing installation, approximately 6 piles would be driven per day with an average of 300 impact hammer strikes per pile. If additional crews are utilized, more piles would be driven per day.

#### *4.1.2.3 Drilled Shaft Installation*

At the approaches to, and over the main channel of the Ashley River, drilled shafts are proposed to support the new bridge structures. Each shaft would be approximately 7 feet in diameter. To install, steel casing would be installed at each location using a vibratory or pile driving hammer. Inside of that casing would be drilled so that rebar cage can be installed. Concrete would then be poured into the casing to create a large support structure in the water. Approximately 120 drilled shafts would be needed for the bridge widening. One shaft per day would be constructed by one work crew, but multiple crews could install supports concurrently. Within the Ashley River, these drilled shafts would be installed at bents 48 through 71, and at bents A, B, C, and D. Bents 48 through 59 are located at the southerly or westerly (West Ashley) approach to the Ashley River. Bents A through D are at the deepest portion of the main channel of the Ashley River. Bents 60 through 71 are located at the northerly or easterly (North Charleston) approach to the Ashley River. Bents 59 through 79 and bents A through D are located within the Ashley River and are the focus of this analysis.

#### *4.1.2.4 Fender System*

The existing fender system will be extended with a system that can accommodate all required uses of the waterway. The proposed fender system will be designed for both recreational watercraft, as well as larger vessels such as commercial fishing boats and tug boats. The fender elements would likely consist of

rubber fenders, with a steel panel and polyethylene facing. Additional prestressed concrete piles will be required to support the new fender systems. These piles would not be load bearing and would not require extensive pile strikes such as those on the permanent bridge system.

#### 4.1.2.5 *Drainage*

Drainage of stormwater from surface runoff from the newly constructed bridges is proposed to be discharged via open scuppers.

#### 4.1.3 *Project Timeline*

Construction is expected to begin in 2022. Construction of the bridge phase over the Ashley River would last approximately three years, with road construction extending beyond this three-year period. Within that three-year period, in-water work of an estimated 5 months would be needed for prestressed pile bents and 16 months would be needed for drilled shaft bents. This project is expected to be delivered via the design build process and final construction sequencing will be determined by the contractor. The following is an outline of the likely construction sequence. This sequence may vary slightly depending on the selected contractor. Any modifications from this proposed by the contractor that could impact effects to listed species would require additional coordination with SCDOT and federal agencies.

#### 4.1.4 *Site Preparation*

After additional right-of-way is acquired, surveys are conducted, and utility location work will begin. Site clearing and grubbing will be necessary for some areas outside of the already maintained right-of-way. These specific areas are not known until a Preferred Alternative is selected and the roadway design is finalized. Grading of slopes will be required and will follow the established Stormwater Pollution Prevention Plan (SWPPP).

#### 4.1.5 *Construction Access and Staging*

Areas for staging, laydown and equipment would primarily be sited outside of aquatic habitats. Best management practices (BMPs), along with other proven procedures would be implemented to mitigate potential temporary impacts from construction. In addition, detailed engineering and construction plans would be developed for the Preferred Alternative, which would specify procedures to mitigate potentially adverse impacts.

#### 4.1.5 *Potential Impacts on Water Quality*

Ashley River and Filbin Creek may see a temporary increase in turbidity as a result of the in-water work such as driving piles and staging materials from barges. Outside of small repairs no major demolition is planned. BMPs should be followed to avoid paint, solvents and other chemicals from entering the

waterway. Steel girders would be used in the construction of the new bridge spans over the main channel of the Ashley River and would need to be surface prepped and painted to withstand impacts from weather and the marine environment. The contractor would be required to submit a painting operation plan to include timing, methodologies to prohibit overspray into waters or adjacent vegetation, and weather and wind thresholds for painting operations.

Migration of fill material in stormwater runoff would be minimized by following the SWPPP and utilizing BMPs such as double rows of silt fence, sediment basins, turbidity curtains, immediate seeding and matting of slopes, and check dams.

## 4.2 Operations and Maintenance

Once construction is complete, much of the operations and maintenance of the roadway will take place in upland, maintained roadside habitat. Tasks such as routine mowing, guard rail repairs, road surface repairs, and stormwater infrastructure maintenance would be needed. Routine maintenance is expected on the existing and proposed new bridges including sanding/painting, deck resurfacing, concrete patching, lighting replacement, and periodic fender and dolphin repair from exposure and/or vessel strikes. SCDOT Maintenance would utilize best management practices to limit sediment and non-point source runoff resulting from maintenance activities.

# 5. Project Action Area

## 5.1 Project Action Area

The action area, as defined under 50 CFR §402.02, includes all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. The project roadway action area includes approximately 1,600 acres, as shown in Appendix A, Figure 1. The action area at the Ashley River bridge, as it relates to potential West Indian manatee impacts, extends 500 meters (1,650 feet) upstream and downstream of the proposed project. The basis for the selection of the 1,650 feet upstream and downstream of the proposed project was due to the limits of the proposed action and potential turbidity effects in the Ashley River. Although sedimentation is not expected to be long lasting or severe based on the velocity of currents in the area, the effects from sedimentation are expected to be wider ranging than noise effects.

## 5.2 Limits of an Action Area

The limits of the action area are within the PSA. The PSA would likely be refined once a Preferred Alternative is selected. The action area may be slightly modified again as the design team begins final

road, bridge, and drainage design. Any activities that could potentially impact protected species, other than those already outlined in this document may require additional Section 7 coordination.

## 6. Effects Analysis

### 6.1 Direct and Indirect Effects

Direct and indirect effects to species will be avoided and minimized to maximum extent practicable. There are no known populations of threatened or endangered species residing in the project area. In the case of the wildlife species, the anticipated direct impacts are to potential foraging habitat, as opposed to known nesting, roosting, or spawning habitat. Generally, secondary or indirect impacts are induced by the initial action. They may be comprised of a variety of effects such as changes in land use, development patterns, water quality, wildlife habitat, and other natural systems. Transportation projects may influence development in localized areas and have environmental impacts resulting from land use changes. Risk factors include being struck by construction equipment or materials (piles, barges, trestles, heavy equipment), construction-associated noise and turbidity, temporary or permanent loss of habitat, and temporary disruption of spawning/migratory behaviors. In the case of the plant species, surveys were conducted within the survey window and no protected species were identified. Activities associated with the widening of I-526 West would cause temporary impacts to the natural environment in the form of noise, habitat conversion, shading, and potential temporary sedimentation. These activities would be avoided and minimized to the maximum extent possible. Potential impacts are as listed:

American wood stork: Three American wood storks were observed feeding within the PSA. There are no known wood stork rookeries within the PSA. The proposed project would affect wood stork foraging habitat. While impacts would be minimized, areas of open waters and wetlands would be filled with widened bridge approaches and widened roadways. Foraging wood storks would likely avoid the construction area when activity and noise increases. The project area contains a system of wetlands, tidal creeks, and marshes, which provide alternative feeding habitats nearby. **Therefore, the proposed project may affect, but is not likely to adversely affect American wood stork.**

Bachman's warbler: Suitable habitat for Bachman's warbler exists within the PSA. Small areas of cane thickets and seasonally flooded swamp forests with variable amounts of water were observed. Evidence of Bachman's warbler was not noted within the PSA. The bird was last observed in the U.S. in 1962 near Charleston, South Carolina. **Therefore, the proposed project may affect, but is not likely to adversely affect Bachman's warbler.**

Eastern black rail: Suitable habitat for Eastern black rail exists in the marshes associated with the Ashley River and other streams within the PSA. No black rails were identified during field surveys and there are no known populations within the PSA. **Therefore, the proposed project may affect, but is not likely to adversely affect Eastern black rail.**

Piping plover: Suitable foraging habitat for piping plover may exist on mudflats and sandbars associated with the Ashley and the Cooper Rivers. No piping plovers were identified during field surveys and there are no known populations within the PSA. **Therefore, the proposed project may affect, but is not likely to adversely affect piping plover.**

Northern long-eared bat: Habitat conducive to seasonal occupation for northern long-eared bat is located within the PSA. The PSA contains potentially suitable summer roosting and foraging habitat for this species within forested areas. The preferred winter hibernation habitat for this species does not exist within the PSA or its immediate vicinity. In addition, the narrow range of forested woodlands within the PSA is a limiting factor to its suitability for this species. No northern long-eared bats were identified during pedestrian field surveys and there are no known populations or hibernacula within the PSA. Federal agencies often utilize the “Northern Long-Eared Bat 4(d) Rule Streamlined Consultation Form” regarding potential impacts to this species. This framework allows federal agencies to rely upon the USFWS January 5, 2016, intra-Service Programmatic Biological Opinion on the final 4(d) rule for section 7(a)(2) compliance. According to the 4(d) rule, the proposed project may affect the northern long-eared bat, but any resulting incidental take of the species is not prohibited by the final 4(d) rule. A draft version of this form is included in Appendix D. **Therefore, the proposed project may affect, but is not likely to adversely affect this species and incidental take is not prohibited by the 4(d) rule.**

West Indian manatee: Suitable habitat for the West Indian manatee exists in the PSA within the Ashley River. West Indian manatees migrate into estuarine water off the coast of South Carolina during the warmer, summer months and early fall from May to September. There are known occurrences of manatees within the Cooper River near the WestRock paper facility located just outside the PSA, as well as within the Ashley River. Vessel strikes pose a serious threat to the slow-moving manatee (USFWS 2001b). Care and consideration should be taken during construction in summer months or early fall as this is when the waterways would likely support increasing numbers of manatee. The USFWS North Florida Field Office has created Manatee Protection Guidelines (Appendix E) which, if incorporated into construction activities, could reduce the potential of vessel strikes. A trained spotter would be needed from May to October for in-water work in the Ashley River. Other conditions, such as operating vessels

as slow speeds and halting in-water work if a manatee is spotted would reduce the potential to animal strikes.

An additional risk to manatees is created through the generation of in-water construction noise. Manatee's functional hearing range and responsiveness to noise has been disputed in recent studies (Gerstein et al. 2008; Gerstein et al. 1999). Impact thresholds for manatees have not been developed at this time. Bridge construction activities such as impact pile driving and drilled shaft installation could harm manatees if individuals are close to the noise source for prolonged periods. Differing types of installation of support structures could reduce impacts to manatees. Fewer impacts are seen from vibratory installation of casing for drilled shafts as opposed to higher impact pile driving. Vibratory driving of new piles or bridge support structures generates a continuous but low-level noise that is unlikely to cause more than non-injurious, insignificant behavioral effects to the species. During construction, the potential effect of underwater noise impacts would also be minimized through the use of "slow starts", where pile driving ramps up slowly in an effort to deter manatees from the work area. In accordance with Manatee Protection Guidelines, if manatees are observed within 50 feet of active construction equipment, that equipment would be shut down. Utilizing these guidelines would minimize potential adverse effects of underwater construction noise on manatees in the project area.

A minor threat to manatees may be created through increased turbidity during construction. This may come as the result of the placement of bridge pilings and would be temporary. Best management practices would be implemented to minimize turbidity. The indirect effect on manatees would be minimal because manatees often inhabit areas with turbid conditions (FWC 2007). In accordance with Manatee Protection Guidelines, if siltation or turbidity barriers are used, they would be made of material in which manatees cannot become entangled, would be properly secured, and would be regularly monitored to avoid manatee entanglement or entrapment.

Adverse effects on manatees are not expected to occur within the project area because construction operations would follow the Manatee Protection Guidelines. Furthermore, manatees would likely avoid the construction area given the increased vessel traffic and noise. **Therefore, the proposed project may affect, but is not likely to adversely affect West Indian manatee.**

Canby's dropwort: This plant grows in moist areas in the coastal plain and sandhills, including wet meadows, wet pineland savannas, ditches, sloughs, and around the edges of Cypress-pine ponds. Canby's dropwort seems to be more prolific when the habitat has been burned. Suitable habitat for Canby's



dropwort exists within ditches and other open wet areas (i.e., grass and sedge fields) located within the PSA. Surveys were conducted during the flowering period and this species was not observed. **Therefore, the proposed project may affect, but is not likely to adversely affect Canby’s dropwort.**

Pondberry: This plant is typically associated with bottomland hardwoods in the inner coastal plain, and margins of sinks, ponds, and other depressions in the outer coastal plain. Suitable habitat for pondberry exists within freshwater depressional wetlands and along the margins of ponds located within the PSA. Surveys were conducted during the flowering period and this species was not observed. **Therefore, the proposed project may affect, but is not likely to adversely affect pondberry.**

### 6.2 Interrelated and Interdependent Actions and Activities

Interrelated and interdependent actions are those that are part of a larger action and depend on the larger action for their justification. There are no related or dependent actions to the I-526 West project.

## 7. Effect Determinations

This section includes effect determinations to listed species (Table 2). There are no candidate species, or critical habitat within or near the PSA. There is one proposed threatened species, the Eastern black rail. Proposed threatened species are not protected by the take prohibitions of Section 7, consistent with any protective regulations finalized under section 4(d) of the ESA, until the rule to list is finalized. Under section 7(a)(4) of the ESA, federal agencies must confer with the USFWS if their action will jeopardize the continued existence of a proposed species.

**Table 2. Protected Species Effect Determinations**

Species	Protection Status	Biological Conclusion
Flatwoods salamander ( <i>Ambystoma cingulatum</i> )	Threatened	No effect
American wood stork ( <i>Mycteria americana</i> )	Threatened	May affect, not likely to adversely affect
Bachman's warbler ( <i>Vermivora bachmanii</i> )	Endangered	May affect, not likely to adversely affect
Eastern Black rail ( <i>Laterallus jamaicensis</i> )	Threatened (proposed)	May affect, not likely to adversely affect
Piping plover ( <i>Charadrius melodus</i> )	Threatened	May affect, not likely to adversely affect
Red-cockaded woodpecker ( <i>Picooides borealis</i> )	Endangered	No effect
Red knot ( <i>Calidris canutus rufa</i> )	Threatened	No effect
Atlantic sturgeon ( <i>Acipenser oxyrinchus oxyrinchus</i> )	Endangered	May affect, not likely to adversely affect

Species	Protection Status	Biological Conclusion
Shortnose sturgeon ( <i>Acipenser brevirostrum</i> )	Endangered	May affect, not likely to adversely affect
Finback whale ( <i>Balaenoptera physalus</i> )	Endangered	No effect
Humpback whale ( <i>Megaptera novaengliae</i> )	Endangered	No effect
Northern long-eared bat ( <i>Myotis septentrionalis</i> )	Threatened	May affect, but any resulting incidental take is not prohibited by the final 4(d) rule
Right whale ( <i>Balaena glacialis</i> )	Endangered	No effect
Sei whale ( <i>Balaenoptera borealis</i> )	Endangered	No effect
Sperm whale ( <i>Physeter macrocephalus</i> )	Endangered	No effect
West Indian manatee ( <i>Trichechus manatus</i> )	Threatened	May affect, not likely to adversely affect
American chaff seed ( <i>Schwalbea americana</i> )	Endangered	No effect
Canby's dropwort ( <i>Oxypolis canbyi</i> )	Endangered	May affect, not likely to adversely affect
Pondberry ( <i>Lindera melissifolia</i> )	Endangered	May affect, not likely to adversely affect
Seabeach amaranth ( <i>Amaranthus pumilus</i> )	Threatened	No effect
Green sea turtle ( <i>Chelonia mydas</i> )	Threatened	No effect
Kemp's ridley sea turtle ( <i>Lepidochelys kempii</i> )	Endangered	No effect
Leatherback sea turtle ( <i>Dermochelys coriacea</i> )	Endangered	No effect
Loggerhead sea turtle ( <i>Carretta carretta</i> )	Threatened	No effect

An ESA Section 7 project affect determination on bald eagle is not necessary as the species is no longer protected by the ESA and does not require Section 7 consultation. As proposed, there would be no impacts to bald eagle.

## 8. Conservation Measures and Environmental Commitments

Steps should be taken to avoid impacts to wetlands and aquatic areas to minimize the potential to impact West Indian manatee and American wood stork. The aforementioned species rely on wetland and open water areas for habitat and as such habitat degradation and elimination should be minimized.

Drilled shafts should be used in place of driven piles where possible. Equipment and materials used during the construction of the bridge would not obstruct or impede passage through more than 50 percent of the channel. Underwater noise impacts would also be minimized through the use of "slow starts", where pile-driving ramps up slowly in an effort to deter marine species from the work area.

The SCDOT commits to implementing the following conservation measures, or actions, to minimize or compensate for effects to each species:

- Follow SCDOT Best Management Practices during construction
- Obtain NPDES permit and prepare a Stormwater Pollution Prevention Plan
- Ensure equipment does not obstruct or impede passage through more than 50 percent of the Ashley River.
- Use of “slow starts” for pile driving, barge movement, and other vessel movement where activity ramps up slowly in an effort to deter marine species from the work area.
- Avoid demolition of existing in-water structures.
- Obligations under Section 7 of the Endangered Species Act must be considered if (1) new information reveals impacts associated with this project may affect listed species or critical habitat in a manner not previously considered, (2) the project is subsequently modified in a manner which was not considered in this assessment, or (3) a new species is listed or critical habitat is determined that may be affected by the proposed improvements.”
- All contractors involved in the construction will be required to comply with the USFWS Manatee Protection Guidelines (Appendix E) for in-water work.
  - Conservation measures would be undertaken to minimize the three predominate risks to manatees including vessel strikes, noise, and turbidity. The contractor would adhere to the USFWS Manatee Protection Guidelines during project construction to eliminate the possibility of construction related manatee injury or death. To avoid striking manatees, construction vessels would operate at low speeds (no-wake or idle) within the project area and when operating with less than a 4-foot clearance from the bottom. The use of a designated spotter between May 15 and October 15 would provide reasonable assurance against impacts resulting from in-water work. In-water moving equipment would be halted if a manatee is spotted within 50 feet of the in-water construction area. Any collision or injury to manatees will be reported immediately to the USFWS South Carolina Field Office.
  - The project manager and/or contractor would inform all project personnel that manatees may be present in the project area. The project manager would ensure that all construction personnel know the general appearance of the species and their habit of moving about completely or partially submerged in shallow water.

