SAVANNAH & PINCKNEY ISLAND NATIONAL WILDLIFE REFUGE

TRANSPORTATION STUDY REPORT

Contract No. DTFH71-09-D-00001

US Department of Transportation, Federal Highway Administration, Eastern Federal Lands Highway Division
in cooperation with US Fish and Wildlife Service

Kimley-Horn
and Associates, Inc.

January 2009

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Executive Summary

Each National Wildlife Refuge (NWR) under the United States Fish and Wildlife Service (USFWS) must complete a Comprehensive Conservation Plan (CCP) describing future conditions at each refuge and establishing management direction based on a 15-year time horizon. Each CCP includes a transportation planning component which identifies transportation enhancements that will provide efficient mobility for visitors and staff members of the refuges. This Transportation Study Report provides the basis for the CCP transportation planning component for the Savannah and Pinckney Island NWRs.

The Transportation Study Report reviews the internal roadways, entrances, access roads, parking areas, and trails of both the Savannah NWR and the Pinckney Island NWR and provides short, medium, and long range recommendations for the transportation system. The study included development of a public involvement plan, inventory of existing conditions at the refuges, and identification of traffic safety and access needs for each refuge. Based on these reports, preliminary candidate alternatives were developed and responsible stakeholder partners were identified for each alternative. The preliminary candidate alternatives were divided into roadway and other alternatives for initial screening. The roadway alternatives were then evaluated in further detail to determine the preferred alternatives and develop into a short and long range implementation plan. The implementation plan presented herein includes a summary of the environmental, social, and financial impacts of the conceptual roadway alternatives. More detailed information on the planning process can be found in this report.

The Savannah NWR is located on the border of Jasper County, South Carolina, and Chatham and Effingham Counties, Georgia, with approximately half of the refuge in each state. The public access area is located in South Carolina. The transportation study area for the Savannah NWR includes portions of the City of Hardeeville and Jasper County, South Carolina along SC 170 and US 17.

The Pinckney Island NWR is located in Beaufort County, South Carolina. The Pinckney Island NWR transportation study area includes US 278 between the Towns of Bluffton and Hilton Head Island, South Carolina.

Based on the results of the study short, medium, and long range transportation recommendations for the Savannah and Pinckney Island NWRs include the following:

Savannah NWR Transportation Recommendations

Short Range

- Provide Turn Lanes on US 17 at Visitors Center (completed)
- Provide Turn Lanes on SC 170 at Wildlife Drive
- Implement Wildlife Drive Internal Connection Trail
- Improve Internal Roadways
- Perform Speed Study on SC 170

- Install a Weigh Station / Weigh-in-Motion Station on SC 170
- Provide Wayfinding Improvements
- Improve Speed Enforcement

Medium Range

- Provide Internal Shuttle Service between Wildlife Drive and Visitors Center
- Identify Overflow Parking Areas
- Encourage Pedestrians & Bicyclists to Visit the Refuge

Long Range

- Replace Deficient SC 170 Bridges
- Provide External Transit Service

Pinckney Island NWR Transportation Recommendations

Short Range

- Improve Internal Roadway
- Review Posted Speed Limit on US 278 around the Refuge
- Improve Median Opening
- Provide Wayfinding Improvements
- Encourage Pedestrians & Bicyclists to Visit the Refuge

Medium Range

- Construct US 278 Underpass and Relocate Entrances
- Identify Additional Parking Area
- Provide External Transit Service

Long Range

- Widen US 278
- Lengthen Turn Lanes into Refuge (as part of widening US 278)

1. Introduction

The Savannah Coastal Refuges Complex is a chain of seven National Wildlife Refuges (NWRs) in South Carolina and Georgia. The Complex maintains nearly 57,000 acres of land along 100 miles of coastline. The focus of this study is on the Savannah and Pinckney Island NWRs. The remaining five refuges in the Complex are Wassaw, Tybee, Harris Neck, Blackbeard Island, and Wolf Island.

The Savannah Coastal NWRs are located in an ecosystem referred to as "Lowcountry," which is characterized by coastal marsh and barrier islands. This ecosystem provides habitat for a wide variety of plants and animals. The variety of birds within the Lowcountry is enhanced by its location on the Atlantic flyway.

The Savannah Coastal Refuges Complex protects a unique network of bottomland hardwood forests, wetlands, grasslands, beaches, and aquatic habitats. In a rapidly developing coastal environment, these refuges will protect and manage the highly diverse habitats. The refuges in the complex will contribute to the long term conservation of migratory and native wildlife populations, and the recovery of endangered and threatened species.

1.1 USFWS Mission and Goals

The NWR System is administered through the United States Fish and Wildlife Service (USFWS) under the Department of the Interior. The mission of the USFWS is to:

"Work with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people."

The goals of the USFWS are aimed at fulfilling this mission. Primary USFWS goals are to:

- Sustain fish and wildlife populations including migratory birds, endangered species, anadromous fish, and marine animals;
- Conserve a network of lands and waters, including the NWR System; and
- Provide Americans the opportunity to understand and participate in the conservation and use of fish and wildlife resources.

The USFWS manages refuges across the country. The passage of the NWR System Improvement Act of 1997 defines the mission of the NWR System as follows:

"To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, plant resources and their habitats within the United States for the benefit of present and future generations of Americans."

The goals of the Wildlife Refuge System are to:

- Preserve, restore, and enhance threatened and endangered species in their natural ecosystems;
- Perpetuate the migratory bird resource;
- Preserve a natural diversity and abundance of fish and wildlife ecology;
- Help the public gain an understanding and appreciation of fish and wildlife ecology; and
- Provide Americans the opportunity to understand and participate in the conservation and use of fish and wildlife resources.

The NWR System Improvement Act of 1997 identified six wildlife-dependent recreational uses that are recognized as priority public uses of refuge lands, including:

- Hunting
- Fishing
- Wildlife Observation
- Wildlife Photography
- Environmental Education
- Environmental Interpretation

1.2 Project Location

The overall boundaries for the Savannah and Pinckney Island NWRs are shown in **Figure 1.1**.

1.2.1 Savannah NWR

The Savannah NWR is on the border of South Carolina (Jasper County) and Georgia (Chatham and Effingham Counties), with approximately half of the refuge in each state. The public access area is located in South Carolina. The transportation study area for the Savannah NWR (**Figure 1.2**) includes portions of the City of Hardeeville and Jasper County, South Carolina along SC 170 and US 17.

1.2.2 Pinckney Island NWR

The Pinckney Island NWR is located in Beaufort County, South Carolina. The Pinckney Island NWR transportation study area (**Figure 1.3**) includes US 278 between the Towns of Bluffton and Hilton Head Island, South Carolina.