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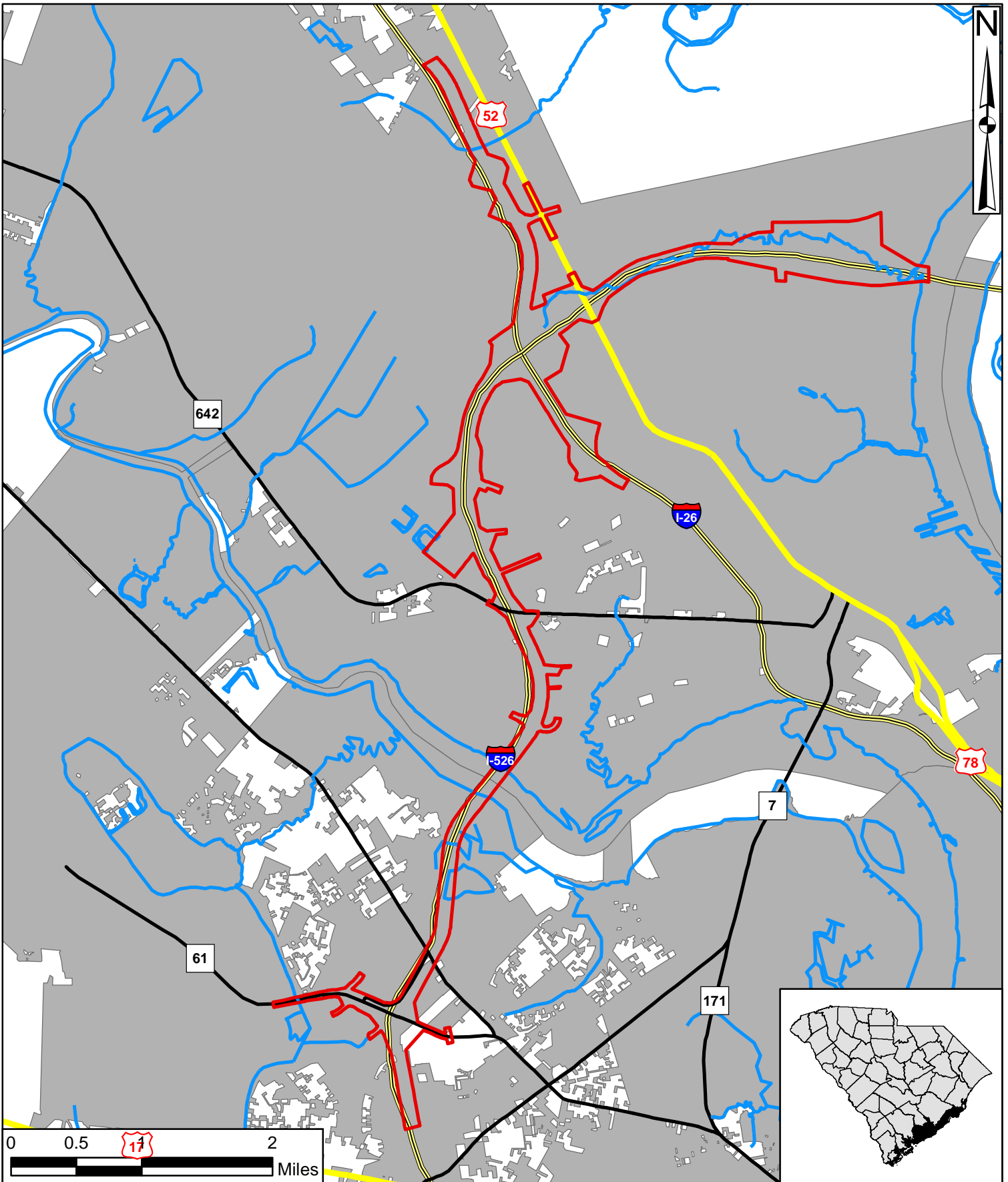
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## **Appendix A**

<b>Figure 1</b>	<b>Project Location Map</b>
<b>Figure 2</b>	<b>SC DHEC Waters Classification</b>
<b>Figure 3</b>	<b>HUC Boundary and Water Quality Monitoring Stations</b>
<b>Figure 4</b>	<b>Shellfish Harvest Classifications</b>



Source:  
Composite County  
Roadway Data

Drawn By: RHH  
QA/QC: KLM

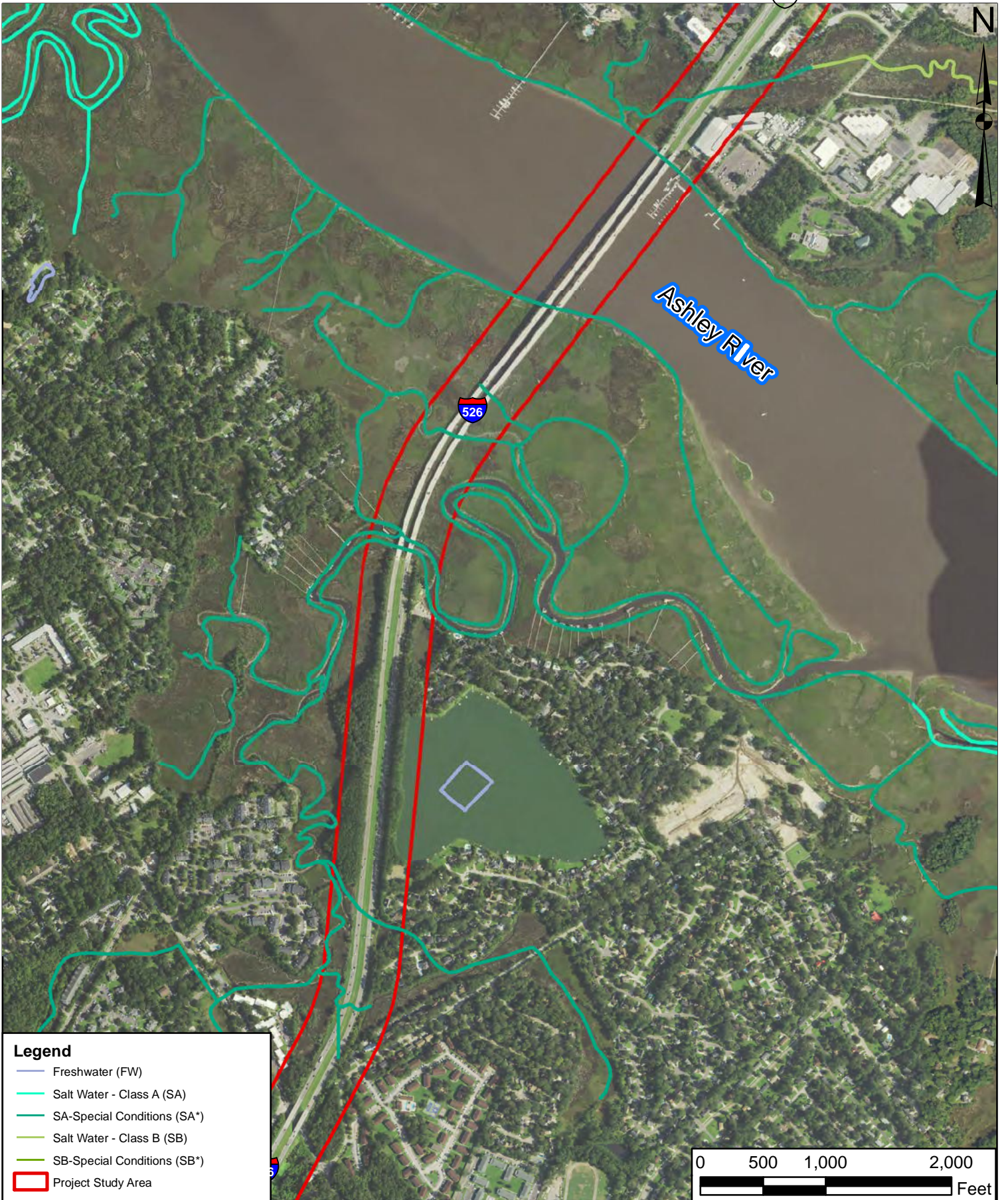
**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

Project Location

Figure 1

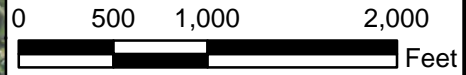
**Legend**

- Project Study Area
- Streams
- SC Route
- US Route
- Interstate
- Incorporated City Limits



**Legend**

- Freshwater (FW)
- Salt Water - Class A (SA)
- SA-Special Conditions (SA\*)
- Salt Water - Class B (SB)
- SB-Special Conditions (SB\*)
- Project Study Area





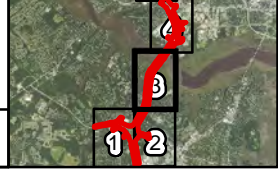
Source:  
 SCDHEC Water Quality Tool  
 2020  
 R.61-69 Effective 6/22/2012

Drawn By: RHH  
 QA/QC: KLM

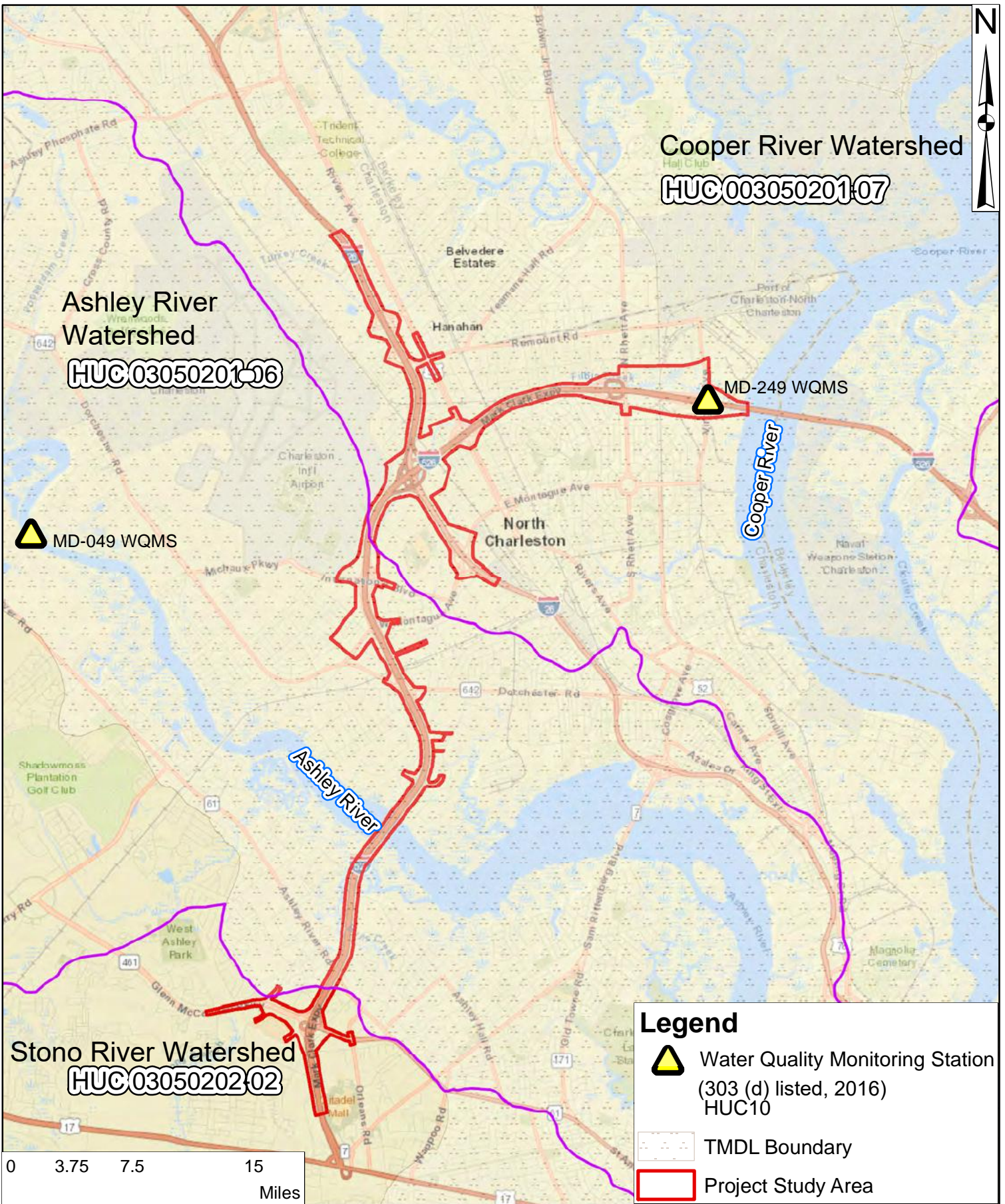
**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

Waters Classification




Figure 2

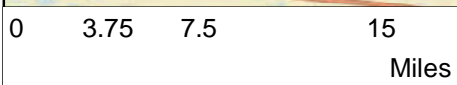




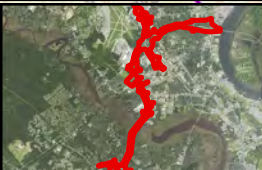


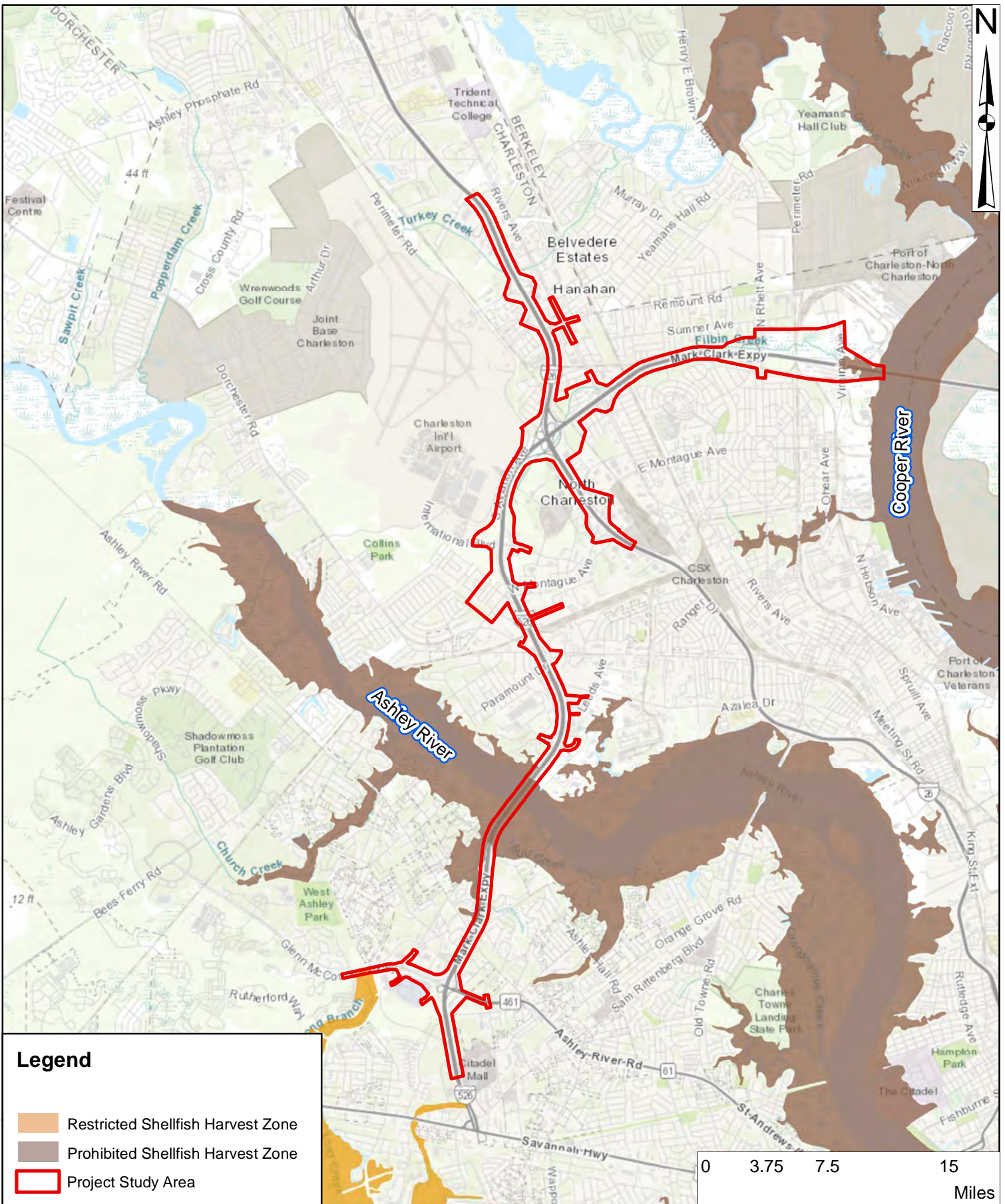


**Legend**

-  Water Quality Monitoring Station (303 (d) listed, 2016) HUC10
-  TMDL Boundary
-  Project Study Area

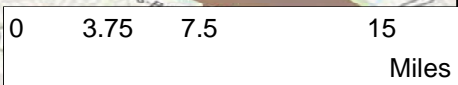


 	Source: USGS NHD January 2020	<b>I-526 Lowcountry Corridor West</b> <b>Charleston County</b> <b>SCDOT P032102</b> <b>February 2020</b>		
	Drawn By: RHH QA/QC: KLM	HUC Boundary Dataset TMDL Boundary	Figure 3	



**Legend**

- Restricted Shellfish Harvest Zone
- Prohibited Shellfish Harvest Zone
- Project Study Area



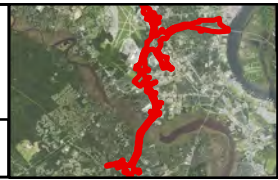
Source:  
SCDHEC Water Quality Tool  
2020

**I-526 Lowcountry Corridor West**  
**Charleston County**  
**SCDOT P032102**  
**February 2020**

Drawn By: RHH  
QA/QC: KLM

Shellfish Harvest  
Classification

Figure 4



# **Appendix B**

**UFWS LOI Response Letter and USFWS Charleston County Protected Species List**



# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

176 Croghan Spur Road, Suite 200  
Charleston, South Carolina 29407



February 1, 2016

Mr. Chad Long  
NEPA Coordinator  
South Carolina Department of Transportation  
P.O. Box 191  
Columbia, SC 29202-0191

Re: Letter of Intent, I-526 Widening, SCDOT Project ID: P027507, Charleston County, SC  
FWS Log No. 2016-CPA-0062

Dear Mr. Long:

The U.S. Fish and Wildlife Service (Service) has received your January 27, 2016, Letter of Intent (LOI) for the proposed widening of a portion of I-526 in Charleston County, South Carolina. The South Carolina Department of Transportation (SCDOT) is proposing to widen 7.5 miles of I-526 from its interchange at Rivers Avenue to the interchange at Paul Cantrell Boulevard. The SCDOT is soliciting comments for consideration and incorporation into an Environmental Assessment (EA) which is being prepared pursuant to the National Environmental Policy Act of 1969, as amended (43 U.S.C. 4321 *et seq.*) (NEPA).