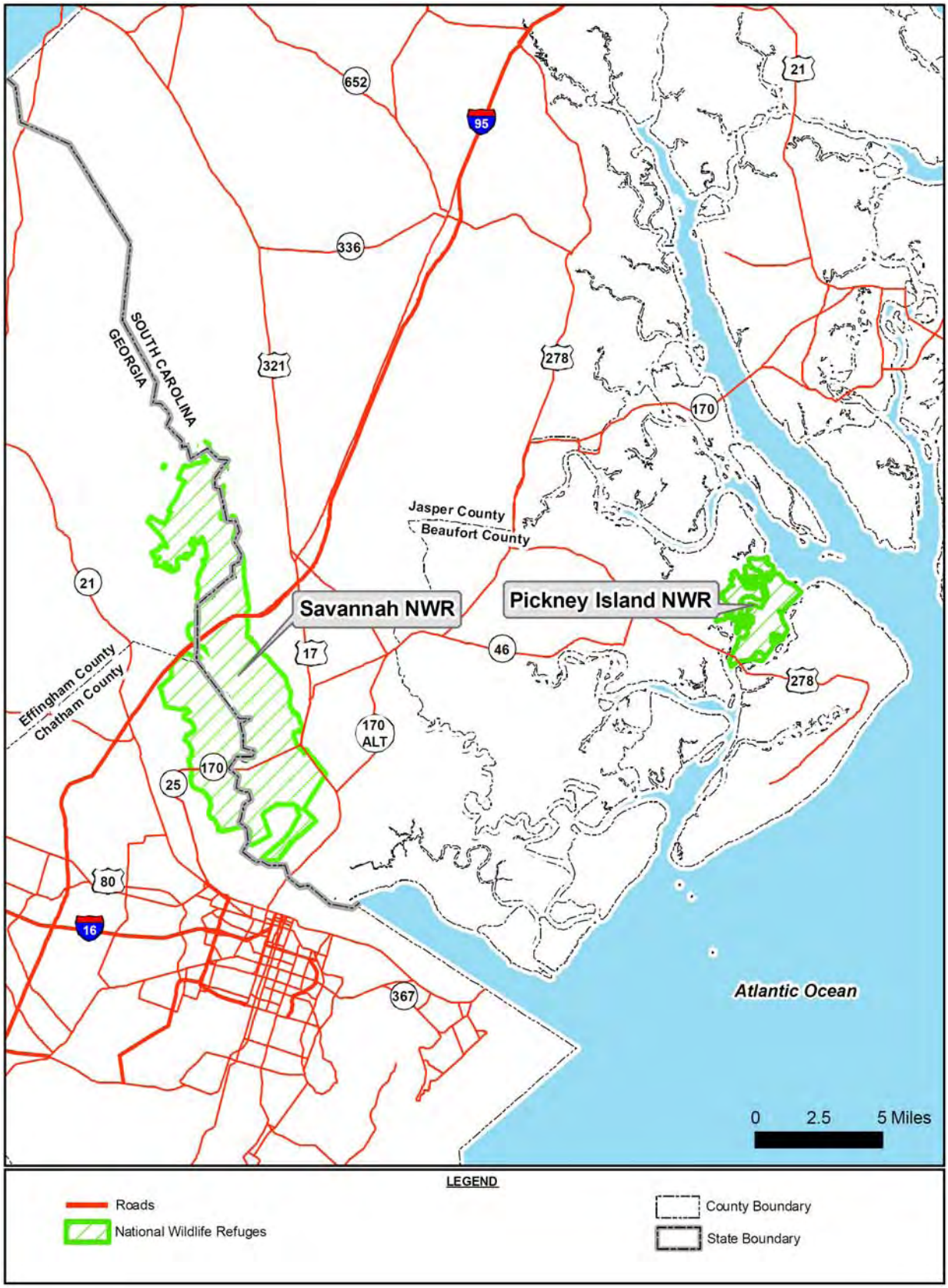


Figure 1.1: Overall Site Location Map for the Savannah and Pinckney Island NWRs

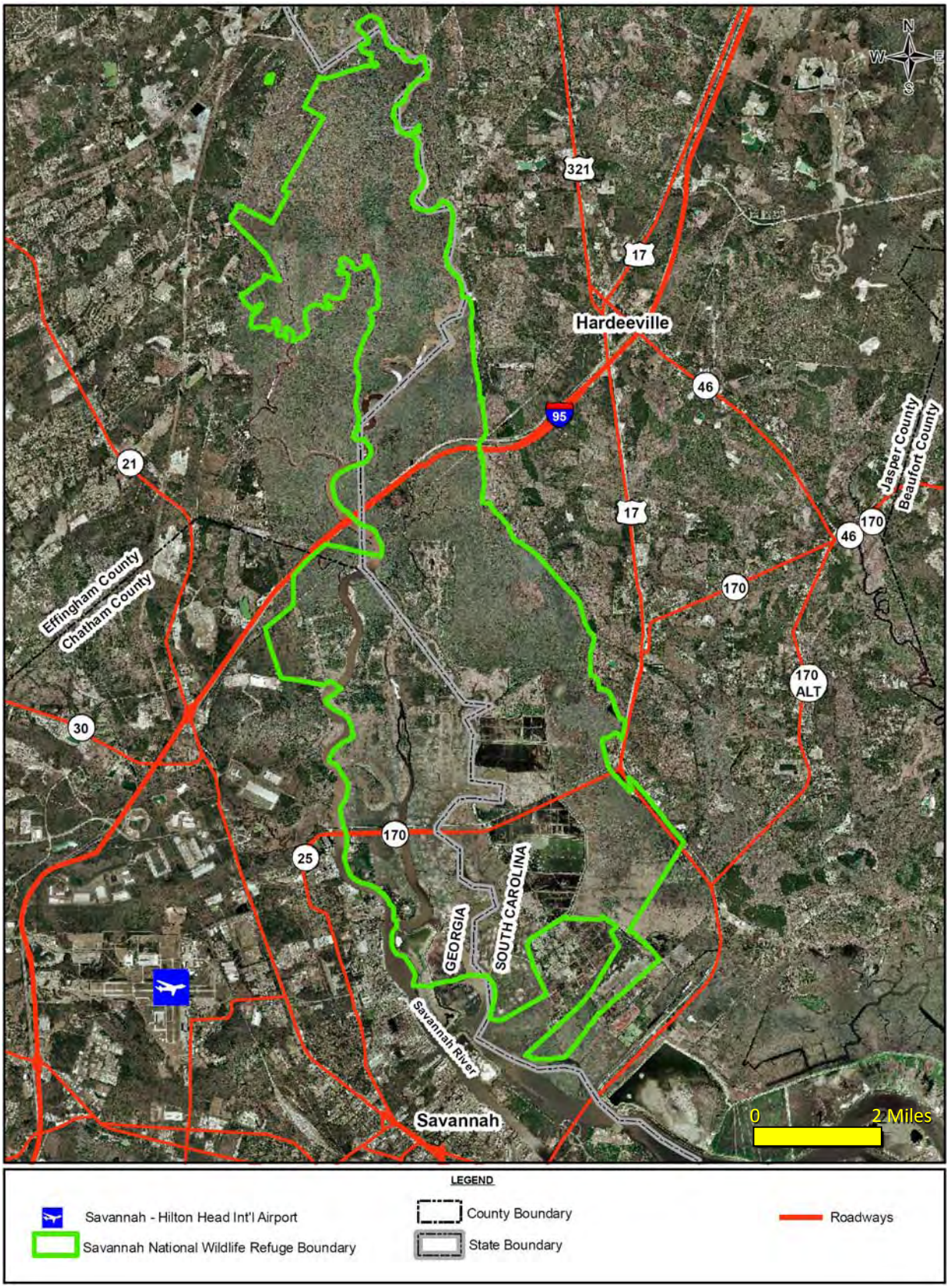


Figure 1.2: Location Map of the Savannah NWR

Figure 1.3: Location Map of the Pinckney Island NWR

1.3 Project Background and Purpose

Each refuge under the USFWS must complete a Comprehensive Conservation Plan (CCP) describing the future conditions at each refuge and establishing management direction based on a 15-year time horizon. The CCP includes a transportation planning component that identifies transportation enhancements that will provide efficient mobility for visitors and staff members of the refuges. The Transportation Study Report will serve as a resource to the CCP by reviewing internal roads, parking areas, and trails, in addition to the entrances and roadways providing access to the refuges. After reviewing the existing conditions and the traffic needs for the refuges, transportation improvements were recommended.

The following studies have been completed to date for the Savannah and Pinckney Island NWR and were used as resources to the Transportation Study. The engineering studies were primarily focused on USFWS maintained roadway infrastructure.

- *Engineering Study (Savannah NWR)* – Johnson, Mirmiran & Thompson (JMT), January 2005
- *Engineering Study (Pinckney Island NWR)* – JMT, January 2005
- *Savannah and Pinckney Island National Wildlife Refuges Road Safety Audit* – March 2008, VHB, Inc., FHWA, SCDOT, USFWS

1.4 Overview of Transportation Study

The Transportation Study Report reviews the internal roadways, entrances, access roads, parking areas, and trails of both the Savannah and Pinckney Island NWRs and provides short, medium, and long range recommendations for the transportation system. This document is a compilation of the four previously completed reports:

- Existing Conditions Report (June 2009)
- Traffic Needs and Safety Report (August 2009)
- Preliminary Candidate Alternatives Report (August 2009)
- Short and Long Range Improvement Plan Report (November 2009)

The comments received from the stakeholder and public meetings have been incorporated into the overall study and final recommendations.

2. Public Involvement

A public involvement plan (PIP) was created to outline the public and stakeholder involvement efforts for the study. The project stakeholder list and notes from the three stakeholder meetings are included in the **Appendix**.

2.1 Public Meetings

A kickoff meeting with the stakeholders was conducted on April 16, 2009 (**Figure 2.1**) to understand the significant transportation concerns at the refuges and establish available data for the project team. The Stakeholders were invited to the kickoff meeting to provide them with the purpose and scope of the study; to build consensus in defining the transportation issues, problems, challenges, and opportunities at the refuges; and to secure data that the stakeholders would have.

Figure 2.1: April 16, 2009 Stakeholder Kickoff Meeting

The first stakeholder and public meetings took place on September 3, 2009 (**Figure 2.2** and **Figure 2.3**). At these meetings, information from the Existing Conditions Report, Traffic Needs and Safety Report, and Preliminary Candidate Alternatives Report were presented. Comments received during these meetings were incorporated into the study's planning process.

The second stakeholder meeting was held on December 9, 2009 (**Figure 2.4**), and the Short and Long Range Improvement Plan Report and recommendations were presented. Comments received during this meeting were incorporated into the study's recommendations.

Figure 2.2: September 3, 2009 Stakeholders Meeting

Figure 2.3: September 3, 2009 Public Meeting

Figure 2.4: December 9, 2009 Stakeholders Meeting

3. Existing Conditions

Existing internal transportation conditions and external transportation systems providing access to the Savannah and Pinckney Island NWRs were reviewed as the first step of this study. This section identifies the findings of this review and presents the existing conditions.

3.1 Savannah NWR

3.1.1 Savannah NWR History

The Savannah NWR was established by Executive Order 4626 on April 6, 1927, in Jasper County, South Carolina, on 2,352 acres of land owned by the United States near the Savannah River. Originally called the Savannah River Bird Refuge, these lands were reserved for use by the Department of Agriculture as a preserve and breeding ground for native birds. The refuge was first renamed the Savannah River Wildlife Refuge, and later was renamed the Savannah NWR. Between 1927 and 2002, parcels were added to bring the refuge to its current size of 29,175 acres.

3.1.2 Regional Location

The Savannah NWR is on the border of Jasper County, South Carolina, and Chatham and Effingham Counties, Georgia. I-95 crosses northeast-southwest through the refuge and US 17, US 321, and SC 170 traverse through or near it.

3.1.3 Entrances to the Refuge

Currently, there is one public entrance to the Savannah NWR (**Figure 3.1**). This entrance, Laurel Hill Wildlife Drive (Wildlife Drive), is located on SC 170 east of the Georgia state line. Wildlife Drive is a one-way road that traverses an impoundment area of the refuge. Just off SC 170, inside the entrance, is a parking area with an informational kiosk where visitors can leave their cars to bike or walk within the refuge. However, to complete the loop back to their vehicle, visitors must walk or bike along SC 170 to return to the parking area. Visitors may also drive through the impoundment area.

Figure 3.1: Wildlife Drive Entrance and Sign

A second public entrance was added in the fall of 2009 for the future Visitors Center on US 17, south of SC 170. The Visitors Center will open in 2010.

All other entrances to the Savannah NWR are gated and are typically not accessible to the public by vehicle. However, there are small unmarked parking areas at some locations such as the Kingfisher area, the area across from the Wildlife Drive exit, and the Solomon Tract area, where visitors can park in an unmarked area and enter the refuge by foot. These are not posted as public access points. An example of this type of area across from the exit of Wildlife Drive is shown in **Figure 3.2.**

Figure 3.2: Unmarked Access Area Across from Wildlife Drive

Wayfinding to the refuge is posted on I-95 alerting visitors of the proper exit with additional wayfinding signs along US 17 and other access routes that direct visitors to the Wildlife Drive entrance. Traveling from Georgia along GA 25 and SC 170, there are signs that identify the refuge as shown in **Figure 3.3**. USFWS has performed and submitted a Wayfinding Inventory for the refuge to the South Carolina Department of Transportation (SCDOT) and the Georgia Department of Transportation (GDOT).

Figure 3.3: Wayfinding Signs on SC 170

3.1.4 Visitation Summary and Profile

Approximately 155,000 people visited the Savannah NWR through the Laurel Hill Wildlife Drive entrance in 2008. **Table 3.1** shows the number of visitors via the Wildlife Drive entrance over the past 10 years.

Table 3.1: Savannah NWR Visitation Summary

Year	Annual Visitors*
1999	153,787
2000	128,519
2001	134,459
2002	130,249
2003	154,373
2004	147,064
2005	154,981
2006	143,273
2007	144,996
2008	154,888

*Based on counts measured at Wildlife Drive gate counter and adjusted for staff vehicles and occupancy of visitor vehicles

3.1.5 Regional Transportation Conditions

3.1.5.1 Regional Roadway Infrastructure

The Savannah NWR is located just north of the City of Savannah. The public access areas are currently served by SC 170 and will be served by US 17 in the future. Both routes are rural in nature. The transportation network around these public areas serves as the regional transportation study area for this project.

SC 170 is a two-lane road with a posted speed limit of 55 mph, 12-foot lanes, and no paved shoulders (**Figure 3.4).** Partially paved shoulders occur periodically along the segment as pull-off areas. The

number of trucks is very high on this roadway as it serves the Port of Savannah and industrial plants along the Savannah River. Peak hour traffic counts show greater than 30% trucks. There are five bridges and one culvert crossing on SC 170 in the area of the refuge. All five bridges have sufficiency ratings below 50, which qualify them for federal funding for replacement. According to the *South Carolina Bridge Design Manual*, "The Sufficiency Rating formula is a method of evaluating highway bridge data by calculating several factors (structural adequacy, safety, serviceability, functional obsolescence, and special reductions) to obtain a numeric value that is indicative of the bridge's sufficiency to remain in service, and its funding eligibility. The result of the Sufficiency Rating formula is a percentage in which 100 is an entirely sufficient bridge and 0 is an entirely deficient bridge." The inspection reports for the five bridges with sufficiency ratings below 50 are including in the **Appendix**.

Figure 3.4: SC 170 at Wildlife Drive Entrance

Just east of the Savannah NWR public access, US 17 is a two-lane roadway with 12-foot lanes, no paved shoulders, and a posted speed limit of 55 mph. I-95 is north of this section of US 17 and to the City of Savannah, across the Talmadge Memorial Bridge, is to the south (**Figure 3.5** shows the new Visitors Center entrance on US 17.)

Figure 3.5: US 17 at new Visitors Center Entrance

3.1.5.2 Regional Traffic Volume Summary

Traffic volumes have been collected by SCDOT and GDOT in the study area for the Savannah NWR. **Table 3.2** shows the available average annual daily traffic (AADT) volumes from the past five years, where available.

Table 3.2: Historical Daily Traffic Volumes for Study Area Roadways

	Segment	2004 AADT	2005 AADT	2006 AADT	2007 AADT	2008 AADT
SC 170	Georgia State Line to US 17	2,900	3,800	4,400	4,500	5,200
US 17	SC 170 to Purrysburg Road	7,700	9,200	9,500	10,900	10,800
US 17	SC 170 Alt. to SC 170	5,400	5,600	6,000	5,800	6,300
GA 25	Coldstream Road to Appleby Road	3,380	3,230	3,580	5,950	-

Source: SCDOT, GDOT
Note: - Indicates data was not available

3.1.5.3 Area Transportation Mode Split

Mode split analysis identifies the transportation method (automobile, transit, walk or bike) people take in a defined geographic area, expressed as a percentage of trips. As the main public access areas for the Savannah NWR are in Jasper County, this county was used to determine mode split. Approximately 95% of trips in Jasper County were taken by automobile. Analyzing mode split helps determine the transportation demand characteristics of the local community. As the most congested time on roadways often corresponds with the traditional work day, modal split analysis is often conducted based on how people get to work. Journey-to-work data was obtained from the *2005 - 2007 American Community Survey* and compiled for Jasper County, summarized in **Table 3.3**. The *2005 - 2007 American Community Survey* 3-year estimates are based on the average between 2005 and 2007.

Table 3.3: Jasper County Mode Split	
Mode	**Percentage**
Automobile	94.61%
Transit	0.25%
Walk/Bike	1.64%
Other	2.14%
Work at Home	1.36%

Source: 2005-2007 *American Community Survey* 3-Year Estimates

The East Coast Greenway is generally conceptualized in this area to travel along US 17 into Savannah; however, no specific alignments have been established at this time.

3.1.5.4 Crash Summary

Based on the *Road Safety Audit* (2008), there were 74 crashes in the Savannah NWR study area for years 2004 to 2007; five along SC 170 and 69 along US 17. Along SC 170, 80% of the crashes were run-off road with the remaining crashes as rear-end crashes. Along US 17, 43% of the crashes were run-off road, 28% were angle crashes, and 19% were rear-end crashes. There were two fatalities along US 17.

3.1.5.5 Regional Development Patterns

The area around the Savannah NWR is a growing area with a proposed ocean terminal facility, the Jasper Ocean Terminal, and several other large planned developments just outside of the refuge. **Figure 3.6** shows the locations of the Riverport, Sherwood, Tetra, and Delta Bluffs developments. These projects will affect the transportation facilities in the study area.

The Jasper Ocean Terminal is a joint South Carolina and Georgia container port planned for the north side of the Savannah River on a little more than 1,500 acres of confined disposal facility (CDF). The planning for this project started in early 2009. Currently, the project is in the planning and preliminary engineering design phase of project development. It is planned that this port will be operational in 10 to 15 years.

Table 3.4 shows the 30-year build-out intensities for the planned developments in the area, based on the *Application to the South Carolina State Transportation Infrastructure Bank for the New Exit 3 on I-95 and Related Improvements* prepared by the City of Hardeeville/Jasper County in March 2009. Riverport, the largest of these developments, is a 5,137-acre mixed-use planned development. The main purpose of these developments is to serve the Jasper Ocean Terminal and the Port of Savannah needs.

Source: Figure 3, City of Hardeeville/Jasper County Application to the South Carolina Infrastructure Bank for the New Exit 3 on I-95 and Related Improvements, March 2009

Figure 3.6: Locations of Planned Development around Savannah NWR

Table 3.4: Development Intensities in Square Footage or Units (30-year build-out)				
Development	**Commercial (sf)**	**Office (sf)**	**Industrial (sf)**	**Residential (units)**
Riverport	3,000,000	500,000	15,535,000	9,814
Sherwood	4,650,865	588,949	0	1,269
Delta Bluffs	3,568,290	0	0	0
Total	**11,219,155**	**1,088,949**	**15,535,000**	**11,083**

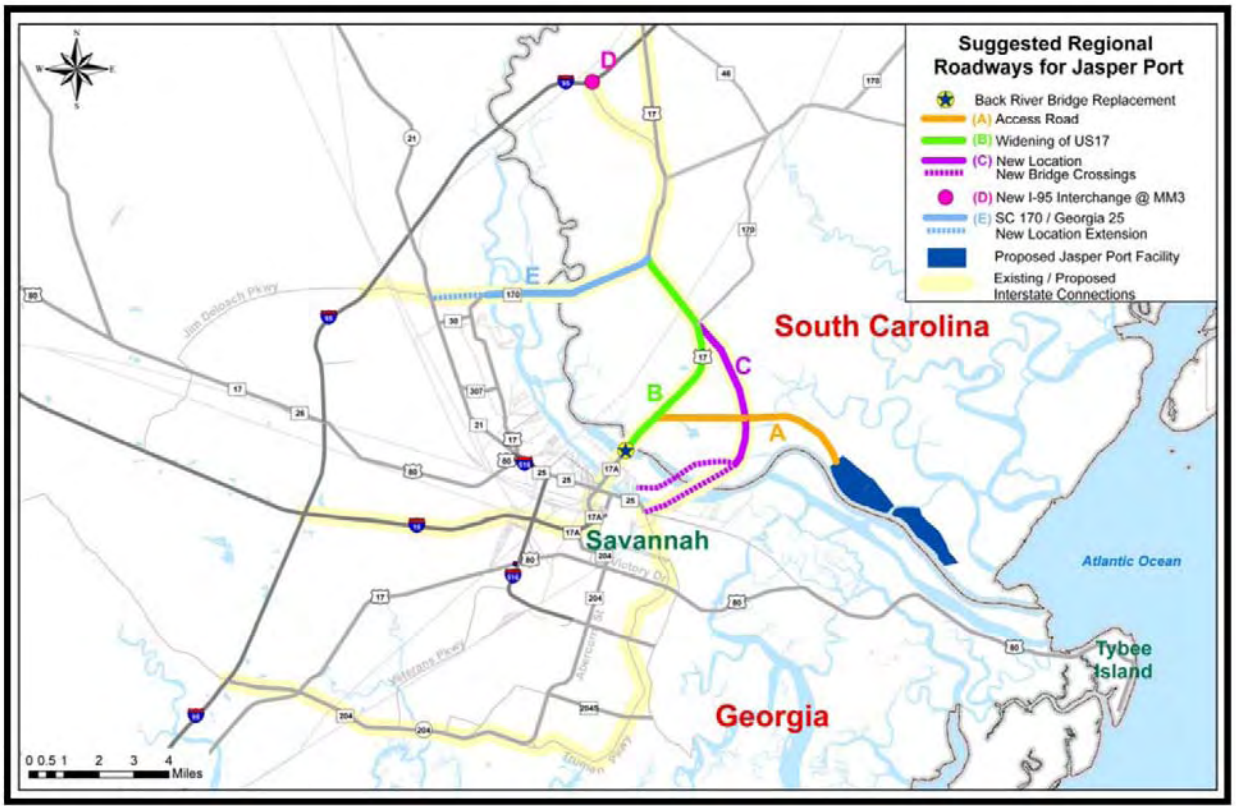
Source: Table 1, City of Hardeeville/Jasper County Application to the South Carolina Infrastructure Bank for the New Exit 3 on I-95 and Related Improvements, March 2009

3.1.5.6 Planned Area Transportation Improvement Projects

With the large amount of projected growth related to the Jasper Ocean Terminal and other planned developments, regional planning activities have been performed to initially identify potential improvements in this study area. GDOT is moving forward with the Back River bridge replacement and some preliminary studies have begun on widening US 17 in South Carolina, but the other projects listed below are not funded at this time.