The LOI states that study alternatives included considerations of roadways alignments shifts and bicycle/pedestrian path options. The Service encourages SCDOT to utilize such measures in order to avoid or minimize impacts, particularly near wetland resources. Widening I-526 to the inside of the existing median would result in the lowest amount of resource impacts. This is particularly important as improving the approach causeways for the General Westmoreland Bridge has the potential to impact critically important salt marsh wetlands of the Ashley River. Once a range of alternatives has been identified, the Service recommends that SCDOT schedule a multi-agency site visit to review the project's potential impacts.

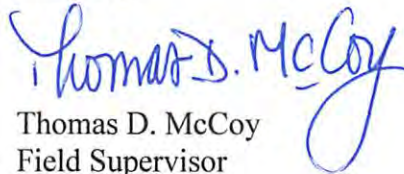
The Ashley River and its emergent salt marsh habitat is considered suitable habitat for the American wood stork and the West Indian manatee. The Service recommends that SCDOT conduct a survey for the presence of these two species, as well as other T&E species and their suitable habitats, during the planning phase for I-526. Once the survey is complete, it should be submitted to our office for review and approved by the Service before project begins.

For SCDOT's convenience, the Service has included with this letter a list of species that are currently protected under the Endangered Species Act of 1973 (ESA). This list includes species that are considered as a candidate for listing under the ESA and those that have been petitioned for listing under the ESA. Appropriate survey timeframes or windows for each species are included in the list. The species which have been petitioned for listing are considered "At-Risk Species" (ARS) and may occur in Charleston County, South Carolina. Although there are no Federal protections afforded to ARS, please consider including ARS in your survey efforts. Incorporating proactive measures to avoid or minimize harm to ARS may improve their status and assist with precluding the need to list these species. Additional information on ARS can be found at:

<http://www.fws.gov/southeast/candidateconservation>

The Service appreciates the opportunity to provide input at this early stage of the project's development. If you have any questions, please contact Mr. Mark Caldwell at (843) 727-4707 ext. 215, and reference FWS Log No. 2016-CPA-0062.

Sincerely,

Handwritten signature of Thomas D. McCoy in blue ink.

Thomas D. McCoy  
Field Supervisor

TDM/MAC

## South Carolina List of At-Risk, Candidate, Endangered, and Threatened Species - Charleston County

CATEGORY	COMMON NAME/STATUS	SCIENTIFIC NAME	SURVEY WINDOW/ TIME PERIOD	COMMENTS
Amphibian	Frosted flatwoods salamander (T, CH)	<i>Ambystoma cingulatum</i>	January 1-April 30	Larvae present in breeding ponds
	Gopher frog (ARS)	<i>Lithobates capito</i>	Breeding: October-March	Call survey: February-April
Bird	American wood stork (T)	<i>Mycteria americana</i>	February 15-September 1	Nesting season
	Bachman's warbler (E)	<i>Vermivora bachmanii</i>	May 1-June 15	Breeding
	Bald eagle (BGEPA)	<i>Haliaeetus leucocephalus</i>	October 1-May 15	Nesting season
	Black-capped petrel (ARS)	<i>Pterodroma hasitata</i>	April-October	offshore water primarily
	Black rail (ARS)	<i>Laterallus jamaicensis</i>	May-July	
	MacGillivray's seaside sparrow (ARS)	<i>Ammodramus maritimus macgillivrayi</i>	May-June	
	Piping plover (T, CH)	<i>Charadrius melodus</i>	July 15-May 1	Migration and wintering
	Red-cockaded woodpecker (E)	<i>Picoides borealis</i>	April 1-July 31	Nesting season
	Red knot (T)	<i>Calidris canutus rufa</i>	August 1-May 31	Migration and wintering
Crustacean	None Found			
Fish	American eel (ARS)	<i>Anguilla rostrata</i>	March 1-May 30; October 1-December 15	Temperature dependent: normally (17-20°C); can be found between 13-25°C
	Atlantic sturgeon* (E)	<i>Acipenser oxyrinchus*</i>	February 1-April 30	Spawning migration
	Blueback herring (ARS)	<i>Alosa aestivalis</i>	Mid-January-mid May	Peak: March-April
	Shortnose sturgeon* (E)	<i>Acipenser brevirostrum*</i>	February 1-April 30	Spawning migration
Insect	Monarch butterfly (ARS)	<i>Danaus plexippus</i>	August-December	Overwinter population departs: March-April
	Rare skipper (ARS)	<i>Problema bulenta</i>	May; July-September	Two brood periods
Mammal	Finback whale* (E)	<i>Balaenoptera physalus*</i>	November 1-April 30	Off the coast
	Humpback whale * (E)	<i>Megaptera novaengliae</i>	January 1-March 31	Migration off the coast
	Rafinesque's big-eared bat (ARS)	<i>Corynorhinus rafinesquii</i>	Year round	Found in mines, caves, large hollow trees, buildings, and bat towers
	Right whale* (E)	<i>Balaena glacialis</i>	November 1-April 30	Off the coast
	Tri-colored bat (ARS*)	<i>Perimyotis subflavus</i>	Year round	Found in mines and caves in the winter
	West Indian manatee (E)	<i>Trichechus manatus</i>	May 15-October 15	In coastal waters
Mollusk	None Found			
Plant	American chaffseed (E)	<i>Schwalbea americana</i>	May-August	1-2 months after a fire
	Bog asphodel (ARS*)	<i>Narthecium americanum</i>	June-July	
	Boykin's lobelia (ARS)	<i>Lobelia boykinii</i>	May-July/August	
	Canby's dropwort (E)	<i>Oxypolis canbyi</i>	Mid-July-September	
	Carolina bishopweed (ARS)	<i>Ptilimnium ahlesii</i>	May-July	
	Ciliate-leaf tickseed (ARS)	<i>Coreopsis integrifolia</i>	August-November	
	Godfrey's privet (ARS)	<i>Forestiera godfreyi</i>	April-June	
	Hedge-nettle	<i>Stachys caroliniana</i>	Late June-August	Can be confused with <i>S. floridana</i>
	Pondberry (E)	<i>Lindera melissifolia</i>	February-March	
	Seabeach amaranth (T)	<i>Amaranthus pumilus</i>	July-October	

## South Carolina List of At-Risk, Candidate, Endangered, and Threatened Species - Charleston County

CATEGORY	COMMON NAME/STATUS	SCIENTIFIC NAME	SURVEY WINDOW/ TIME PERIOD	COMMENTS
Reptile	Eastern diamondback rattlesnake (ARS)	<i>Crotalus adamanteus</i>	Most of the year	Peak: April-November
	Green sea turtle ** (T)	<i>Chelonia mydas</i> **	May 1-October 31	Nesting and hatching
	Kemp's ridley sea turtle ** (E)	<i>Lepidochelys kempii</i> **	May 1-October 31	In coastal waters
	Leatherback sea turtle ** (E)	<i>Dermochelys coriacea</i> **	May 1-October 31	Nesting and hatching
	Loggerhead sea turtle ** (T, CH)	<i>Caretta caretta</i> **	May 1-October 31	Nesting and hatching
	Southern hognose snake (ARS)	<i>Heterodon simus</i>	Most of the year	
	Spotted turtle (ARS)	<i>Clemmys guttata</i>	February-mid April	

\* Contact National Marine Fisheries Service (NMFS) for more information on this species

\*\* The U.S. Fish and Wildlife Service (FWS) and NMFS share jurisdiction of this species

ARS Species that the FWS has been petitioned to list and for which a positive 90-day finding has been issued (listing may be warranted); information is provided only for conservation actions as no Federal protections currently exist.

ARS\* Species that are either former Candidate Species or are emerging conservation priority species

BGEPA Federally protected under the Bald and Golden Eagle Protection Act

C FWS or NMFS has on file sufficient information on biological vulnerability and threat(s) to support proposals to list these species

CH Critical Habitat

E Federally Endangered

P or P - CH Proposed for listing or critical habitat in the Federal Register

S/A Federally protected due to similarity of appearance to a listed species

T Federally Threatened

These lists should be used only as a guideline, not as the final authority. The lists include known occurrences and areas where the species has a high possibility of occurring. Records are updated as deemed necessary and may differ from earlier lists.

For a list of State endangered, threatened, and species of concern, please visit <https://www.dnr.sc.gov/species/index.html>.

## CHARLESTON COUNTY

CATEGORY	COMMON NAME/STATUS	SCIENTIFIC NAME	SURVEY WINDOW/ TIME PERIOD	COMMENTS
<b>Amphibians</b>	Frosted flatwoods salamander (T, CH)	<i>Ambystoma cingulatum</i>	January 1-April 30	Larvae present in breeding ponds
	Gopher frog (ARS)	<i>Lithobates capito</i>	Breeding: October-March	Call survey: February-April
<b>Birds</b>	American wood stork (T)	<i>Mycteria americana</i>	February 15-September 1	Nesting season
	Bachman's warbler (E)	<i>Vermivora bachmanii</i>	May 1-June 15	Breeding
	Bald eagle (BGEPA)	<i>Haliaeetus leucocephalus</i>	October 1-May 15	Nesting season
	Black-capped petrel (ARS)	<i>Pterodroma hasitata</i>	April-October	Offshore water primarily
	Eastern black rail (P)	<i>Laterallus jamaicensis jamaicensis</i>	April-June	Minimum of five surveys/survey point
	Piping plover (T, CH)	<i>Charadrius melodus</i>	July 15-May 1	Migration and wintering
	Red-cockaded woodpecker (E)	<i>Picoides borealis</i>	March 1-July 31	Nesting season
	Red knot (T)	<i>Calidris canutus rufa</i>	August 1-May 31	Migration and wintering
	Saltmarsh sparrow (ARS)	<i>Ammodramus caudacuta</i>	Fall/winter	Fall/winter surveys
<b>Crustaceans</b>	None Found			
<b>Fishes</b>	Atlantic sturgeon* (E)	<i>Acipenser oxyrinchus*</i>	February 1-April 30	Spawning migration
	Shortnose sturgeon* (E)	<i>Acipenser brevirostrum*</i>	February 1-April 30	Spawning migration
<b>Insects</b>	Frosted elfin (ARS)	<i>Callophrys irus</i>	March - June	
	Monarch butterfly (ARS)	<i>Danaus plexippus</i>	August-December	Overwinter population departs: March-April
<b>Mammals</b>	Finback whale* (E)	<i>Balaenoptera physalus*</i>	November 1-April 30	Off the coast
	Humpback whale * (E)	<i>Megaptera novaengliae</i>	January 1-March 31	Migration off the coast
	Northern long-eared bat (T)	<i>Myotis septentrionalis</i>	Year round	Winter surveys not as successful
	Right whale* (E)	<i>Balaena glacialis</i>	November 1-April 30	Off the coast
	Sei whale* (E)	<i>Balaenoptera borealis</i>		
	Sperm whale* (E)	<i>Physeter macrocephalus</i>		
	Tri-colored bat (ARS)	<i>Perimyotis subflavus</i>	Year round	Found in mines and caves in the winter
West Indian manatee (T)	<i>Trichechus manatus</i>	May 1-November 15	In coastal waters	
<b>Mollusks</b>	None Found			



## CHARLESTON COUNTY

CATEGORY	COMMON NAME/STATUS	SCIENTIFIC NAME	SURVEY WINDOW/ TIME PERIOD	COMMENTS
Plants	American chaffseed (E)	<i>Schwalbea americana</i>	May-August	1-2 months after a fire
	Boykin's lobelia (ARS)	<i>Lobelia boykinii</i>	May-July/August	
	Canby's dropwort (E)	<i>Oxypolis canbyi</i>	Mid-July-September	
	Ciliate-leaf tickseed (ARS)	<i>Coreopsis integrifolia</i>	August-November	
	Pondberry (E)	<i>Lindera melissifolia</i>	February-March	
	Seabeach amaranth (T)	<i>Amaranthus pumilus</i>	July-October	
Reptiles	Eastern diamondback rattlesnake (ARS)	<i>Crotalus adamanteus</i>	Most of the year	Peak: April-November
	Green sea turtle ** (T)	<i>Chelonia mydas</i> **	May 1-October 31	Nesting and hatching
	Kemp's ridley sea turtle ** (E)	<i>Lepidochelys kempii</i> **	May 1-October 31	In coastal waters
	Leatherback sea turtle ** (E)	<i>Dermochelys coriacea</i> **	May 1-October 31	Nesting and hatching
	Loggerhead sea turtle ** (T, CH)	<i>Caretta caretta</i> **	May 1-October 31	Nesting and hatching
	Southern hognose snake (ARS)	<i>Heterodon simus</i>	Most of the year	
	Spotted turtle (ARS)	<i>Clemmys guttata</i>	February-mid April	

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CH Critical Habitat

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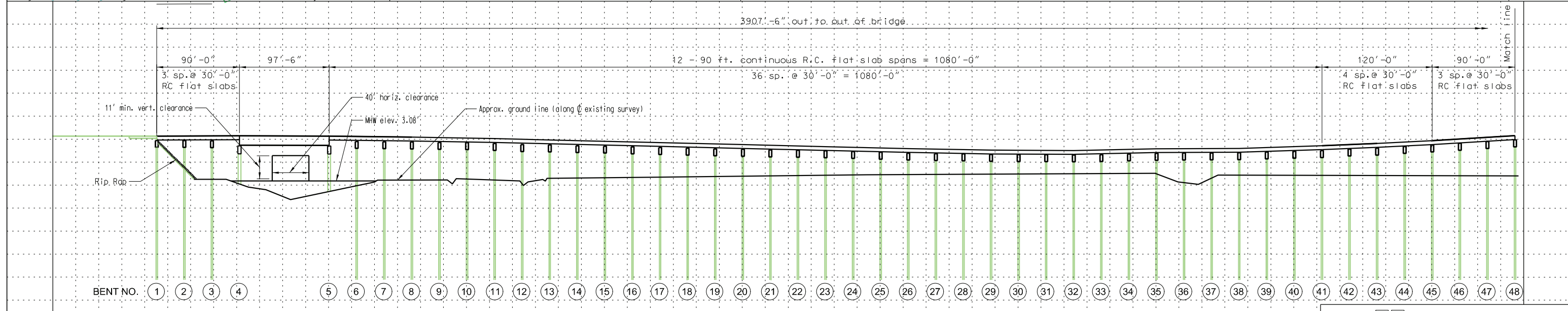
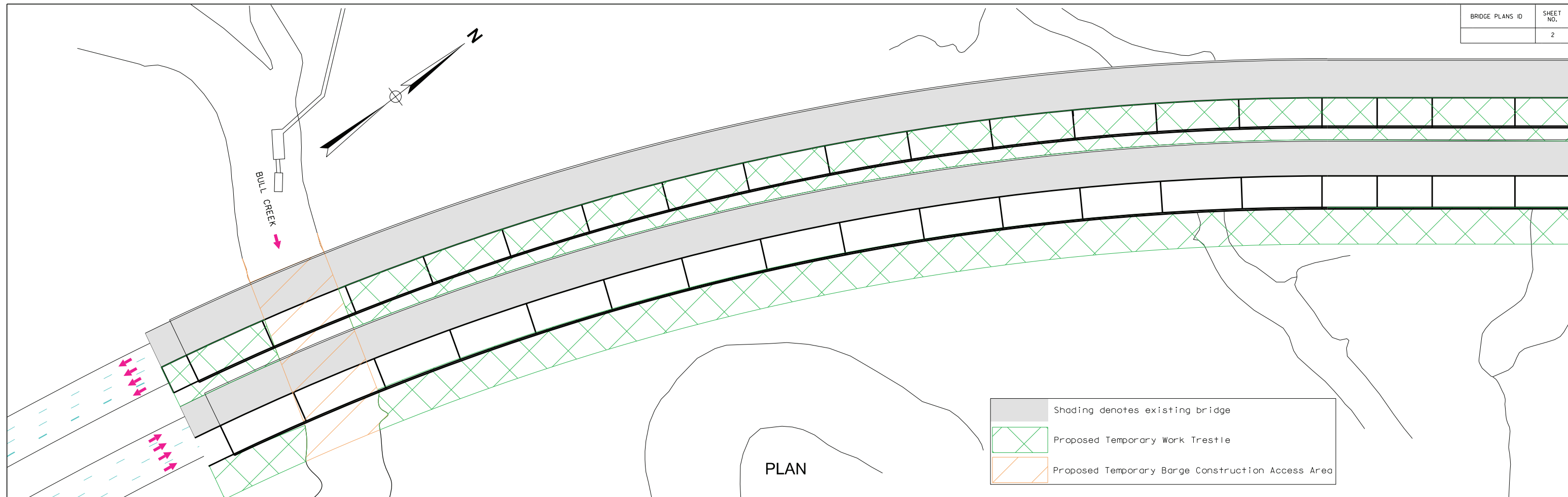
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For a list of State endangered, threatened, and species of concern, please visit <https://www.dnr.sc.gov/species/index.html>.

# **Appendix C**

## **I-526 Ashley River Conceptual Design Plans and Impact Areas**





**CONCEPTUAL SUBSTRUCTURE:**  
 Bents 1-3 & 6-48 - Driven Prestressed piles  
 Bents 4 & 5 - Concrete Columns

**NOTE: BENTS 1-3, 6-47, AND 72-80 ARE PRESTRESSED PILES. BENTS 4-5, A-D, AND 48-71 ARE DRILLED SHAFTS.**

**SECTION ALONG CENTERLINE**

CONCEPTUAL PLANS  
 NOT FOR CONSTRUCTION

REV.			
REV.			
REV.			
REVIEWED			
QUAN.			
DR.			
DES.			
BY	CHK.	DATE	

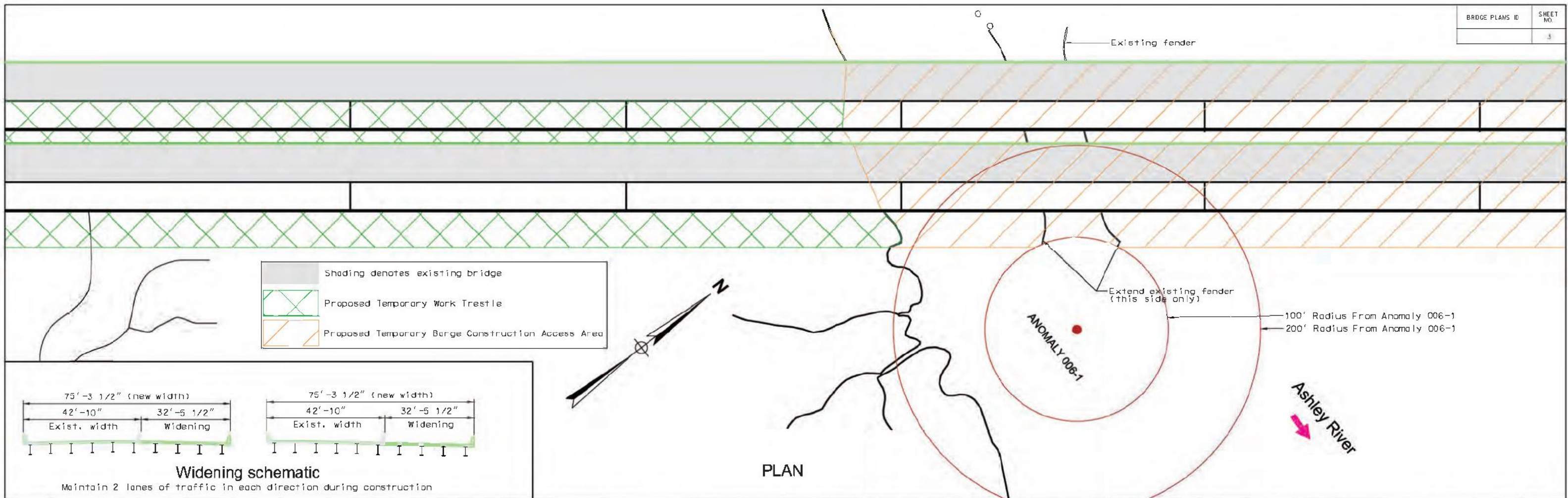
**CE** CIVIL ENGINEERING  
**CS** CONSULTING SERVICES, INC.

SOUTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION

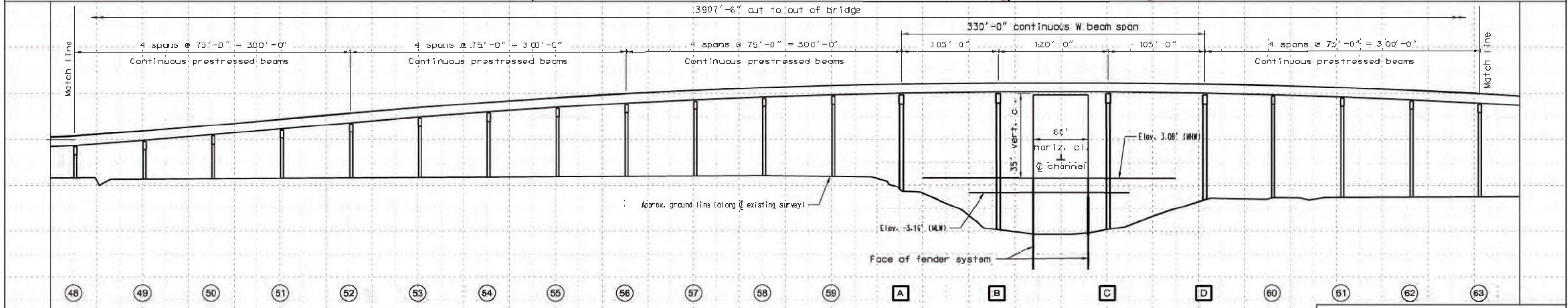
**BRIDGE PLAN & PROFILE**

I-526 BRIDGE WIDEN OVER  
 WEST ASHLEY RIVER AND BULL CREEK

COUNTY CHARLESTON	ROUTE I-526
----------------------	----------------



PLAN



SECTION ALONG CENTERLINE

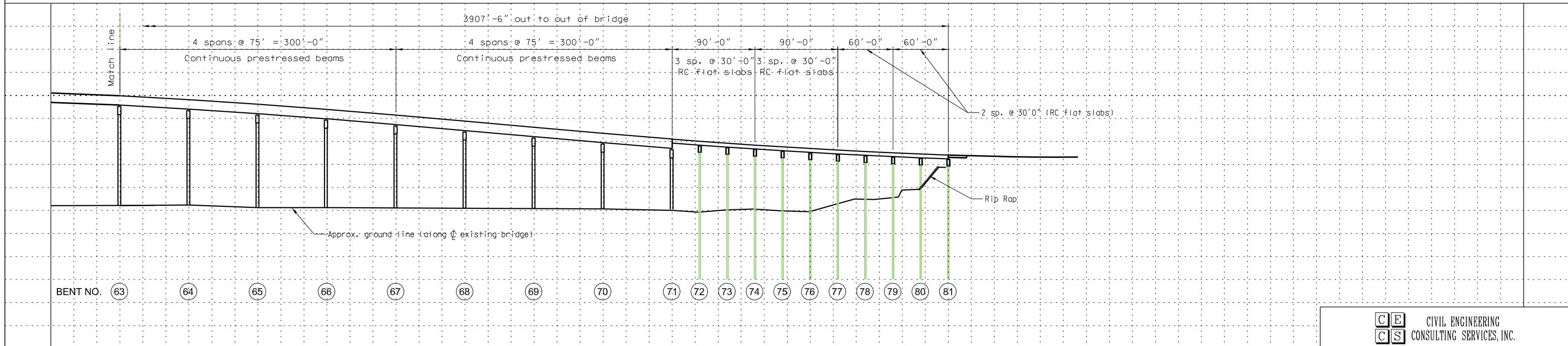
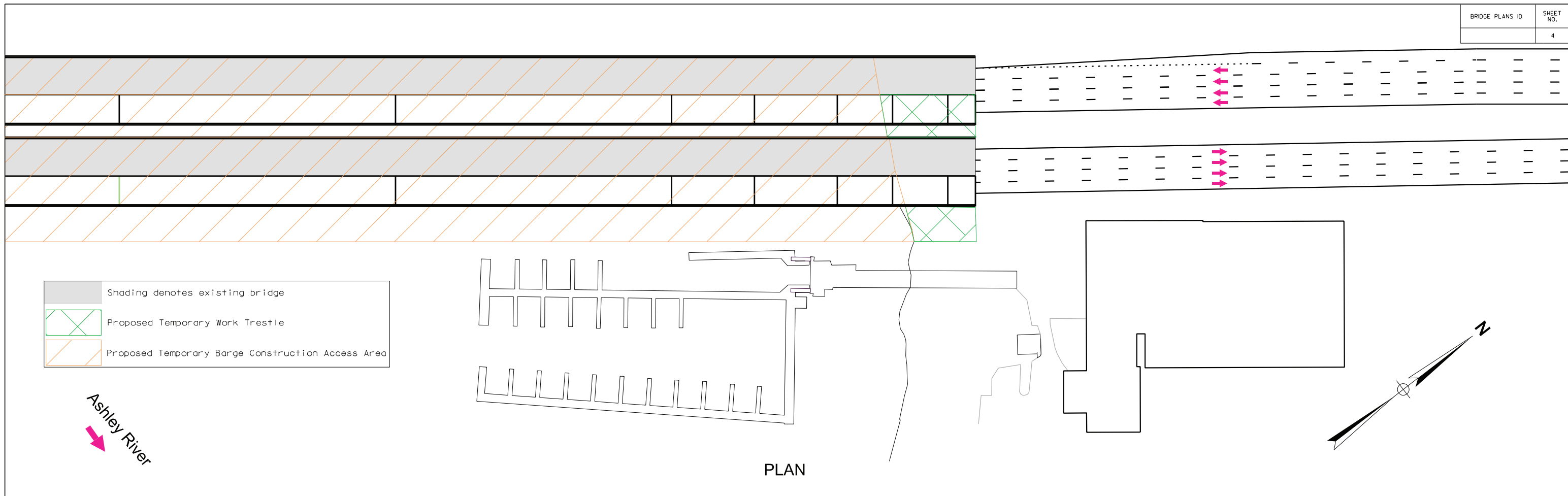
CONCEPTUAL SUBSTRUCTURE:  
 Bents 48-63 Concrete Columns  
 Bents A, B, C, and D - Concrete Columns

NOTE: BENTS 1-3, 6-47, AND 72-80 ARE PRESTRESSED PILES.  
 BENTS 4-5, A-D, AND 48-71 ARE DRILLED SHAFTS.

CONCEPTUAL PLANS  
 NOT FOR CONSTRUCTION

REV.			
REV.			
REV.			
QUAN.			
DR.			
DES.			
BY	CHK.	DATE	

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION	
<b>BRIDGE PLAN &amp; PROFILE</b> I-526 BRIDGE WIDEN OVER WEST ASHLEY RIVER AND BULL CREEK	
COUNTY CHARLESTON	ROUTE I 526

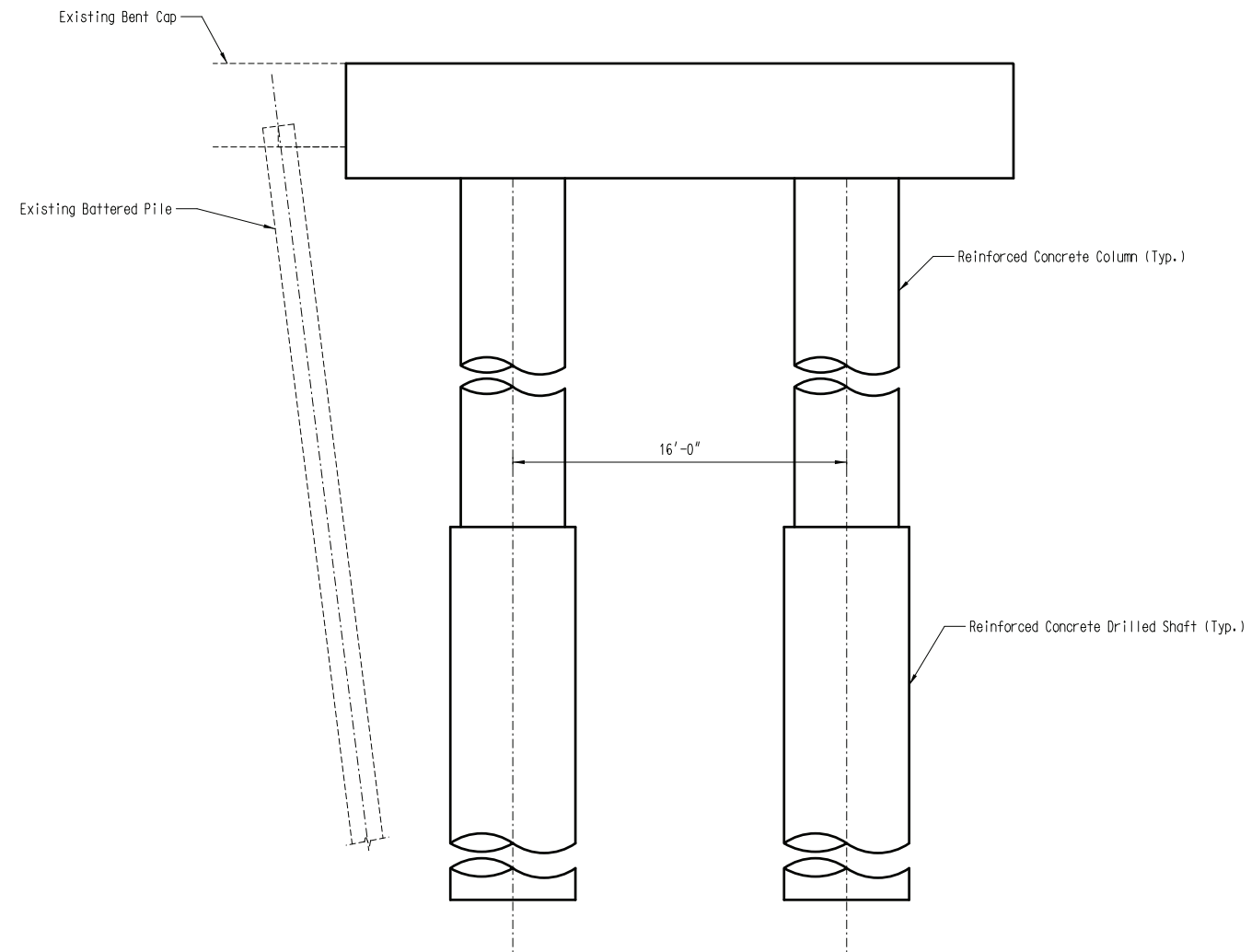


**CONCEPTUAL SUBSTRUCTURE:**  
 Bents 72-81 - Driven Prestressed piles  
 Bents 63-71 - Concrete Columns

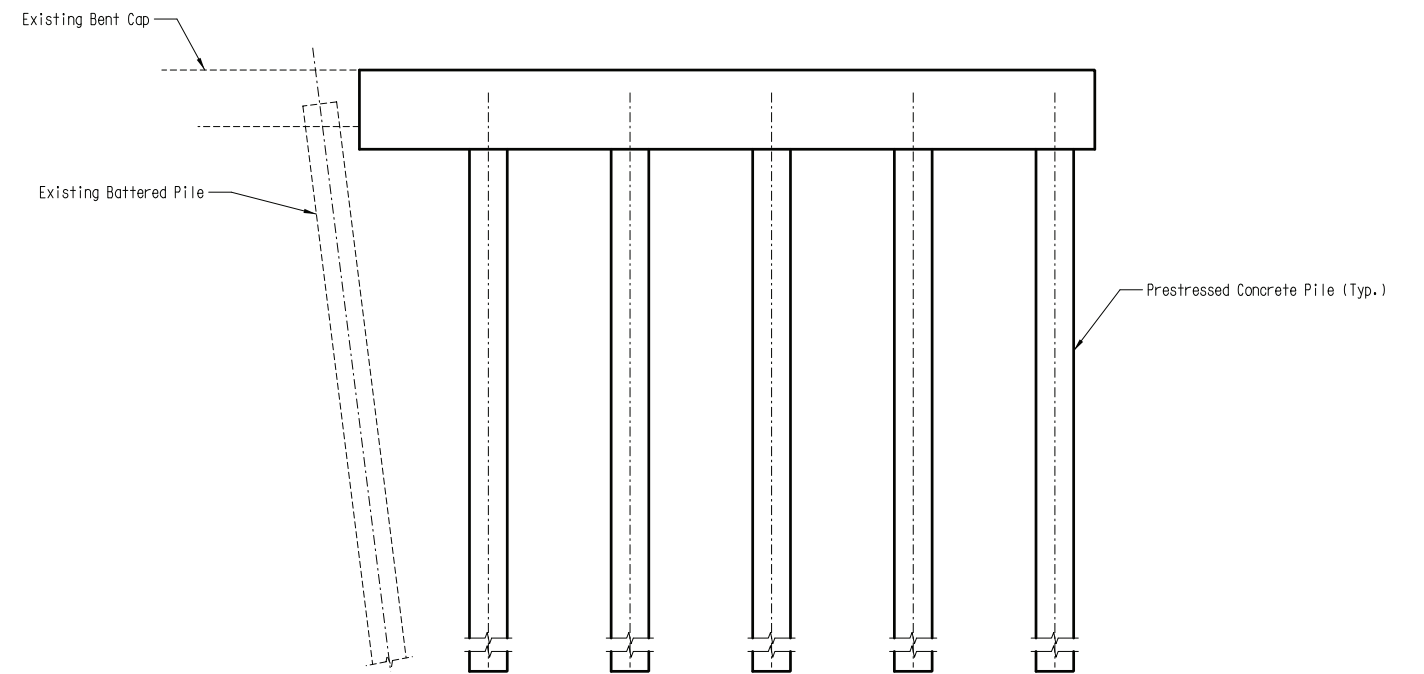
**NOTE:** BENTS 1-3, 6-47, AND 72-80 ARE PRESTRESSED PILES.  
 BENTS 4-5, A-D, AND 48-71 ARE DRILLED SHAFTS.