- New roadway from SC 170 across the Savannah River to the Truman Parkway and downtown Savannah
- New I-95 interchange at Mile Marker 3 and the upgrade of Purrysburg Road
- Extension of SC 170/GA 25 to US 21

Figure 3.7 shows a map of these planned roadway improvements.



Source: Figure 5, City of Hardeeville/Jasper County Application to the South Carolina Infrastructure Bank for the New Exit 3 on I-95 and Related Improvements, March 2009

Figure 3.7: Suggested Regional Roadway Improvements

3.1.6 Refuge Transportation and Infrastructure

3.1.6.1 Vehicle Circulation, Parking, and Access

There are approximately 4 miles of public road along Wildlife Drive within the refuge. This roadway is also open to pedestrian and bicycle traffic. Access is regulated by a gate that is open during daylight hours. Beyond the entrance and initial paved parking area, Wildlife Drive becomes an approximately 4-mile one-way gravel roadway through the refuge with pull-off areas (**Figure 3.8**). The pull-off areas do not have delineated parking spaces. Generally, the internal roadway width ranges from 15 to 20 feet, with shoulders that are considered "poor" based on past engineering studies. These studies also noted that roadway signs within the refuge are generally installed in accordance with the *Manual of Uniform Traffic Control Devices* (MUTCD).

Figure 3.8: Wildlife Drive in the Savannah NWR

The parking area at the Wildlife Drive entrance, shown in **Figure 3.9**, has approximately eight delineated parking spaces but has other non-delineated parking areas for overflow parking.

Figure 3.9: Parking Area at Wildlife Drive

The entrance and exit gates on Wildlife Drive are shown in **Figure 3.10** and **Figure 3.11**.

Figure 3.10: Wildlife Drive Entrance

Figure 3.11: Wildlife Drive Exit

At the new Visitors Center **(Figure 3.12)** on US 17 there will be 23 general parking spaces and 4 handicap parking spaces for visitors. There also will be an overflow area for five additional vehicles if needed. The Visitors Center will open in 2010.

Figure 3.12: New Visitors Center will be Open in 2010

3.1.6.2 Traffic Volumes and Demand Characteristics

A counter is located at the gate at Wildlife Drive (**Figure 3.13**). This is an "eye" counter that counts anything that passes in front of the photocell.

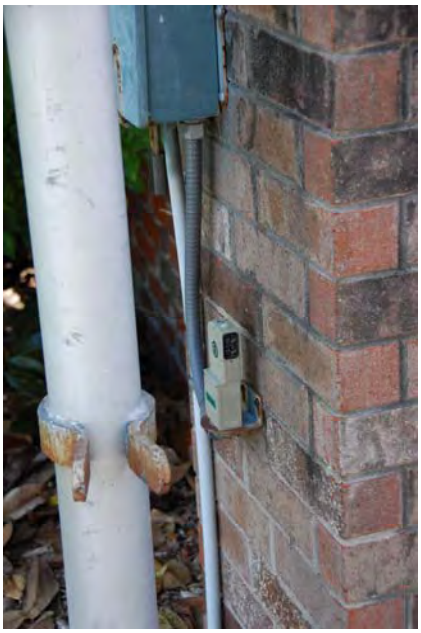


Figure 3.13: "Eye" Counter at Wildlife Drive Entrance

3.1.6.3 Visitor Activities

There are driving, bicycling, and walking activities available at Savannah NWR to experience wildlife observation and photography (**Figure 3.14**). The Visitors Center will provide opportunities for wildlife education and interpretation. Fishing is permitted in the freshwater pools based on South Carolina and refuge regulations. There are also deer, feral hog, squirrel, and turkey hunts held in the fall and winter.

Figure 3.14: Visitor Signage at Savannah NWR

3.1.6.4 Water Transportation Access

There are no public boat access points at the refuge; though boats that launch at other locations can access areas of the refuge. There are four nearby public boat ramps outside the refuge boundary: (1) Beck's Ferry near South Carolina state secondary road 170 (S-27-170), (2) Mill Stone Landing south of Church Road, (3) Abercorn Landing off Abercorn Creek, and (4) a public boat ramp west of Onslow Island off of GA 25.

3.1.6.5 Refuge Visitors Center and Office

A new Visitors Center located off US 17 (**Figure 3.12**) will open in the spring of 2010. This facility will provide an opportunity for wildlife interpretation and education programs. The Savannah Coastal Refuges Complex offices will also be housed at this location.

Just west of Wildlife Drive on the north side of SC 170 are the Complex maintenance facilities. This area is not open to the public.

3.1.7 Other Considerations

3.1.7.1 Community Features

Based on a review of parks, schools, places of worship, and civic buildings in the study area, no major community facilities were found in the immediate vicinity of the Savannah NWR. Port Wentworth, Georgia and Hardeeville, South Carolina both have elementary, middle, and high schools; civic buildings; and places of worship within approximately 5 and 10 miles, respectively, of the Wildlife Drive area of the refuge.

3.1.7.2 Demographic Profile of Study Area

The Savannah NWR is located in Jasper County, South Carolina and Chatham and Effingham Counties, Georgia. All three counties have grown over the past two decades, with Jasper County growing by over 33% and Effingham County growing by over 46% between 1990 and 2000. According to the *American Community Survey* estimates, all three counties have continued to grow between 2000 and 2007. The City of Hardeeville, SC grew by 13% and Garden City, GA grew by over 52% between 1990 and 2000. However, Chatham County, Savannah, and Port Wentworth (GA) experienced population declines during this same period.

Although population has declined in some municipalities, overall population in the study area is growing at a high rate. The refuge is not immune to the impacts growth creates on a community. Increased population growth results in increased demand on the surrounding transportation system as well as increased user demand at the refuges.

Table 3.5 shows the historic population figures in the counties and cities surrounding the refuges.

Table 3.5: Demographic Information for Counties and Municipalities in Study Area					
Jurisdiction	1990	2000	2005/2007 Estimate	% Change 1990-2000	% Change 2000-2005/2007 Estimate
Jasper County, SC	15,487	20,678	21,569	33.52%	4.31%
Hardeeville	1,583	1,793	N/A	13.27%	N/A
Chatham County, GA	216,953	232,048	244,296	6.96%	5.28%
Effingham County, GA	25,687	37,535	48,527	46.12%	29.28%
Savannah	137,560	131,510	127,526	-4.40%	-3.03%
Garden City	7,410	11,289	N/A	52.35%	N/A
Port Wentworth	4,012	3,276	N/A	-18.34%	N/A
Effingham County, GA	25,687	37,535	48,527	46.12%	29.28%

Source: 2000 U.S. Census; 2005-2007 *American Community Survey* 3-Year Estimates
Note: N/A = Not applicable

3.1.7.3 Environmental Justice Impacts

According to the U.S. Environmental Protection Agency (EPA):

"*Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. EPA has this goal for all communities and persons across this Nation. It will be achieved when everyone enjoys the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work*."

For this plan, poverty level, income, and race in counties and municipalities surrounding the refuge were analyzed.

Poverty

The Census uses income before taxes, not including capital gains or non-cash benefits (such as public housing, Medicaid, and food stamps), to define thresholds that vary based on family size and composition according to the Office of Management and Budget's (OMB) Statistical Policy Directive 14. The percentages of families and individuals below the poverty level nationwide are 9.8% and 13.30%, respectively. Both South Carolina and Georgia have poverty levels slightly higher than the national levels for both families and individuals. Jasper County (SC) and Chatham County (GA) exceed the respective state and national poverty level averages. Three of the cities that surround the refuges- Hardeeville (SC), Savannah (GA), and Garden City (GA) - also have poverty levels that significantly exceed state and national averages as described below.

Table 3.6 shows the percentage of families and individuals below the poverty level in the study area counties and municipalities. Effingham County (GA) has a poverty level lower than state and national poverty levels.

Table 3.6: Percentage of Families and Individuals Below the Poverty Level

	Families	Individuals
Jasper County, SC	14.9%	19.7%
Hardeeville	27.7%*	31.8%*
Chatham County, GA	11.1%	15.7%
Effingham County, GA	8.5%	10.0%
Savannah	16.5%	22.7%
Garden City	17.3%*	18.3%*
Port Wentworth	10.0%*	11.0%*
South Carolina	11.8%	15.6%
Georgia	11.1%	14.5%
U.S.	9.8%	13.3%

Source: 2005-2007 *American Community Survey* 3-year estimates

*Indicates 2005-2007 was not available; 2000 U.S. Census Bureau figures were used

Income

Median household incomes in South Carolina ($42,405) and Georgia ($48,540) exceed the national median household income of $41,994 based on U.S. Census data. Jasper County's median household income is $33,959, below both the state and national averages. Chatham and Effingham Counties exceed both the state and national median household incomes. Hardeeville's median household income is $28,977, 32% below the state average. Garden City and Savannah, Georgia, have median household incomes 39% and 33% below the state average, respectively.

Detailed information on income can be found in the **Appendix**.