<b>CONCEPTUAL PLANS NOT FOR CONSTRUCTION</b>	REV.		
	REV.		
	REV.		
	REVIEWED		
	QUAN.		
DR.			
DES.			
BY	CHK.	DATE	

<b>CE</b> <b>CS</b>	CIVIL ENGINEERING CONSULTING SERVICES, INC.
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION	
<b>BRIDGE PLAN &amp; PROFILE</b>	
I-526 BRIDGE WIDEN OVER WEST ASHLEY RIVER AND BULL CREEK	
COUNTY CHARLESTON	ROUTE I-526



**TYPICAL SECTION AT DRILLED SHAFT BENTS**



**TYPICAL SECTION AT PILE BENTS**

**CE** CIVIL ENGINEERING  
**CS** CONSULTING SERVICES, INC.

SOUTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

**SUBSTRUCTURE -  
TYPICAL SECTION**

I-526 BRIDGE WIDEN OVER  
WEST ASHLEY RIVER AND BULL CREEK

COUNTY CHARLESTON ROUTE I-526

CONCEPTUAL PLANS  FOR INFORMATION ONLY	REV.			
	REV.			
	REV.			
	REVIEWED			
	QUAN.			
	DR.	DPM	MSA	3-20
DES.				
	BY	CHK.	DATE	

# **Appendix D**

## **Northern Long-Eared Bat 4(d) Rule Streamlined Consultation Form**



## Northern Long-Eared Bat 4(d) Rule Streamlined Consultation Form

Federal agencies should use this form for the optional streamlined consultation framework for the northern long-eared bat (NLEB). This framework allows federal agencies to rely upon the U.S. Fish and Wildlife Service's (USFWS) January 5, 2016, intra-Service Programmatic Biological Opinion (BO) on the final 4(d) rule for the NLEB for section 7(a)(2) compliance by: (1) notifying the USFWS that an action agency will use the streamlined framework; (2) describing the project with sufficient detail to support the required determination; and (3) enabling the USFWS to track effects and determine if reinitiation of consultation is required per 50 CFR 402.16.

This form is not necessary if an agency determines that a proposed action will have no effect to the NLEB or if the USFWS has concurred in writing with an agency's determination that a proposed action may affect, but is not likely to adversely affect the NLEB (i.e., the standard informal consultation process). Actions that may cause prohibited incidental take require separate formal consultation. Providing this information does not address section 7(a)(2) compliance for any other listed species.

### Information to Determine 4(d) Rule Compliance:

**YES    NO**

Information to Determine 4(d) Rule Compliance:	YES	NO
1. Does the project occur wholly outside of the WNS Zone <sup>1</sup> ?	<input type="checkbox"/>	X
2. Have you contacted the appropriate agency <sup>2</sup> to determine if your project is near known hibernacula or maternity roost trees?	X	<input type="checkbox"/>
3. Could the project disturb hibernating NLEBs in a known hibernaculum?	<input type="checkbox"/>	X
4. Could the project alter the entrance or interior environment of a known hibernaculum?	<input type="checkbox"/>	X
5. Does the project remove any trees within 0.25 miles of a known hibernaculum at any time of year?	<input type="checkbox"/>	X
6. Would the project cut or destroy known occupied maternity roost trees, or any other trees within a 150-foot radius from the maternity roost tree from June 1 through July 31.	<input type="checkbox"/>	X

You are eligible to use this form if you have answered yes to question #1 **or** yes to question #2 **and** no to questions 3, 4, 5 and 6. The remainder of the form will be used by the USFWS to track our assumptions in the BO.

**Lead Federal Agency:** Federal Highway Administration

**Applicant<sup>3</sup> (Name, Email, Phone No.):** South Carolina Department of Transportation

Will McGoldrick, mcgoldriWR@scdot.org, 803-737-1326

**Project PIN/Project Number:** P032012

**Project County:** Charleston County

**Project Name:** I-526 West Lowcountry Corridor

**Project Location** (include coordinates if known): Charleston and North Charleston

The project extends 11.4 miles from near Paul Cantrell Boulevard in West Ashley to Virginia Avenue. 32.811417; -80.049709

**Basic Project Description** (provide narrative below or attach additional information):

SCDOT proposes to add two travel lanes in each direction along I-526 and to upgrade the interchange of I-526 and I-26. Improvements to access I-526 from Paul Cantrell Boulevard, North Rhett Avenue, and Virginia Avenue are also proposed.

<sup>1</sup> <http://www.fws.gov/midwest/endangered/mammals/nleb/pdf/WNSZone.pdf>

<sup>2</sup> See <http://www.fws.gov/midwest/endangered/mammals/nleb/nhisites.html>

<sup>3</sup> If applicable - only needed for federal actions with applicants (e.g., for a permit, etc.) who are party to the consultation.

<b>General Project Information</b>	<b>YES</b>	<b>NO</b>
Does the project occur within 0.25-mile of a known hibernaculum?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Does the project occur within 150 feet of a known maternity roost tree?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Does the project include forest conversion <sup>4</sup> ? (if yes, report acreage below)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Estimated total acres of forest conversion		
If known, estimated acres <sup>5</sup> of forest conversion from April 1 to October 31		
If known, estimated acres of forest conversion from June 1 to July 31 <sup>6</sup>		
Does the project include timber harvest? (if yes, report acreage below)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Estimated total acres of timber harvest	N/A	
If known, estimated acres of timber harvest from April 1 to October 31		
If known, estimated acres of timber harvest from June 1 to July 31		
Does the project include prescribed fire? (if yes, report acreage below)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Estimated total acres of prescribed fire	N/A	
If known, estimated acres of prescribed fire from April 1 to October 31		
If known, estimated acres of prescribed fire from June 1 to July 31		
Does the project install new wind turbines? (if yes, report capacity in MW below)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Estimated wind capacity (MW)	N/A	

Agency Determination:

By signing this form, the action agency determines that this project may affect the NLEB, but that any resulting incidental take of the NLEB is not prohibited by the final 4(d) rule.

If the USFWS does not respond within 30 days from submittal of this form, the action agency may presume that its determination is informed by the best available information and that its project responsibilities under 7(a)(2) with respect to the NLEB are fulfilled through the USFWS January 5, 2016, Programmatic BO. The action agency will update this determination annually for multi-year activities.

The action agency understands that the USFWS presumes that all activities are implemented as described herein. The action agency will promptly report any departures from the described activities to the appropriate USFWS Field Office. The action agency will provide the appropriate USFWS Field Office with the results of any surveys conducted for the NLEB. Involved parties will promptly notify the appropriate USFWS Field Office upon finding a dead, injured, or sick NLEB.

Signature: \_\_\_\_\_

Date Submitted: \_\_\_\_\_

<sup>4</sup> Any activity that temporarily or permanently removes suitable forested habitat, including, but not limited to, tree removal from development, energy production and transmission, mining, agriculture, etc. (see page 48 of the BO).

<sup>5</sup> If the project removes less than 10 trees and the acreage is unknown, report the acreage as less than 0.1 acre.

<sup>6</sup> If the activity includes tree clearing in June and July, also include those acreage in April to October.

# **Appendix E**

## **West Indian Manatee Protection Guidelines**

## Manatee Protection Guidelines

To reduce potential construction-related impacts to the manatee to discountable and insignificant levels, the Service recommends implementing the *Standard Manatee Construction Conditions*.

The permittee will comply with the following manatee protection construction conditions:

- a. The permittee shall instruct all personnel associated with the project of the potential presence of manatees and the need to avoid collisions with manatees. All construction personnel must monitor water-related activities for the presence of manatee(s) during May 15 - October 15.
- b. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act of 1972 and the ESA.
- c. Any siltation barriers used during the project shall be made of material in which manatees cannot become entangled and must be properly secured, and regularly monitored to avoid manatee entrapment.
- d. All vessels associated with the project shall operate at "no wake/idle" speeds at all times while in the construction area and while in water where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will follow routes of deep water whenever possible.
- e. If manatee(s) are seen within 100 yards of the active construction area all appropriate precautions shall be implemented to ensure protection of the manatee. These precautions shall include the operation of all moving equipment no closer than 50 feet to a manatee. Operation of any equipment closer than 50 feet to a manatee shall necessitate immediate shutdown of that equipment. Activities will not resume until the manatee(s) has departed the project area of its own volition.
- f. Any collision with and/or injury to a manatee shall be reported immediately to Mr. Mark Caldwell of the U.S. Fish and Wildlife Service, South Carolina Field Office, at 843-727-4707, Ext 215.

# **Appendix F**

## **I-526 Lowcountry Corridor West Natural Resources Technical Memorandum**

**SEE NRTM IN FEIS APPENDIX L.1**



## **Appendix L.4**

# **NOAA and USFWS Consultation**

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## 526 LCC USFW ESA Consultation

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McGoldrick, Will <McGoldriWR@scdot.org>

Wed, Apr 1, 2020 at 2:06 PM

To: "Mark\_Caldwell@fws.gov" <Mark\_Caldwell@fws.gov>, "thomas\_mccoy@fws.gov" <thomas\_mccoy@fws.gov>, "Charleston\_regulatory@fws.gov" <Charleston\_regulatory@fws.gov>

Cc: "Long, Chad C." <LongCC@scdot.org>, "Heather.Robbins@threeoaksengineering.com"

<Heather.Robbins@threeoaksengineering.com>, "Riley, Joy S." <RileyJ@scdot.org>, "Belcher, Jeffery - FHWA"

<Jeffrey.Belcher@dot.gov>, "Day, Rick" <Rick.Day@stantec.com>, "mccormick (mccormick@cecsinc.com)"

<mccormick@cecsinc.com>

Mark,

In accordance with our Agency Coordination Plan and Permitting Milestones schedule, please find attached a request for consultation with USFW for the I-526 Lowcountry Corridor project. Included is a cover letter requesting initiation of consultation, a biological assessment with appendices, NLEB IPAC report, and a copy of the EIS's Natural Resource Technical Memorandum describing relevant species within the project study area for your review.

A copy of the submittal is being sent to the regulatory address as well for official submittal purposes. Please let Shane or I know if you have any questions or require additional information.

Respectfully,

---

Will McGoldrick, Assoc. DBIA  
Design Build Environmental Coordinator  
SCDOT  
955 Park St Rm 506  
Columbia SC 29202  
(o) 803-737-1326

---

### 5 attachments



**USFW\_ESAS7\_consultcover\_WM.pdf**

106K



**I-526\_West\_NaturalResourcesTechMemo\_03\_30\_2020.pdf**

1256K



**526LCC NLEB.pdf**

257K



**2020-03-27\_I-526\_West\_USFWS\_BA.pdf**

847K



**2020-03-30\_I-526\_West\_USFWS\_BA\_appendices.pdf**

4150K



# United States Department of the Interior



**FISH AND WILDLIFE SERVICE**  
176 Croghan Spur Road, Suite 200  
Charleston, South Carolina 29407

April 6, 2020

Mr. Will McGoldrick  
Design Build Environmental Coordinator  
S.C. Department of Transportation  
P.O. Box 191  
Columbia, South Carolina 29202-0191

Re: S.C. Department of Transportation, I-526 Low Country Corridor West,  
Charleston County, FWS Log # 2016-CPA-0062

Dear Mr. McGoldrick:

The South Carolina Ecological Services Field Office for the U.S. Fish and Wildlife Service (Service) received the South Carolina Department of Transportation's (SCDOT) biological assessment (BA), and other project documentation for the I-526 Low Country Corridor West (I-526 West) in Charleston County, SC. The BA has evaluated potential impacts to threatened and endangered (T&E) species protected under the Endangered Species Act of 1973 (ESA). The SCDOT is seeking our review of the BA and its findings for inclusion into an Environmental Impact Statement (EIS) being developed for I-526 West project the pursuant to the National Environmental Policy Act of 1969.

The proposed I-526 West project extends approximately 11 miles from near Paul Cantrell Boulevard in West Ashley to Virginia Avenue in North Charleston in Charleston County, SC. Two travel lanes are proposed to be added in each direction along I-526 as well as upgrade the current interchange between I-526 and I-26. Improvements to access I-526 from Paul Cantrell Boulevard, North Rhett Avenue, and Virginia Avenue are also proposed. Proposed improvements also include widening of the existing bridge over the Ashley River to match the upland improvements.

The BA provided a list of all T&E species known to occur in Charleston County, including species in offshore waters. A more in depth review was afforded to T&E that may occur in project area based upon habitat within the project area. The SCDOT identified eight species under the jurisdiction of the Service that may occur in the project area; the Bachman's warbler, piping plover, eastern black rail, West Indian manatee, pondberry, Canby's dropwort, northern long-eared bat, and American wood stork. Field reconnaissance by SCDOT personnel did not find any T&E species in the corridor but did find suitable habitat for the eight species.



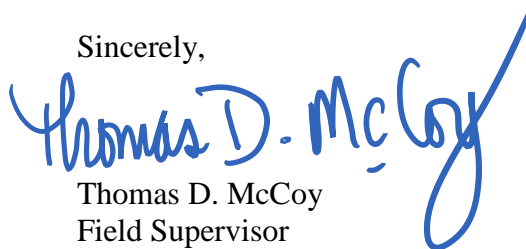
Therefore, a determination of “may effect, not likely to adversely affect” was made for all eight T&E species that may occur in the project area.

Upon review of your information the Service concurs with SCDOT’s determination. For those species in which SCDOT determined the project would have “no effect”, no further consultation is required. Please note that obligations under the ESA must be reconsidered if: (1) new information reveals impacts of this identified action may affect any federally listed species or critical habitat in a manner not previously considered; (2) this action is subsequently modified in a manner, which was not considered in this assessment; or (3) a new species is listed or critical habitat is designated that may be affected by the identified action.

For SCDOT’s convenience the Service has included with this letter a list of species that may occur in Charleston County and are currently protected under the Endangered Species Act of 1973 (ESA). This list also includes species that are considered At Risk Species (ARS) that are either candidates for listing or have been petitioned for listing under the ESA. Appropriate survey time frames or windows for each species are included in the list. Although there are no Federal protections afforded to ARS, please consider including them in your project efforts. Incorporating proactive measures to avoid or minimize harm to ARS may improve their status and assist with precluding the need to list these species. Additional information on ARS can be found at: <http://www.fws.gov/southeast/candidateconservation>.

The Service appreciates the opportunity to provide input at this early stage of the projects’ development. If you have any questions regarding our comments, please do not hesitate to contact Mr. Mark Caldwell of the South Carolina Ecological Services Field Office at (843) 727-4707 ext. 215 and reference FWS Log# 2016-CPA-0062.

Sincerely,



Thomas D. McCoy  
Field Supervisor

TDM/MAC  
EC: Jane Ledwin, USFWS HQ

---

## I-526 Low Country Corridor

---

Beckham, Chris <BeckhamJC@scdot.org>

Tue, Mar 31, 2020 at 3:14 PM

To: "nmfs.ser.esa.consultations@noaa.gov" <nmfs.ser.esa.consultations@noaa.gov>

Cc: "andrew.herndon@noaa.gov" <andrew.herndon@noaa.gov>, "Mary.Wunderlich@noaa.gov"

<Mary.Wunderlich@noaa.gov>, "Belcher, Jeffery - FHWA" <Jeffrey.Belcher@dot.gov>, "McGoldrick, Will"

<McGoldriWR@scdot.org>, "Riley, Joy S." <RileyJ@scdot.org>, "Rick.Day@stantec.com" <Rick.Day@stantec.com>, "Kally

McCormick (mccormickk@cecsinc.com)" <mccormickk@cecsinc.com>, "Long, Chad C." <LongCC@scdot.org>, Heather

Robbins <heather.robbins@threeoaksengineering.com>

Mr. Herndon,

The South Carolina Department of Transportation (SCDOT) on behalf of the Federal Highway Administration (FHWA), is requesting consultation with NOAA-NMFS for species under their jurisdiction in compliance with Section 7 of the Endangered Species Act (ESA) for the above referenced project. Please find the attached copy of the cover letter, the Natural Resource Technical Memorandum (NRTM), the Biological Assessment, and the Biological Assessment Appendices. If you have any questions or need any additional information about this project, please let me know.

Thanks,

Chris Beckham

SCDOT

Environmental Services Office

Office: (803) 737-1332

Mobile: (803) 609-9464

---

### 4 attachments



2020-03-27\_I-526\_West\_NOAA-NMFS\_BA.pdf

678K



I-526\_West\_NaturalResourcesTechMemo\_03\_30\_2020.pdf

1256K



2020-03-25\_I-526\_West\_NOAA-NMFS\_BA\_Appendices.pdf

4299K



NMFSESAS7\_consultcover\_CB.pdf

65K

April 1, 2020

Mr. Andrew Herndon  
Atlantic and Shortnose Sturgeon Recovery Coordinator  
Protected Resources Division  
NOAA Fisheries - Southeast Regional Office  
263 13th Avenue South  
St. Petersburg, FL 33701

**RE Section 7 NOAA-NMFS Consultation Request for I-526 Lowcountry  
Corridor, Charleston County, South Carolina; SCDOT PIN P027507**

Dear Mr. Herndon:

The South Carolina Department of Transportation (SCDOT) on behalf of the Federal Highway Administration (FHWA), is requesting consultation with NOAA-NMFS for species under their jurisdiction in compliance with Section 7 of the Endangered Species Act (ESA) for the above referenced project. The project's Environmental Impact Statement (EIS) is being developed under the One Federal Decision/FAST Act 41 guidance.

This submittal is being provided directly to you for your review and comment. Another package is being submitted via the online web link for official tracking and documentation per our coordination earlier. Attached you should find a copy of a Biological Assessment and accompanying Appendix describing construction activities with effects determinations based upon the described activities, a copy of the EIS's Natural Resource Technical Memorandum (NRTM) documenting all federal and state threatened or endangered species, and a completed Section 7 checklist for quick reference.

As noted above, this request is being provided per the One Federal Decision guidance under which this project falls. Per the schedule agreement with NOAA, this request is being submitted to your agency for a timely and complete review. Please contact myself or Shane Belcher with FHWA with any questions or comments.

Sincerely,

*Chris Beckham*

Chris Beckham  
Environmental Permits Coordinator

CB/wm

enclosures

Biological Assessment with Appendix  
NOAA-NMFS S7 Checklist  
Copy of EIS Natural Resource Technical Memorandum



Mr. Andrew Herndon  
I-526 S7 Consultation  
April 1, 2020  
Page 2 of 2

ec: Shane Belcher, FHWA  
Mary Wunderlich, NOAA  
Chad Long, SCDOT  
Joy Riley, SCDOT  
Kally McCormick, CECS,  
Heather Robbins, Three Oaks Engineering  
Rick Day, Stantec

File: Env/DesignBuild

**FW: [EXTERNAL] 526 LCC Updated FWS coordination for 2016-CPA-0062**

McGoldrick, Will &lt;McGoldriWR@scdot.org&gt;

Fri 2/19/2021 1:26 PM

**To:** Belcher, Jeffery - FHWA <Jeffrey.Belcher@dot.gov>**Cc:** Long, Chad C. <LongCC@scdot.org>; Kally McCormick <mccormickk@cecsinc.com>; Mark Mohr <mark.mohr@threeoaksengineering.com>

■ 1 attachments (33 KB) RE

I-526 West change;

Shane,

Please see below and attached. This should serve as concluding USFW ESA Consultation on the revised BA due to the addition of the shared use path and new species for 526. This exceeds the milestone date of 3-15. Please record and update the dashboard as necessary.

Kally and Mark,

Please update the relevant FEIS chapter/sec on accordingly. All we are missing now is EFH due 3-1.

-WM

---

**From:** Caldwell, Mark <mark\_caldwell@fws.gov>**Sent:** Friday, February 19, 2021 1:05 PM**To:** McGoldrick, Will <McGoldriWR@scdot.org>**Subject:** RE: [EXTERNAL] 526 LCC Updated FWS coordination for 2016-CPA-0062

\*\*\* This is an EXTERNAL email. Please do not click on a link or open any attachments unless you are confident it is from a trusted source. \*\*\*

Will,

My apologies. Another slipped through the crack as I thought I had responded after consulting with our eastern black rail (BLRA) species lead in November 2020 (attached). Please let this email serve as the Service's concurrence with SCDOT's determination that the addition of a 14 foot multiuse path to the I-526 West bridge over the Ashely River is not likely to adversely affect the BLRA.

Mark

Mark A. Caldwell Deputy

Field Supervisor

US Fish and Wildlife Service

South Atlantic-Gulf Region

South Carolina Ecological Services 176

Croghan Spur Road, Suite 200

Charleston, SC 29407

843-300-0426 (direct line)

843-870-0041 (cell)  
843-300-0189 – facsimile

*tomorrow is yesterday's today, today is tomorrow's yesterday, and yesterday is tomorrow's today*

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---

**From:** McGoldrick, Will <[McGoldriWR@scdot.org](mailto:McGoldriWR@scdot.org)>  
**Sent:** Friday, February 19, 2021 11:31 AM  
**To:** Caldwell, Mark <[mark\\_caldwell@fws.gov](mailto:mark_caldwell@fws.gov)>  
**Subject:** RE: [EXTERNAL] 526 LCC Updated FWS coordination for 2016-CPA-0062

Mark,

I wanted to follow up with you on this request since we're just about 3 weeks away from the 3-15 due date. Didn't want it sneak up on us. Thanks. --WM

---

**From:** McGoldrick, Will  
**Sent:** Tuesday, November 24, 2020 12:09 PM  
**To:** Caldwell, Mark <[mark\\_caldwell@fws.gov](mailto:mark_caldwell@fws.gov)>  
**Subject:** RE: [EXTERNAL] 526 LCC Updated FWS coordination for 2016-CPA-0062

Correct. We have that letter from you. This was to provide an update on the changes relating to the SUP and to update for the Rail.

--WM

---

**From:** Caldwell, Mark <[mark\\_caldwell@fws.gov](mailto:mark_caldwell@fws.gov)>  
**Sent:** Tuesday, November 24, 2020 10:45 AM  
**To:** McGoldrick, Will <[McGoldriWR@scdot.org](mailto:McGoldriWR@scdot.org)>  
**Subject:** RE: [EXTERNAL] 526 LCC Updated FWS coordination for 2016-CPA-0062

**\*\*\* This is an EXTERNAL email. Please do not click on a link or open any attachments unless you are confident it is from a trusted source. \*\*\***

Thanks Will. To be clear, SCDOT is only seeking consultation to cover the SUP on the Ashley River bridge portion. You are not seeking consultation for the remainder of the corridor.

Mark A. Caldwell Deputy  
Field Supervisor  
US Fish and Wildlife Service South  
Atlantic-Gulf Region  
South Carolina Ecological Services  
176 Croghan Spur Road, Suite 200  
Charleston, SC 29407  
843-300-0426 (direct line)  
843-870-0041 (cell)  
843-300-0189 – facsimile

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---

**From:** McGoldrick, Will <[McGoldriWR@scdot.org](mailto:McGoldriWR@scdot.org)>  
**Sent:** Tuesday, November 24, 2020 8:24 AM  
**To:** Caldwell, Mark <[mark\\_caldwell@fws.gov](mailto:mark_caldwell@fws.gov)>; McCoy, Thomas <[thomas\\_mccoy@fws.gov](mailto:thomas_mccoy@fws.gov)>  
**Cc:** Riley, Joy S. <[RileyJ@scdot.org](mailto:RileyJ@scdot.org)>; Belcher, Jeffery - FHWA <[Jeffrey.Belcher@dot.gov](mailto:Jeffrey.Belcher@dot.gov)>; Long, Chad C. <[LongCC@scdot.org](mailto:LongCC@scdot.org)>; mccormickk ([mccormickk@cecsinc.com](mailto:mccormickk@cecsinc.com)) <[mccormickk@cecsinc.com](mailto:mccormickk@cecsinc.com)>; Mark Mohr <[mark.mohr@threeoaksengineering.com](mailto:mark.mohr@threeoaksengineering.com)>; Day, Rick <[Rick.Day@stantec.com](mailto:Rick.Day@stantec.com)>  
**Subject:** [EXTERNAL] 526 LCC Updated FWS coordina on for 2016-CPA-0062

**This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.**

Mark,

In light of recent listing status changes of a species and project changes, on behalf of FHWA, I am providing you an information update for your review and concurrence per USFWS guidance. This submittal covers the listing of the black rail and an update on project changes relating to a pedestrian crossing along the Ashley River bridges. Please consider this information as supplemental to the originally submitted BA for FWS concurrence and in accordance with the condition to notify your office about changes.

Please let me or Shane know if you have any questions or need additional information.

Respectfully,

Will McGoldrick, Assoc. DBIA|SCDOT  
Design-Build Environmental Coordinator  
955 Park St Rm 506  
PO 191  
Columbia SC 29202-0191

(o) 803-737-1326

(f) 803-737-1394

[mcgoldriwr@scdot.org](mailto:mcgoldriwr@scdot.org)



*Safety 1<sup>st</sup> – Live By It!*  
*Let 'em Work, Let 'em Live!*

**RE: I-526 West change**

Troutman, Lindsey C <lindsey\_troutman@fws.gov>

Thu 12/3/2020 7:41 AM

To: Caldwell, Mark <mark\_caldwell@fws.gov>

Good Morning Mark,

If the expansion is continuing further into the same habitat that was previously reviewed as not suitable, I have no issues with the NLAA determination. Thank you for keeping me updated! Please let me know if you need anything else.

LT

Lindsey Troutman  
Wildlife Biologist (Recovery)  
US Fish and Wildlife Service  
South Atlantic-Gulf Region (Region 2)  
South Carolina Ecological Services Field Office  
176 Croghan Spur Road, Suite 200  
Charleston, SC 29407  
Main Phone Line: 843-727-4707 ext. 40418  
Direct Phone Line: 843-300-0418

**NOTE:** This email correspondence and any attachments to and from this sender is subject to the Freedom of Information Act (FOIA) and may be disclosed to third parties.

---

**From:** Caldwell, Mark <mark\_caldwell@fws.gov>  
**Sent:** Wednesday, November 25, 2020 8:19 AM  
**To:** Troutman, Lindsey C <lindsey\_troutman@fws.gov>  
**Subject:** I-526 West change

LT,

SCDOT is making a minor addition to the proposed widening of I-526 from the Cooper River going west to Glenn McConnell Parkway (I-526 West). I-526 will be widened from four lanes to eight lanes (Hello LA!). When the proposal first came out many moons ago I conferred with Whitney on possible impacts to the EBLRA but she did not anticipate impacts as suitable habitat was not present. The change to the I-526 West is now to add a 14' shared use path (SUP) to the westbound lanes only. And only on the bridge crossing the Ashley River, not the whole project.

Due to the change and recent listing of the EBLRA SCDOT are now re-consulting for the EBLRA and made a NLAA determination. I do not see a problem with this and plan to concur. Let me know if you see any problems with this. Thanks.

Mark

Mark A. Caldwell



Deputy Field Supervisor  
US Fish and Wildlife Service  
South Atlantic-Gulf Region  
South Carolina Ecological Services  
176 Croghan Spur Road, Suite 200  
Charleston, SC 29407  
843-300-0426 (direct line)  
843-870-0041 (cell)  
843-300-0189 – facsimile

**This email correspondence and any attachments to and from this sender is subject to the Freedom of Information Act and may be disclosed to third parties.**

November 23, 2020

Mr. Mark Caldwell  
Deputy Field Supervisor  
US Fish and Wildlife Service South Atlantic-Gulf Region  
South Carolina Ecological Services  
176 Croghan Spur Road, Suite 200  
Charleston, SC 29407

**RE Updated Section 7 USFWS Consultation Request 2016-CPA-0062 for I-526  
Lowcountry Corridor, Charleston County, South Carolina; SCDOT PIN  
P027507**

Dear Mr. Caldwell:

The South Carolina Department of Transportation (SCDOT) on behalf of the Federal Highway Administration (FHWA), previously requested consultation with US Fish and Wildlife Service (USFWS) for species under their jurisdiction in compliance with Section 7 of the Endangered Species Act (ESA) for the above referenced project. We received your response letter dated April 6, 2020, indicating that USFWS concurred with the findings from our March 27, 2020 Biological Assessment (BA). Since the submittal of the original BA there has been a project design change and also an update to the protection status for the Eastern black rail (*Laterallus jamaicensis*).

The project design change consists of proposing a shared use path (SUP) as part of the proposed widening of existing bridges over the Ashley River. The proposed widening includes two 12-foot wide additional travel lanes and shoulders in each direction (See attachment: Conceptual Design Plans). Additionally, a 14-foot wide SUP accommodating pedestrians and cyclists would be included as part of the westbound widening. The SUP would be located on the north (upstream) side of westbound travel lanes. The 14-foot path would be separated from the motorized travel lanes by a raised barrier separating the path from the outside 12-foot paved shoulder. In addition to the barrier separating the travelway from the SUP, a barrier would be constructed on the outside edge of the SUP to increase safety and prevent fishing or casting from the path. Direct effects from constructing the SUP would include a minor increase in the amount of prestressed concrete piles and drilled shafts needed to support the wider bridge structures.

Providing pedestrian and cyclist access connecting to the bridge SUP would be planned and permitted by others, likely local municipalities and/or Charleston County. These connections could be located in areas of suitable habitat for species protected under the ESA. This may lead to indirect or cumulative potential impacts. At this time local entities have not developed conceptual plans regarding the connection locations and indirect or cumulative impacts have not been quantified, but would be addressed during the federal permitting process for impacts to Waters of the U.S. by local agencies.

At the time of the original BA submittal, the status of the Eastern black rail was noted as “proposed”, indicating that the species had been found to warrant potential listing under the ESA. Given the potential for future listing, the BA originally addressed suitable habitat and potential impacts to the Eastern black rail. SCDOT previously identified eight species that may occur in the project area; Bachman’s warbler, piping plover, Eastern black rail, West Indian manatee, pondberry, Canby’s



dropwort, northern long-eared bat, and American wood stork. The proposed SUP modifications would occur in an area that is included in the existing study boundary and has been previously surveyed. Field reconnaissance by SCDOT personnel did not find any species in the corridor but did find suitable habitat for the eight species. The previous determination of “may effect, not likely to adversely affect” is also recommended following the proposed project SUP modification and the listing of the Eastern black rail.

This information is being provided directly to you for your review and comment. This request is being provided per the One Federal Decision guidance under which this project falls. Per the schedule agreement with USFWS, this request is being submitted to your agency for a timely and complete review. Please contact myself or Shane Belcher with FHWA with any questions or comments.

Sincerely,

A handwritten signature in black ink that reads "Will McGoldrick". The signature is written in a cursive style and is centered below the word "Sincerely,".

Will McGoldrick  
Environmental Permits Coordinator

WRM/km  
enclosures  
Conceptual bridge plans

cc: Shane Belcher, FHWA  
Thomas McCoy, USFW  
Chad Long, SCDOT  
Joy Riley, SCDOT  
Kally McCormick, CECS,  
Mark Mohr, Three Oaks Engineering  
Rick Day, Stantec

File: Env/Design-Build



South Carolina  
Department of Transportation

November 19, 2020

Mr. Andrew Herndon  
Atlantic and Shortnose Sturgeon Recovery Coordinator  
Protected Resources Division  
NOAA Fisheries - Southeast Regional Office  
263 13th Avenue South  
St. Petersburg, FL 33701

**RE SERO-2020-02372 Section 7 NOAA-NMFS Updated Consultation Request  
for I-526 Lowcountry Corridor, Charleston County, South Carolina;  
SCDOT PIN P027507**

Dear Mr. Herndon:

The South Carolina Department of Transportation (SCDOT) on behalf of the Federal Highway Administration (FHWA), is requesting consultation with NOAA-NMFS for species under their jurisdiction in compliance with Section 7 of the Endangered Species Act (ESA) for the above referenced project. The project's Environmental Impact Statement (EIS) is being developed under the One Federal Decision/FAST Act 41 guidance.

This submittal has been updated per coordination with your office and is being provided directly to you for your review and comment. A copy of this package is being submitted via the online web link for official tracking and documentation per our coordination earlier. Attached you should find a copy of a Biological Assessment and accompanying Appendix describing construction activities with effects determinations based upon the described activities, a copy of the EIS's Natural Resource Technical Memorandum (NRTM) documenting all federal and state threatened or endangered species, and a completed Section 7 checklist for quick reference. Updates have been made to address previous coordination and comments received from your initial review.

As noted above, this request is being provided per the One Federal Decision guidance under which this project falls. Per the revised schedule agreement with NOAA, this request is being submitted to your agency for a timely and complete review. Please contact myself or Shane Belcher with FHWA with any questions or comments.

Sincerely,

Will McGoldrick  
Environmental Permits Coordinator

WM/wm

enclosures



Updated Biological Assessment with Appendix  
NOAA-NMFS S7 Checklist  
Copy of Updated EIS Natural Resource Technical Memorandum

cc: Shane Belcher, FHWA  
Mary Wunderlich, NOAA  
Chad Long, SCDOT  
Joy Riley, SCDOT  
Kally McCormick, CECS,  
Mark Mohr, Three Oaks Engineering  
Rick Day, Stantec

File: Env/DesignBuild



**UNITED STATES DEPARTMENT OF COMMERCE**  
National Oceanic and Atmospheric Administration  
**NATIONAL MARINE FISHERIES SERVICE**  
Southeast Regional Office  
263 13<sup>th</sup> Avenue South  
St. Petersburg, Florida 33701-5505  
<https://www.fisheries.noaa.gov/region/southeast>

F/SER31:AH  
SERO-2020-02372

Chris Beckham  
Environmental Permits Coordinator  
South Carolina Department of Transportation  
PO Box 191  
Columbia, SC 29202-0191

Dear Mr. Beckham:

This letter responds to your request for consultation with us, the National Marine Fisheries Service (NMFS), pursuant to Section 7 of the Endangered Species Act (ESA) for the following action.