Race

Blacks or African Americans comprise the largest component of the population in Jasper County, South Carolina, and Savannah, Georgia. Jasper County has 49.1% Blacks or African Americans, with Whites making up the second largest race category at 41.3%. Savannah is comprised of 58.2% Blacks or African Americans, well above the state average of 30% and the national average of 12%. Although not the majority, Blacks or African Americans comprise a significant portion of the population and are higher than their respective state averages in Hardeeville (SC), Chatham County (GA), and Garden City (GA) as well. No other race categories made up a significant percentage of the population in the study area.

Detailed information on race can be seen in the **Appendix**.

3.1.7.4 Air Quality

The Savannah NWR is located partially within three counties, Jasper County, South Carolina, and Chatham and Effingham Counties, Georgia. All three of these counties are currently in attainment for all of the National Ambient Air Quality Standards (NAAQS) criteria pollutants.

3.1.7.5 Habitat

The Savannah NWR is comprised of a variety of habitats, including bottomland hardwood forest, palustrine, estuarine, and riverine wetlands, managed freshwater impoundments, hardwood hammocks, hardwood forests, mixed hardwood forests, pines, and grassland fields.

These habitats are home to a large variety of wildlife including deer, hogs, turkey, squirrels, turtles, ducks, geese, wading birds, and shorebirds. The refuge also provides nesting areas for several species of birds including wood ducks, great horned owls, osprey, and swallow-tailed kites. Additionally, the Savannah NWR is home to three threatened species - the American alligator, bald eagle, and the Flatwoods salamander - and three endangered species - the shortnose sturgeon, West Indian manatee, and wood stork.

3.1.7.6 Floodplains

Figure 3.15 shows the FEMA 100-year floodplains in and around the Savannah NWR. Almost the entire refuge is located within the 100-year floodplain.

3.1.7.7 Wetlands

Figure 3.16 shows the location of wetlands in the Savannah NWR. Wetlands are found throughout the refuge and in scattered areas surrounding the refuge. Types of wetlands found in the refuge include estuarine and marine deepwater, estuarine and marine, freshwater emergent, freshwater forested/shrub, and freshwater pond.

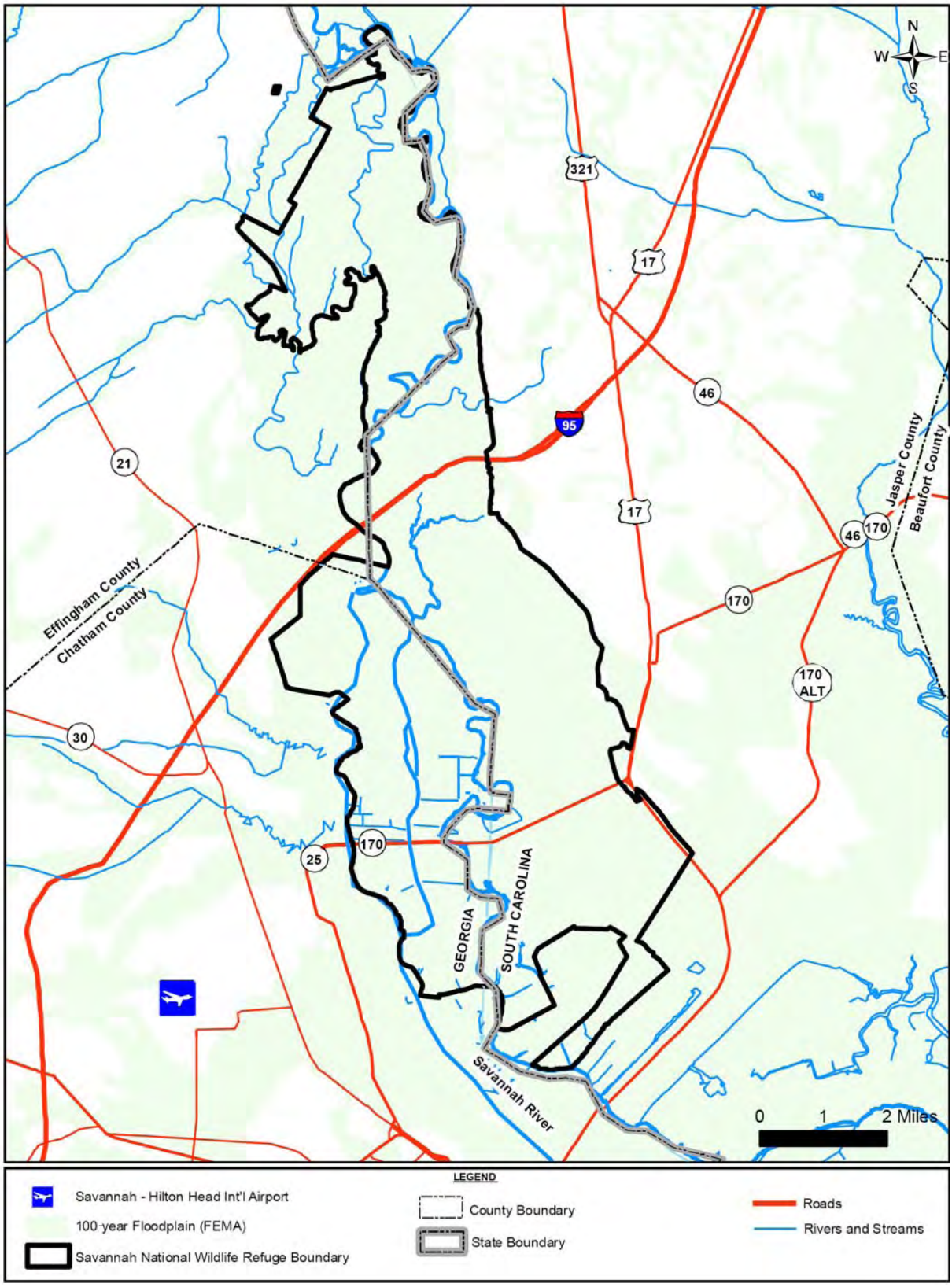


Figure 3.15: Savannah NWR Floodplains

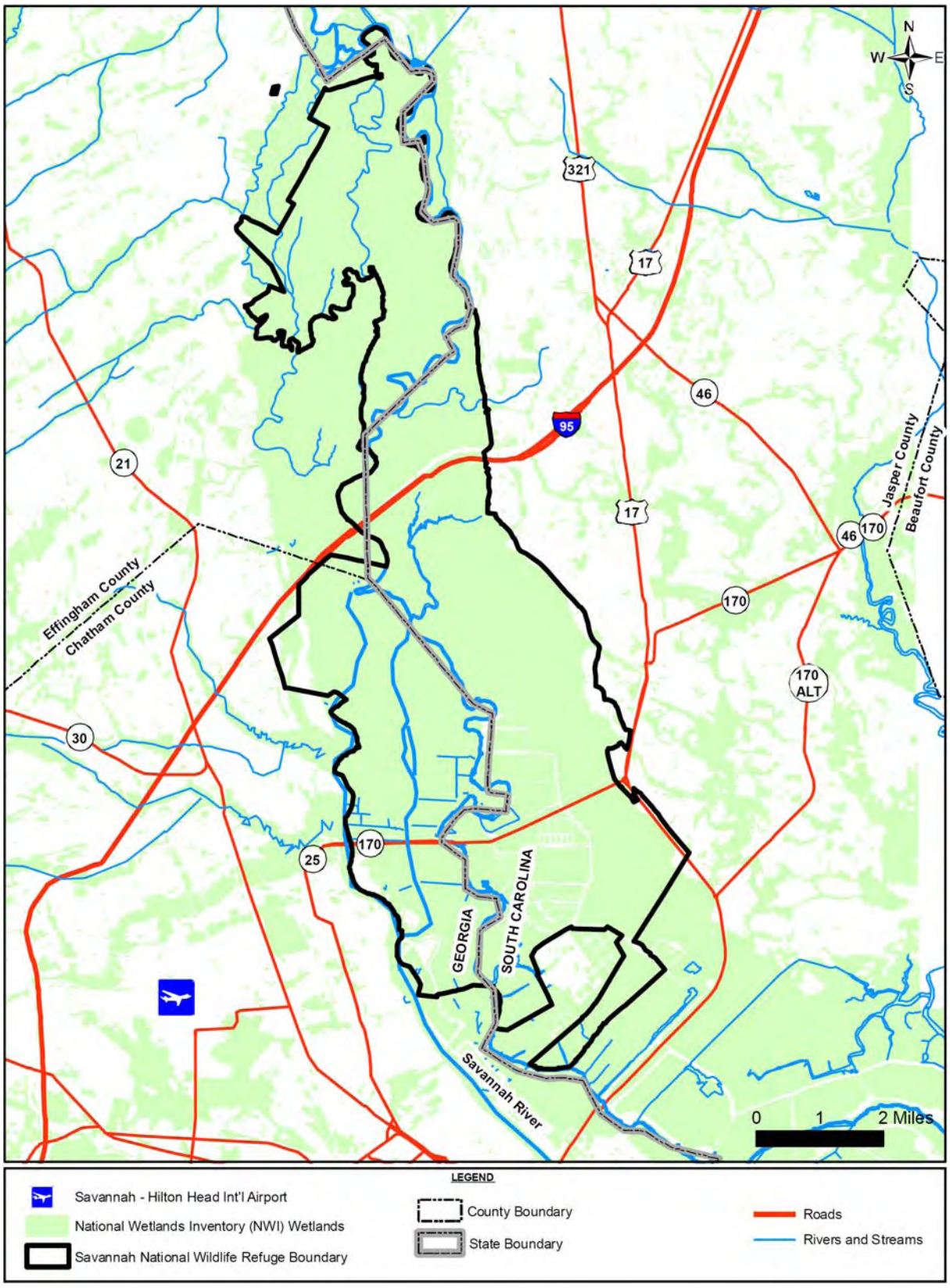


Figure 3.16: Savannah NWR Wetlands

3.1.7.8 Cultural Resources

The Savannah NWR is located on areas of past rice planting activity and includes portions of 13 former rice plantations, 10 of which are located in South Carolina. The former location of the Laurel Hill Plantation house is just off Wildlife Drive (**Figure 3.17**). Old levees formerly used in rice cultivation form the current impoundment structures in the refuge. There are 36 located and inventoried historic and prehistoric archeological sites within the refuge.

Figure 3.17: Laurel Hill Plantation Plaque

3.2 Pinckney Island NWR

Pinckney Island NWR comprises an area of 4,053 acres and includes five islands (Pinckney, Corn, Big Harry, Little Harry, and Buzzard Islands). Pinckney Island is the only island open to the public. Approximately 67% of the refuge is salt marsh and tidal creeks.

3.2.1 Pinckney Island NWR History

The refuge is named after Major General Charles Cotesworth Pinckney, who was a signer of the U.S. Constitution. The land within the refuge was originally the Pinckney family plantation, which was sold in the 1930s and developed into a hunting preserve. In 1975, the islands were donated to the U.S. Fish and Wildlife Service to be managed exclusively as a National Wildlife Refuge and as a nature and forest preserve for aesthetic and conservation purposes. The islands show only a few traces of the original plantation.

3.2.2 Regional Location

Pinckney Island NWR is in Beaufort County, South Carolina, between the Towns of Bluffton and Hilton Head Island. The main refuge area is north of US 278 with a very small portion (Last End Point) south of US 278.

3.2.3 Entrances to the Refuge

There is one public entrance to Pinckney Island NWR shown in **Figure 3.18**. This area is open from sunrise to sunset.

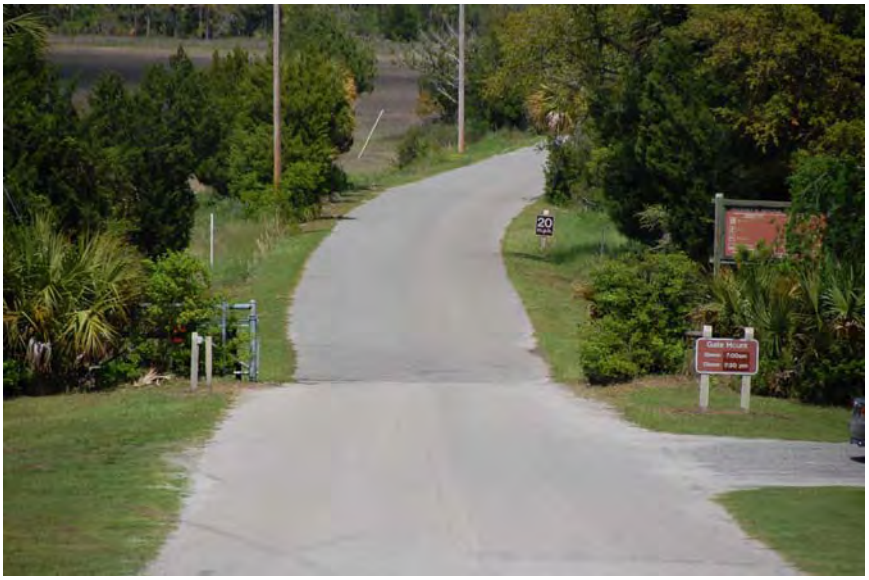


Figure 3.18: Entrance to the Pinckney Island NWR

Wayfinding to the refuge is posted on I-95 alerting visitors of the proper exit. Additional wayfinding signs along US 278 direct visitors to the Pinckney Island NWR entrance (**Figure 3.19**). USFWS has performed and submitted a wayfinding inventory and recommendations for the refuge to SCDOT.

Figure 3.19: Wayfinding on US 278

3.2.4 Visitation Summary and Profile

Approximately 124,000 people visited Pinckney Island NWR in 2008. **Table 3.7** shows the number of visitors for the past 10 years.

Table 3.7: Pinckney Island NWR Visitation Summary

Year	Annual Visitors*
1999	110,628
2000	97,522
2001	118,483
2002	97,562
2003	147,390
2004	351,382
2005	208,790
2006	174,650
2007	114,869
2008	123,677

*Based on counts measured at the gate and adjusted for staff vehicles and occupancy of visitor vehicles.

3.2.5 Regional Transportation Conditions

3.2.5.1 Regional Roadway Infrastructure

Pinckney Island NWR is located just west of Hilton Head Island and has one access point on US 278. US 278 around the refuge entrance was considered the regional transportation study area for this project.

US 278 is a four-lane divided roadway and is the only roadway accessing Hilton Head Island (**Figure 3.20**). The posted speed limit is 55 mph by the refuge entrance. The posted speed limit in Bluffton is 45 mph west of the refuge and 50 mph east of the refuge in Hilton Head. There is a full median opening at the Pinckney Island NWR (**Figure 3.21**). The closest traffic signals to the Pinckney Island NWR are at Squire Pope Road approximately 2 miles east at Hilton Head Island and Moss Creek/Buckingham Plantation Drive approximately 1.5 miles west in Bluffton. US 278 has existing right- and left-turn lanes to access the refuge. The eastbound right-turn lane is 210 feet long; the westbound right-turn lane is 130 feet long. The eastbound left-turn lane is approximately 300 feet long; the westbound left-turn lane is approximately 225 feet long.

There are two sets of large bridges on US 278 in the area of the refuge with individual spans for each direction of traffic. The bridges to the west cross Mackay's Creek, while the bridges to the east cross Skull Creek, which is part of the Intracoastal Waterway. All four spans have sufficiency ratings above 50 with three of them rated above 90. As stated earlier, "the result of the Sufficiency Rating formula is a percentage, where 100 is an entirely sufficient bridge and 0 is an entirely deficient bridge."

Figure 3.20: US 278 at the Entrance to Pinckney Island NWR

Figure 3.21: Full Median Opening at Pinckney Island NWR

3.2.5.2 Regional Traffic Volume Summary

Traffic volumes have been collected by SCDOT along US 278 in Bluffton. **Table 3.8** shows the AADT volumes from the past 5 years.

Table 3.8: Historical Daily Traffic Volumes for the Study Area Roadway						
	Segment	**2004 AADT**	**2005 AADT**	**2006 AADT**	**2007 AADT**	**2008 AADT**
US 278	SC 46 to just west of Pinckney Island	54,900	55,400	56,800	60,000	57,800

Source: SCDOT

3.2.5.3 Area Transportation Mode Split

Mode split analysis identifies the transportation method (automobile, transit, walk or bike) people take in a defined geographic area expressed as a percentage of trips. Approximately 89% of trips in Beaufort County, South Carolina were taken by automobile. Analyzing mode split helps determine the transportation demand characteristics of the local community. As the most congested time on roadways often corresponds with the traditional work day, modal split analysis is often conducted based on how people get to work. Journey-to-work data was obtained from the *2005-2007 American Community Survey* compiled for Beaufort County. A summary of the results is shown in **Table 3.9**.

Table 3.9: Beaufort County Mode Split	
Mode	**Percentage**
Automobile	89.21%
Transit	0.44%
Walk/Bike	2.66%
Other	2.03%
Work at Home	5.66%

Source: 2005-2007 *American Community Survey* 3-Year Estimates

The Town of Bluffton, the Town of Hilton Head Island, and the Greater Bluffton Pathways organization have pathways plans for the study area. Greater Bluffton Pathways is an advocacy group that works with residents and local officials to enhance pathways in the greater Bluffton area. There are future plans for pathways along US 278 from the Jasper County line to the Hilton Head Island bridges but no pathways are funded at this time. Hilton Head Island currently has a pathway along US 278 that ends at Green Shell Park just west of Squire Pope Road.

3.2.5.4 Crash Summary

Based on the *Road Safety Audit* (2008), there were 166 crashes in the Pinckney Island NWR study area, for years 2004 through 2007, along US 278. Fifty percent of these were rear-ends, 25% were run-off road, and the rest were sideswipe or angle crashes.

3.2.5.5 Planned Area Transportation Improvement Projects

Beaufort County has a large transportation project in the design and construction phase that will help relieve traffic on US 278. At build-out, Bluffton Parkway will run parallel to US 278 from SC 170 to just west of the Hilton Head Island bridges at approximately Fording Island Road Extension. This tie-in is located approximately 1 mile west of the entrance to the Pinckney Island NWR. The traffic projections for Bluffton Parkway in this area are 21,590 vehicles in 2008 and 39,387 vehicles in 2028 with 5% trucks.

As US 278 is the only access point to Hilton Head Island, there are discussions from time to time on either building another bridge or widening the current bridges to six lanes. At this time, both of these ideas have economic and/or political constraints and are not expected to be completed by the 15-year, long term time frame for the CCP.

3.2.5.6 Regional Development Patterns

This area of Beaufort County continues to grow and US 278 continues to become increasingly congested. As stated previously, US 278 is the only access point to Hilton Head Island; therefore, it is expected that traffic in front of the refuge will continue to be heavy and congested, especially during peak hours.

3.2.6 Refuge Transportation and Infrastructure

Pinckney Island NWR is not staffed by USFWS. A short public access road terminates in a parking area where visitors park to use the approximately 14 miles of trails on the refuge, including nine named trails.

3.2.6.1 Vehicle Circulation, Parking, and Access

There is one gate-controlled access point where visitors enter the Pinckney Island NWR, with approximately a one-half mile of public road that leads to the parking area. The access road to the parking area has some pull-off locations, but no delineated parking spaces. It is also open to pedestrian and bicycle traffic. This entrance roadway and the subsequent parking area have paved surfaces, with the remaining roadways consisting of gravel surfaces. The entrance roadway is approximately 24 feet wide. Based on previous studies, it was determined that installed signs generally meet guidelines established in the MUTCD.

Once in the parking area (**Figure 3.22**), the remaining refuge area may be only accessed by foot, bicycle, or USFWS vehicles. Public vehicles are not permitted throughout the refuge.