Agency	Project Number	SERO Number	Project Type
South Carolina Department of Transportation (SCDOT)	PIN P027507	SERO-2020-02372	Bridge Demolition and Construction

### Consultation History

We received your letter requesting consultation on March 31, 2020. We requested additional information on May 6, May 8, and May 11, 2020. We received a single response to those requests on May 15, 2020. An additional request for information was sent on June, 23, 2020. We received a final response on June 24, 2020 and initiated consultation that day. On October 14, 2020, we learned you intended to change your proposed action. We received information describing the updated proposed action on November 19, 2020. The consultation package with the new information was deemed completed on December 22, 2020, and consultation was initiated that day. The project has been assigned the following tracking number in the NMFS Environmental Consultation Organizer (ECO), SERO-2020-02372; this project is a FAST-41 project. Please refer to this number in any future inquiries regarding this project.

### Project Location

Address	Latitude/Longitude	Water body
Interstate 526 crossing of Ashley River, 6 miles (mi) north of Charleston, SC	32.835725, -80.02419 (North American Datum 1983)	Ashley River

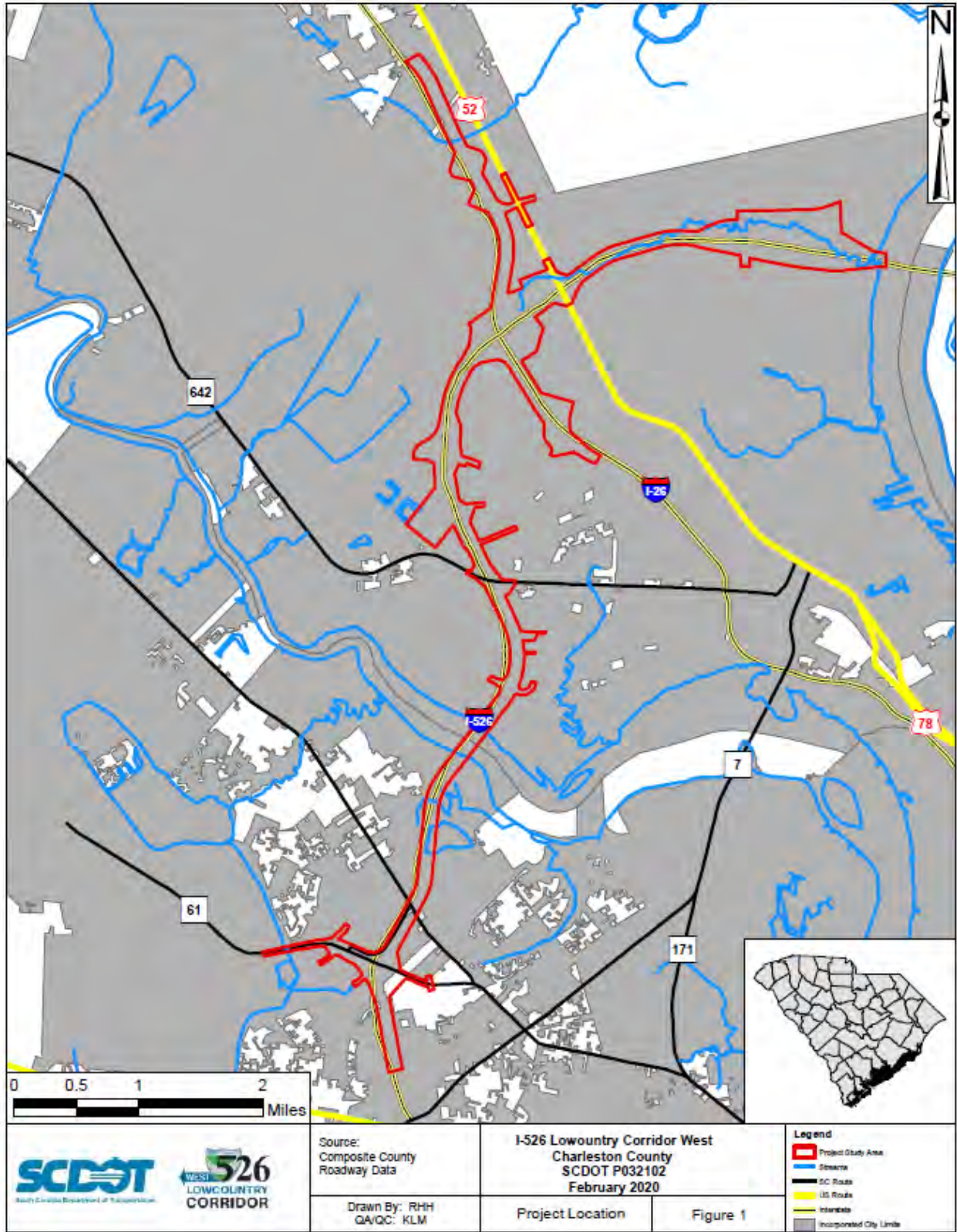
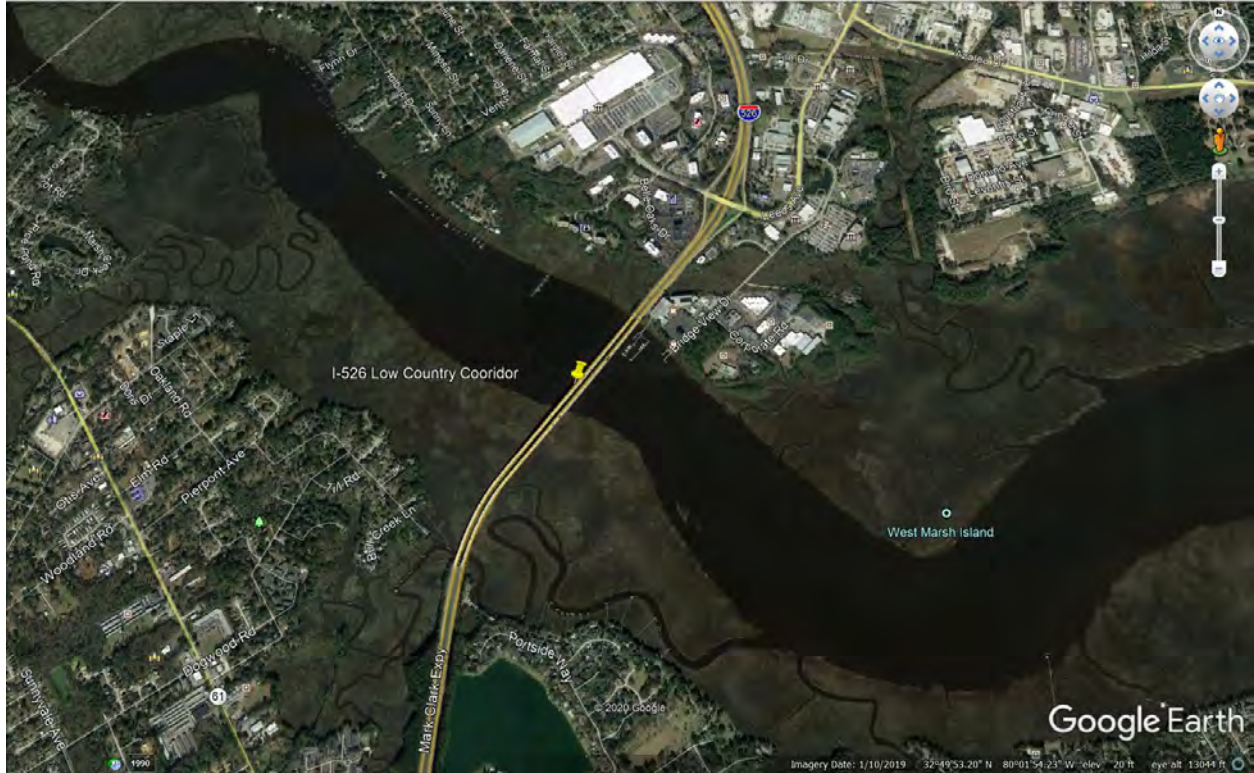


Image of the Project Location and Surrounding Area<sup>1</sup>



**Image of the project location where construction may affect ESA-listed species (I-526 crossing the Ashley River) (© Google Earth 2019)**

### **Existing Site Conditions**

The Ashley River is tidally influenced, with the headwaters originating in Dorchester County, South Carolina. The river joins the Cooper River to form Charleston Harbor before discharging into the Atlantic Ocean. The entire drainage of the Ashley River system, including its headwaters in Cypress and Wassamassaw swamps, extends approximately 60 river miles. At the project site, the width of the main deeper-water navigational channel of the Ashley River is approximately 60 feet (ft) wide. The full width of the Ashley River at the project site is approximately 1,400 ft wide. Water depths in the river range from approximately 0 to 20 ft.<sup>2</sup> The mean tidal range is 5.68 ft and the diurnal range is 6.23 ft. Mean high water (MHW) is approximately 3.08 ft and mean low water is -3.16 ft at the center of the channel. Salinity at the project site ranges from 12 to 17 parts per thousand.<sup>3</sup> The project area does not contain any sensitive habitats or spawning areas for shortnose sturgeon or any distinct population segment of Atlantic sturgeon.

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<sup>1</sup> Interstate 526 Lowcountry Corridor West - Biological Assessment for National Oceanic and Atmospheric Administration, National Marine Fisheries Service. Prepared by Civil Engineering Consulting Service. 20 pp with Appendices. November 16, 2020

<sup>2</sup> Ibid.

<sup>3</sup> Ibid.



## **Project Description**

The General William C. Westmoreland bridge (Westmoreland bridge) is part of I-526 and connects the City of North Charleston with the West Ashley area of Charleston and spans the Ashley River. The bridge is 3,908-ft long, with two 43-ft wide spans; one moving traffic eastbound, the other westbound. Each individual span carries two lanes of traffic, each is 12 ft wide, with a 5.5-ft inside shoulder, and a 10-ft outside shoulder, and an approximately 1.5-ft wide barrier on both sides. Additionally, a 14-ft shared use path to accommodate pedestrians and cyclists would be added to the upstream side of the bridge; the shared use path would be outside of the widened traffic lanes. The 14-ft path would be separated from the motorized travel lanes with a raised barrier separating the path from the outside 12-ft paved shoulder. Barriers for safety would be provided along both sides of the shared use path, which would also prevent fishing or casting from the path. The bridge has a vertical clearance of 35 ft over the Ashley River, when measured from MHW.<sup>4</sup> The project will widen each of the existing 42-ft spans, by 32 ft and 5.5 inches; upon completion each span will be approximately 75-ft wide. The bridge deck will remain at the same height above the Ashley River. The proposed minimum horizontal clearance for the main navigational opening would be 60 ft between fenders. This configuration will be similar to the existing bridge, or would be less restrictive. The vertical clearance of the proposed fixed span bridge would be a minimum of 35 ft from the MHW datum to meet the needs of mariners in the area.<sup>5</sup>

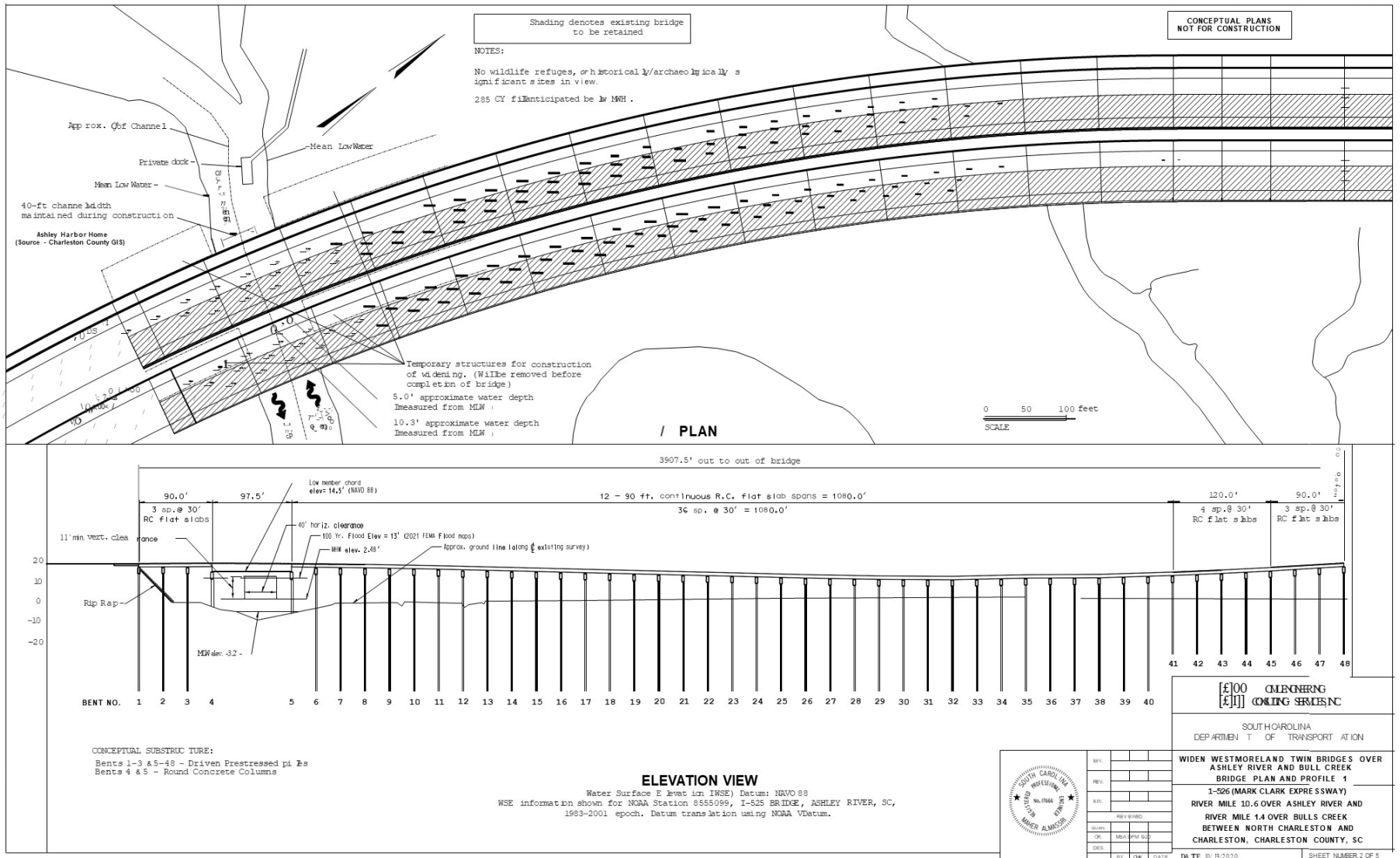
Temporary work trestles would be placed in marsh and wetland areas for construction access outside of the existing eastbound bridge (green cross hatching, images below). Temporary trestle would be approximately 40-ft wide and would be supported by steel pipe piles. The steel piles would be approximately 24-inches in diameter and would be installed with an impact hammer. It is estimated that 240, 24-inch steel pipe piles would be needed for the temporary work trestle. With one work crew performing installation, approximately 4 piles would be driven per day with an average of 350 impact hammer strikes per pile. If additional crews are utilized, more piles would be driven per day; however it is estimated that the contractor would have one crew working on the trestle at a time, given space limitations.<sup>6</sup>

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<sup>4</sup> Ibid.

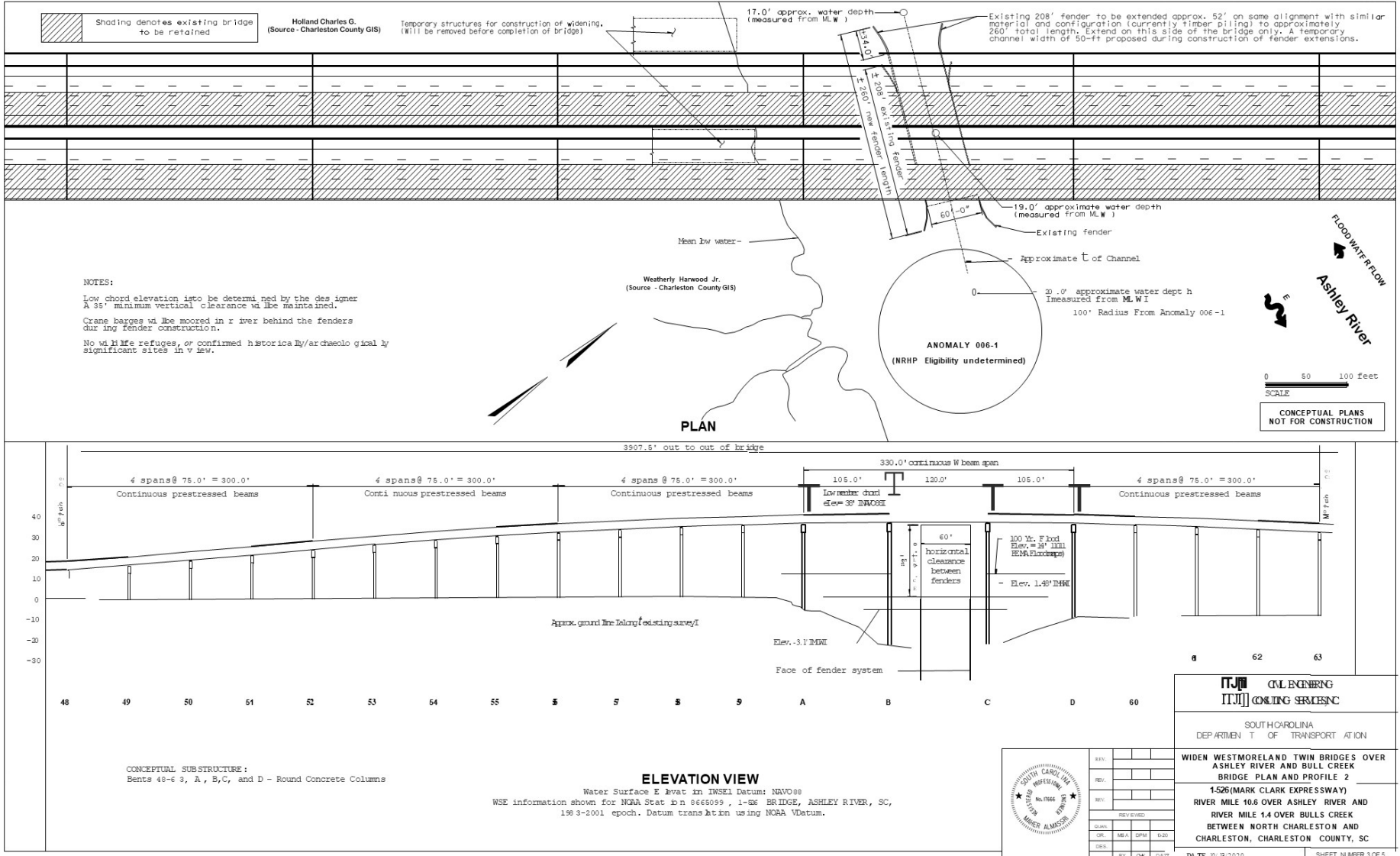
<sup>5</sup> Ibid.