Figure 3.22: Parking Area at Pinckney Island NWR

3.2.6.2 Traffic Volumes and Demand Characteristics

A gate similar to the one at the Savannah NWR is located at the Pinckney Island NWR entrance/exit to count vehicles entering the refuge.

3.2.6.3 Visitor Activities

Visitors can walk or bike along the trails past the parking area. Based on refuge documentation, common activities include wildlife observation and wildlife photography. **Figure 3.23** shows the information kiosk in the parking area.

Figure 3.23: Information Kiosk at Pinckney Island NWR

A one-day deer hunt is scheduled, when necessary, for wildlife management purposes.

3.2.6.4 Water Transportation Access

There is no authorized public access to the refuge from the water.

Beaufort County operates the C.C. Haigh, Jr. Boat Landing on the south side of US 278 on leased USFWS land (**Figure 3.24**). This is the only activity on the refuge south of US 278 (Last End Point).

Figure 3.24: Beaufort County Boat Landing

There are two other boat landings in the vicinity of the refuge: Buckingham Boat Landing on the mainland and the Jenkins Island dock on Hilton Head Island.

3.2.7 Other Considerations

3.2.7.1 Community Features

A review of parks, schools, places of worship, and civic buildings immediately around the study area for the Pinckney Island NWR was performed. The closest schools to this area are the Hilton Head Island Primary, Middle, and High Schools, located approximately 3 miles east of the Pinckney Island NWR. Michael C. Riley Elementary School is located approximately 4 miles west of the refuge. Civic buildings for the Towns of Bluffton and Hilton Head Island are both approximately 5 miles east and west, respectively, from the refuge.

3.2.7.2 Demographic Profile of Study Area

The Pinckney Island NWR is located in Beaufort County, South Carolina, near the Towns of Bluffton and Hilton Head Island. Beaufort County has grown over the past two decades, experiencing almost 40% growth from 1990 to 2000 and continuing to grow between 2000 and 2007, based on U.S. Census estimates. Within Beaufort County, Bluffton grew by almost 73% between 1990 and 2000 and Hilton Head Island by close to 43% from 2000 to 2007.

The refuge is not immune to the impacts growth creates on a community. Increased population growth results in increased demand on the surrounding transportation system as well as increased user demand at the refuges. Analyzing the transportation network in and around the refuges ensures that the USFWS can provide acceptable levels of mobility, operation, and safety.

Table 3.10 shows the population figures in the counties and cities surrounding the refuges.

Table 3.10: Demographic Information for Counties and Municipalities in the Pinckney Island NWR Study Area

Jurisdiction	1990	2000	2005/2007 Estimate	% Change 1990-2000	% Change 2000-2005/2007 Estimate
Beaufort County, SC	86,425	120,937	143,421	39.93%	18.59%
Bluffton	738	1,275	N/A	72.76%	N/A
Hilton Head Island	23,694	33,862	36,248	42.91%	7.05%

Source: 2000 U.S. Census; 2005-2007 *American Community Survey* 3-Year Estimates
Note: N/A = Not applicable

3.2.7.3 Environmental Justice Impacts

According to the U.S. EPA:

"*Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. EPA has this goal for all communities and persons across this Nation. It will be achieved when everyone enjoys the same degree of protection from environmental and health hazards and equal access to the decision-making process to have a healthy environment in which to live, learn, and work*."

For this plan, poverty level, income, and race in counties and municipalities surrounding the Pinckney Island NWR were analyzed.

Poverty

The percentages of families and individuals below the poverty level nationwide are 9.8% and 13.30%, respectively. South Carolina has poverty levels slightly higher than the national levels for both families and individuals. Beaufort County poverty levels are lower than state and national poverty levels at 8.7% and 11.3% for families and individuals, respectively. Bluffton and Hilton Head Island poverty levels are lower than the state and national averages as described below.

Table 3.11 shows the percentage of families and individuals below the poverty level in the study area county and municipalities.

Table 3.11: Percentage of Families and Individuals Below the Poverty Level		
	Families	**Individuals**
Beaufort County, SC	8.7%	11.3%
Bluffton	8.6%*	12.6%*
Hilton Head Island	6.2%	9.6%
South Carolina	11.8%	15.6%
U.S.	9.8%	13.3%

Source: 2005-2007 *American Community Survey* 3-year Estimates
Note: *Indicates 2005-2007 was not available; 2000 U.S. Census Bureau figures were used

Income

The median household income in South Carolina ($42,405) exceeds the national median household income of $41,994 based on U.S. Census data. The median household income in Beaufort County was $52,595, $48,611 in Bluffton, and $65,214 in Hilton Head Island.

Detailed information on income is provided in the **Appendix**.

Race

Whites make up the largest race category in Beaufort County at 75.3%. Blacks or African Americans comprise 21.8% of the population. The state average of Blacks or African Americans is 29.2%, and the national average is 12.32%. Although not the majority, Blacks or African Americans comprise a significant portion of the population in Bluffton. No other race categories make up a significant percentage of the population in the study area.

The historical Black and African American culture on Hilton Head Island is significant; the Gullah culture dates back to 1500's when Africans were brought to the Carolina Colony. Hilton Head Island is a historic area where people settled through the years and families still remain.

Detailed information on race is provided in the **Appendix**.

3.2.7.4 Air Quality

The Pinckney Island NWR is located in Beaufort County, South Carolina, which is currently in attainment for all of the National Ambient Air Quality Standards (NAAQS) criteria pollutants.

3.2.7.5 Habitat

The Pinckney Island NWR is comprised primarily of interior coastal islands, separated by salt marsh and tidal creeks. Other habitats found on the refuge include mixed hardwood forests, bottomland hardwood forests, longleaf pine woodlands, brush, grassland, fallow fields, and freshwater ponds.

A wide variety of wildlife species are found on the refuge, including white-tailed deer, bobcat, raccoon, opossum, eastern grey and fox squirrels, river otter, red fox, and several species of snakes. Additionally, the refuge is home to three threatened species - the American alligator, bald eagle, and the Flatwoods salamander - and one endangered species - the wood stork.

3.2.7.6 Floodplains

Figure 3.25 shows the FEMA 100-year floodplains in and around the Pinckney Island NWR. The refuge is located within the 100-year floodplain as well as areas surrounding Port Royal Sound, Mackay's Creek, Skull Creek, and the May River.

3.2.7.7 Wetlands

Figure 3.26 shows the location of wetlands in the Pinckney Island NWR. Large areas of wetlands are found throughout the refuge and surrounding all waterways in proximity to the refuge. Types of wetlands found in the refuge include estuarine and marine deepwater, estuarine and marine, freshwater emergent, freshwater forested/shrub, and freshwater pond.

Figure 3.25: Pinckney NWR Floodplains

Figure 3.26: Pinckney Island NWR Wetlands

3.2.7.8 Cultural Resources

Pinckney Island NWR (**Figure 3.27**) has 115 prehistoric and historic sites with human occupation as early as the Archaic Period (8000 BC – 1000 BC). Small-scale temporary settlements occurred until the 16th and 17th centuries when, in 1708, the island was permanently inhabited by Alexander MacKay. The lands were then sold to the Pinckney family who developed a plantation on the property. The island was later occupied by Union troops in the Civil War. In 1937, it was developed as a hunting preserve and donated to USFWS in 1975.

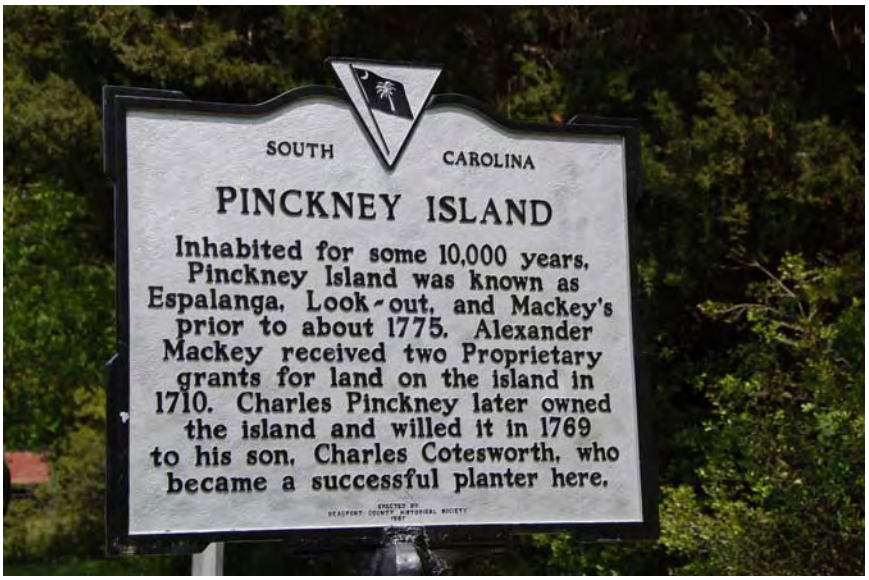


Figure 3.27: Historical Information Sign at Pinckney Island NWR

4. Traffic Needs and Safety

This section documents the potential needs for future transportation infrastructure improvements at major roads and other regional transportation facilities adjacent to or providing access to the refuges and their internal infrastructure.

4.1 Savannah NWR

4.1.1 Future Traffic

Traffic volumes for the roadways providing access to the Savannah NWR are expected to increase based on population growth and future development in the area. To determine projected future volumes, the following area traffic models were used: the Chatham-Effingham Model (base year 2001, future year 2025) and the Low Country Council of Governments Model (base year 2004, future year 2025).

Interpolation was used between the base and future years to determine modeled short, medium, and long range conditions. Based on a review of these models, the traffic volumes for the study area did not fully account for the recent growth and planned development in the area. The 2008 modeled volumes were significantly lower than 2008 actual measured volumes. For the analysis, the modeled traffic volumes for short, medium, and long range conditions were further adjusted by the percent difference between the 2008 modeled and 2008 actual conditions (year 2007 for GA 25 from Coldstream Road to Appleby Road). The resulting existing and projected daily traffic volumes are shown in **Table 4.1**.