<sup>6</sup> Ibid.



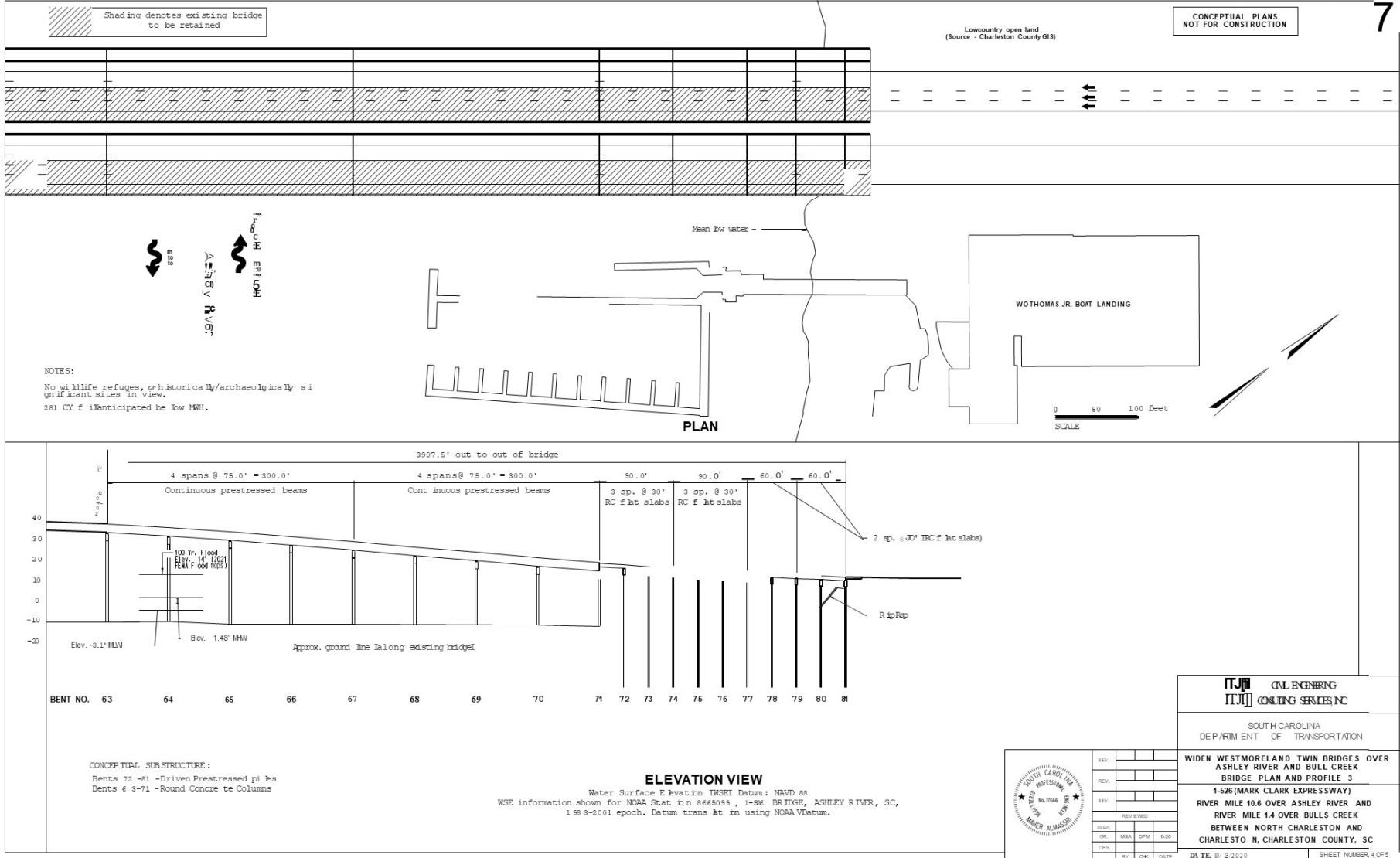
Plan Schematic of Bents and Piling Type on West/South Side of Ashley River (Image 1 of 3).<sup>7</sup>

<sup>7</sup> Ibid.



Plan Schematic of Bents and Piling Type over Ashley River (Image 2 of 3).<sup>8</sup>

<sup>8</sup> Ibid.



Plan Schematic of Bents and Piling Type on East/North Side of Ashley River (Image 3 of 3).<sup>9</sup>

<sup>9</sup> Ibid.

For access over marsh areas between the existing bridges, either trestles or a combination of barge, barge mats, and timber mats would be needed due to the limited space between the structures. Deeper water and the main channel of the Ashley River would be accessed via barges for construction. Barges may be delivered and moved via water and transport vessels or via land on flatbed trucks with cranes and other heavy equipment. At no point would barges in the Ashley River block more than 50% of the channel.<sup>10</sup>

Pre-stressed concrete piles will be installed (Bents 1-3; 6-48; and 72-80) with an H-pile steel “stinger” at the end of the concrete pile to prevent damage to the pile as it is driven into hard subsurface materials. Piles would be installed with an impact or vibratory hammer (for purposes of our analysis we assume impact hammering will be used). It is estimated a total of 649, 24-inch pre-stressed concrete piles would be needed for bridge widening. With one work crew performing installation, approximately 2 to 3 piles would be driven per day with an average of 300 impact hammer strikes per pile, for a total of up to 900 strikes per day.<sup>11</sup> If additional crews are utilized, more piles would be driven per day; however, it is assumed that the contractor would have 1 crew working on at a time, given space limitations.<sup>12</sup>

Drilled shafts would be installed at bents 48 through 71, and at bents A, B, C, and D. Bents 48 through 59 are located at the southerly or westerly (West Ashley) approach to the Ashley River. Bents A through D are at the deepest portion of the main channel of the Ashley River. Bents 60 through 71 are located at the northerly or easterly (North Charleston) approach to the Ashley River.<sup>13</sup>

Each drilled shaft would be approximately 7 ft in diameter. Each steel casing will house a drilled shaft, and each casing would be installed using a vibratory hammer. Once the steel casings are in place, the interior is drilled out so a rebar cage can be installed. Concrete would then be poured into the casing to create a large support structure in the water. Approximately 150 drilled shafts would be needed for the bridge widening. One steel casing per day would be constructed by one work crew, but an additional crew might be used, increasing installation to 2 shafts per day.<sup>14</sup>

The proposed project would also extend an existing fender system. The fender elements would likely consist of rubber fenders, with a steel panel and polyethylene facing. An additional sixty (24-inch) pre-stressed concrete piles would be driven in place via impact hammer to support the new fender systems with an average of 150 strikes per pile. These piles would not be load bearing and would not require extensive pile strikes such as those on the permanent bridge system.<sup>15</sup>

Construction is expected to begin in 2027. Construction of the bridge phase over the Ashley River would last approximately 3 years. Within that 3-year period, in-water work of an

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<sup>10</sup> Ibid.

<sup>11</sup> Up to 3 piles x 300 strike per pile = 900 strikes per day

<sup>12</sup> Ibid.

<sup>13</sup> Ibid.

<sup>14</sup> Ibid.

<sup>15</sup> Ibid.

estimated 6 months would be needed for pre-stressed pile bents and 17 months would be needed for drilled shaft bents. This project is expected to be delivered via the design build process and final construction sequencing will be determined by the contractor. The following is an outline of the likely construction sequence. This sequence may vary slightly depending on the selected contractor. Any modifications from this proposed by the contractor that could impact effects to listed species would require additional coordination with SCDOT and federal agencies.<sup>16</sup>

**Pile Installation Information**

Pile type(s)	Project Purpose	Number of Piles	Total Area Affected (ft <sup>2</sup> )	Installation Method	Strikes or seconds per pile
Steel (24 inches)	Work Trestles	240	754	Impact hammer	350
Pre-stressed concrete (24 inches)	Bridge Widening	649	1,298	Vibratory or impact hammer	300
Steel casing for drilled shaft (84 inches)	Bridge Widening	150	5,500	Vibratory	500
Pre-stressed concrete (24 inches)	Fender System	60	189	Impact hammer	150

**Construction Conditions**

This project is being considered under the One Federal Decision process. As a result, the project is yet to be contracted, and many specific construction details are not currently available. To maintain competitiveness during the bid process for this project, SCDOT has not finalized the means and methods of construction to ensure contractors have the ability to propose specific methods and equipment. The project construction conditions therefore follow an outline of the likely construction activities and project designs. This may vary slightly depending on the selected contractor and bid process. Regardless, SCDOT has committed to ensuring the following are done:

- SCDOT Best Management Practices for erosion control are followed during construction;
- The appropriate National Pollution Discharge Elimination System permit is obtained;
- A Stormwater Pollution Prevention Plan is created;
- Equipment does not obstruct or impede passage through more than 50% of the Ashley River;
- “Slow starts” for pile driving, barge movement, and other vessel movement are used; and
- Demolition of existing in-water structures is avoided.

The contractor will be required to use sediment fences, turbidity curtains, and other best management practices to mitigate increases in turbidity during construction and demolition. Bridge removal and placement will be conducted in accordance with SCDOT standard specifications.

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<sup>16</sup> Ibid.

**Effects Determinations for Species the Action Agency or NMFS Believes May Be Affected by the Proposed Action**

<b>Species</b>	<b>ESA Listing Status<sup>17</sup></b>	<b>Action Agency Effect Determination<sup>18</sup></b>	<b>NMFS Effect Determination</b>
Atlantic Sturgeon, South Atlantic DPS <sup>19</sup>	E	NLAA	NLAA
Shortnose Sturgeon	E	NLAA	NLAA

**Critical Habitat**

The project is not located in designated critical habitat, and there are no potential routes of effect to any designated critical habitat.

**Analysis of Potential Routes of Effect to Species**

Atlantic and shortnose sturgeon infrequently use Ashley River, including up to the I-526 Bridge. From 2011-2017, South Carolina Department of Natural Resources detected only three Atlantic sturgeon in the vicinity of the action area. Shortnose sturgeon have been detected in the Ashley River near the confluence with the Cooper River (approximately 8 river miles away) but are not generally found near the I-526 Bridge. Neither species uses the Ashley River for spawning, nor do they exhibit migratory behavior in the river. Based on the information available regarding how sturgeon use the Ashley River, we anticipate only the installation of Bents A-D and 59-81 could potentially effect sturgeon (B. Post, SCDNR to A. Herndon, NMFS 2020).

Sturgeon may be physically injured if struck by construction equipment, vessels, or materials. This effect is extremely unlikely to occur due to the infrequency with which sturgeon are likely to be near the action area. Additionally, sturgeon are able to move away from or avoid entirely the project site if disturbed.

Use of turbidity curtains, construction activities, and related construction noise may prevent or deter sturgeon from entering the project area. We believe the effects to these species from temporary exclusion from the project area due to construction activities, including related noise and presence of turbidity curtains, will be insignificant. The animals spend very little time or around the action area and only 25 (Bents A-D and 59-79) of the total 81 bents proposed will be installed in waters potentially accessible to sturgeon because of the depth around the bridge. Following installation of these bents sturgeon would potentially be excluded from a maximum area of 3,574 square feet (ft<sup>2</sup>).<sup>20</sup>

Noise created by pile driving activities can physically injure animals or change animal behavior in the affected areas. Injurious effects can occur in two ways. First, immediate adverse effects can occur to listed species if a single noise event exceeds the threshold for direct physical injury.

<sup>17</sup> E = Endangered

<sup>18</sup> NLAA = May affect, not likely to adversely effect

<sup>19</sup> DPS = Distinct Population Segment

<sup>20</sup> 17 Bents with Drilled Shafts (Bents A-D and 60-71) x 5 Drilled Shafts per Bent x 38.48 ft<sup>2</sup> per shaft = 3,270.8 ft<sup>2</sup>; 8 Bents (72-79) with Pre-Stressed Concrete Pilings x up to 12 Pre-Stressed Concrete Pilings per Bent x 3.15 ft<sup>2</sup> per piling = 302.4 ft<sup>2</sup>; 3,270.8 ft<sup>2</sup> + 302.4 ft<sup>2</sup> = 3,573.2 ft<sup>2</sup>.

Second, effects can result from prolonged exposure to noise levels that exceed the daily cumulative exposure threshold for the animals, and these can constitute adverse effects if animals are exposed to the noise levels for sufficient periods. Behavioral effects can be adverse if such effects interfere with animals migrating, feeding, resting, or reproducing, for example. Our evaluation of effects to listed species as a result of noise created by construction activities is based on the analysis prepared in support of the biological opinion for SAJ-82.<sup>21</sup> The noise analysis in this consultation evaluates effects to ESA-listed fish identified by NMFS as potentially affected in the table above.

Eighty-five drilled shafts (5 shafts/bent; Bents A-D and 60-71) will be used in the mainstem of the Ashley River where sturgeon could occur. Each drilled shaft would be approximately 7 ft in diameter and installed with a vibratory hammer. Based on our noise calculations, installation of these piles by vibratory hammer, could cause a single-strike or peak-pressure injurious noise effect at a distance of 6 ft. Sturgeon could also be injured by cumulative sound exposure caused by vibratory hammer use, but we believe this route of effect is extremely unlikely to occur. The cumulative sound exposure level (cumulative SEL) of multiple pile strikes by vibratory hammer over the course of a day may cause injury to a sturgeon weighing 102 grams or more at a distance of 16 ft away; sturgeon weighing less than 102 grams are not anticipated in the project area. We anticipate sturgeon are unlikely to be in the project area based on the best available information. Additionally, due to the mobility of sturgeon, we expect them to move away from noise disturbances, even if they were in the project area. Therefore, we believe this potential route of effect is extremely unlikely to occur.

Sturgeon behavior (i.e., foraging, migrating, spawning) could be adversely affected by vibratory hammer use, but we believe behavioral effects will be insignificant. Installation of the drilled shafts could result in behavioral effects radius of up to 3,280 ft. Based on the best available information, sturgeon do not appear to be using the Ashley River for foraging, migrating, spawning; thus, we anticipate sturgeon are unlikely to be in the project area and are unlikely to have any essential life activities interrupted by the proposed action.

Up to 96 pre-stressed concrete pilings (12 shafts/bent; Bents 72-79) will be installed in the mainstem of the Ashley River where sturgeon could occur. To be conservative toward the species we will assume an impact hammer will be used to install those pilings. Sturgeon could be injured by the noise energy created during the installation, but we believe that effect is extremely unlikely to occur. Based on our noise calculations, installation of these piles by impact hammer, we anticipate sound levels for a single strike impact will not reach the threshold of potential injury to fish. Sturgeon could also be injured by cumulative sound exposure. The cumulative SEL of multiple pile strikes by impact hammer over the course of a day may cause injury to a sturgeon weighing 2 grams or more at a distance of 49 ft from the piles being driven; sturgeon weighing less than 2 grams are not anticipated in the project area. We anticipate sturgeon are unlikely to be in the project area based on the best available information. Additionally, due to the mobility of sturgeon, we expect them to move away from noise disturbances, even if they were in the project area. Therefore, we believe this potential route of effect is extremely unlikely to occur.

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<sup>21</sup> NMFS. Biological Opinion on Regional General Permit. SAJ-82 (SAJ-2007-01590), Florida Keys, Monroe County, Florida. June 10, 2014.



Sturgeon behavior could be adversely affected by impact hammer use, but we believe behavioral effects will be insignificant. Installation of the pre-stressed concreted piles could result in behavioral effects radius of up to 707 ft. Based on the best available information, sturgeon do not appear to be using the Ashley River for foraging, migrating, spawning; thus, we anticipate sturgeon are unlikely to be in the project area and are unlikely to have any essential life activities interrupted by the proposed action.

### **Conclusion**

Because all potential project effects to listed species were found to be extremely unlikely to occur, insignificant, or beneficial, we conclude that the proposed action is not likely to adversely affect listed species under NMFS's purview. This concludes your consultation responsibilities under the ESA for species under NMFS's purview. Consultation must be reinitiated if a take occurs or new information reveals effects of the action not previously considered, or if the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat in a manner or to an extent not previously considered, or if a new species is listed or critical habitat designated that may be affected by the identified action. NMFS's findings on the project's potential effects are based on the project description in this response. Any changes to the proposed action may negate the findings of this consultation and may require reinitiation of consultation with NMFS.

We look forward to further cooperation with you on other projects to ensure the conservation of our threatened and endangered marine species and designated critical habitat. If you have any questions on this consultation, please contact Andy Herndon, Consultation Biologist, at (727) 824-5367, or by email at [Andrew.Herndon@noaa.gov](mailto:Andrew.Herndon@noaa.gov).

Sincerely,

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for David Bernhart  
Assistant Regional Administrator  
for Protected Resources

File: 1514-22.1.2