Table 4.1: Existing and Projected Daily Traffic Volumes for Study Area Roadways

	Segment	2008 AADT	2014 AADT	2019 AADT	2024 AADT
SC 170	Georgia State Line to US 17	5,200	5,600	5,900	6,100
US 17	SC 170 to Purrysburg Road	10,800	11,200	13,000	14,000
US 17	SC 170 Alt to SC 170	6,300	7,300	8,100	8,900
GA 25	Coldstream Road to Appleby Road.	5,950*	7,100	7,900	8,700

Notes: AADT = Annual Average Daily Traffic
2008 AADT count collected by SCDOT
*Indicates 2007 AADT count collected by GDOT

Not all potential future development described in Section 3 will be implemented during the time frame for this study and future analysis for these projects has not been completed at this time. Projections from existing models for the short and medium range conditions reflect good estimates of future traffic. Long range projections for year 2024 traffic volumes may be somewhat low, but are within reasonable magnitude.

4.1.2 Traffic Operations and Needs

4.1.2.1 Future Roadway Analysis

The study area roadways were analyzed using a daily traffic volume level of service (LOS). The grades for LOS range from A through F and are based on average vehicle delay. LOS D is the typical target threshold during the peak hours of the day. LOS E and F represent near failing and failing conditions, respectively.

The Florida Department of Transportation (FDOT) has created a tool to help analyze planning-level traffic volumes, known as *Generalized Level of Service Tables (2007)*. These tables are based on *Highway Capacity Manual* definitions and methodologies and allow users to determine planning level LOS based on the specific roadway conditions of the corridor. **Table 4.2** shows projected LOS for short, medium, and long range conditions.

Table 4.2: Existing and Projected Level of Service for Study Area Roadways

	Segment	2008 Existing	2014 Short Range	2019 Medium Range	2024 Long Range
SC 170	Georgia State Line to US 17	B	B	B	B
US 17	SC 170 to Purrysburg Road	A	A	A	A
US 17	SC 170 Alt to SC 170	B	B	B	C
GA 25	Coldstream Road to Appleby Road.	B*	B	B	C

Source: FDOT's *Generalized Level of Service Table*s, Table 4-2 - Transitioning into Urbanized Areas or Areas over 5,000 not in Urbanized Areas, Uninterrupted Flow Highways

Notes: Existing LOS were determined from 2008 AADT counts collected by SCDOT.
*Indicates existing LOS was determined from 2007 AADT counts collected by GDOT.

Based on the results of the analysis, all study area roadways are projected to operate acceptably in future years. It should be noted that as the planned development comes online, these LOS may deteriorate quickly.

4.1.2.2 Roadway Conditions

SC 170 is currently a two-lane road with a posted speed limit of 55 mph, 12-foot lanes, and partially paved shoulders located periodically along the roadway as pull-off areas. Pavement conditions are generally fair (bordering on poor in some areas), with some pavement rutting and fading pavement markings. Just east of the Savannah NWR, US 17 is a two-lane roadway with 12-foot lanes, no paved shoulders, and a speed limit of 55 mph.

The *Road Safety Audit* (2008) reviewed the existing conditions of roads providing access to the refuge and identified that the lane markings have poor visibility at night. This deficiency should be addressed during the next painting or resurfacing project on US 17 or SC 170 with restriping at the standard retroreflectivity. The clear zone also should continue to be maintained where possible.

Within the refuge, routine maintenance to re-grade and add gravel to the unpaved road surface should be performed periodically to maintain the quality of the road.

4.1.2.3 Sight Distance at Refuge Entrance/Exit Locations

Sight distance exiting the USFWS Maintenance Entrance on SC 170 was measured to be approximately 530 feet to the left and identified as having no issues to the right. The recommended sight distance for the design speed of 55 mph is 610 feet, as indicated in *A Policy on Geometric Design of Highways and Streets* (2004). By trimming the excess vegetation in this area, the sight distance would improve to approximately the recommended distance.

At Wildlife Drive, a field review identified no issues with the existing sight distance.

4.1.2.4 Shoulder Widths

SC 170 has either no shoulders or only periodic ones serving as pull-off areas. Additional width for roadway shoulders is constrained by the adjacent impoundment areas along much of SC 170 in the study area. During the next resurfacing project, shoulders should be installed where feasible.

4.1.2.5 Bridge Conditions

Five bridges on SC 170 within the study area had sufficiency ratings below 50, qualifying them for federal replacement funding and consideration by SCDOT for bridge replacement. As indicated from the inspection reports (**Appendix**) for these bridges, four of the five are structurally deficient and the remaining bridge is functionally obsolete. The five bridges are currently not being considered for replacement or posting of weight limit restrictions.

4.1.2.6 Speeds

The posted speed limit for SC 170 by the refuge entrance is 55 mph. Many vehicles, including trucks, appear to be exceeding this speed limit. Speeding could be controlled somewhat by a greater law enforcement presence in the corridor. Traffic calming measures (such as speed tables) are not recommended due to the roadway's classification, high traffic volumes, high truck percentages, and high design speed along this roadway; however, other measures such as signs, pavement markings, and intelligent transportation systems (ITS) (including variable speed signs, highway advisory message signs with a flashing beacons, and vehicle entering highway signs), may encourage slower speeds. A speed study should be conducted to review speeds near the refuge. Based on the results of the speed study, a reduction in the speed limit may be considered.

4.1.2.7 Turn Lanes

Turn lanes are desirable for roads with substantial traffic volumes and/or higher speeds to help reduce the number of rear-end crashes. Due to the high travel speeds on SC 170, a westbound left-turn lane at the Wildlife Drive entrance would enable drivers to turn more safely into the refuge, thereby reducing the potential for rear-end crashes. Based on the *SCDOT Highway Design Manual* (2009), the recommended distance for a left-turn lane (including taper and storage) is 425 feet. The existing right-turn lane is approximately 150 feet, which is less than the recommended distance of 325 feet (including taper and storage) **Figure 4.1** shows the existing right-turn lane outside the Wildlife Drive Entrance.

Figure 4.1: SC 170 West of Wildlife Drive Entrance

A northbound left-turn lane and southbound right-turn lane have been completed at the Visitors Center on US 17, as shown in **Figure 4.2**. No additional improvements at this location are recommended.

Figure 4.2: Turn Lanes on US 17 for the Visitors Center

4.1.2.8 Truck Volumes

Trucks comprise over 30% of traffic on SC 170 and over 14% of traffic on US 17 during the PM peak hour. These percentages are expected to increase on both facilities throughout the day based on planned future developments, including the proposed Jasper Ocean Terminal, where it is likely a majority of the trucks accessing the terminal will use US 17.

4.1.2.9 Wayfinding

Based on the USFWS *Wayfinding Inventory* (2009) and project team field visits, several wayfinding signs will need to be replaced and/or updated through coordination with SCDOT and GDOT.

- Three wayfinding signs on I-95 in Georgia should be replaced.
- A damaged sign (**Figure 4.3**) on eastbound SC 170 before the Wildlife Drive entrance should be replaced.
- Wayfinding signs will need to be updated to direct drivers to the new Visitors Center.

Based on the *Road Safety Audit* (2008), wayfinding signs have poor visibility at night. When signs are replaced, they should be brown in color, with upper and lowercase letters and retroreflectivity in conformance with the *Manual on Uniform Traffic Control Devices* (MUTCD, 2009).

Figure 4.3: Damaged Wayfinding Sign on SC 170

4.1.2.10 Parking

Based on projected future traffic on roadways adjacent to the refuge and the addition of new refuge facilities, a considerable increase in refuge visitation is expected. The increase in visitors may result in potential parking issues during peak times, so additional overflow parking areas should be identified at the Wildlife Drive entrance and the new Visitors Center so that visitors park in areas acceptable to the USFWS.

4.1.2.11 Transit

Currently, no future transit operations are planned to or within the refuge. Coordination with the Chatham Area Transit (CAT) and Savannah Area Chamber of Commerce should be ongoing, gauging the interest in transit service to the Visitors Center.

A shuttle service also could be implemented that would operate between the new Visitors Center and the Wildlife Drive area if demand materializes.

4.1.2.12 Pedestrians and Bicyclists

Ideally, visitors should feel comfortable biking or walking to or within the refuge. Currently, Jasper County has no plans for regional pedestrian/bicycle routes on SC 170 or US 17. Opportunities for bike lanes and sidewalks should be further investigated as part of any plans to widen US 17 and SC 170.

The East Coast Greenway (ECG), a designated route for pedestrians and bicyclists to travel along the East Coast, is conceptually planned to travel along US 17 past the new Visitors Center location. The refuge should coordinate with the ECG regarding this path.

As stated previously, pedestrians and bicyclists who park at the Wildlife Drive entrance and walk or bike along Wildlife Drive have to return to their vehicles along SC 170 or turn around and take the trail back. An trail within the refuge or path along SC 170 between the Wildlife Drive exit and entrance would help facilitate the safer return of pedestrians and bicyclists to their vehicles.

4.2 Pinckney Island NWR

4.2.1 Future Traffic

Traffic volumes along US 278 are expected to increase based on projected growth in the area. To determine a projected future volume along US 278, the following area traffic models were used: the Beaufort County Model (base year 2004, future year 2025) and Lowcountry Council of Governments Model (base year 2004, future year 2025). Interpolation between the base year and future year was performed to determine projections for each model for each design year. Data from each model was then averaged to determine the projected traffic volumes for the short, medium, and long range design years, shown in **Table 4.3**.

Table 4.3: Existing and Projected Daily Traffic Volumes for Study Area Roadways

	Segment	2008 AADT	2014 AADT	2019 AADT	2024 AADT
US 278	SC 46 to just west of Pinckney Island	57,800	62,100	70,000	77,900

Notes: AADT = Annual Average Daily Traffic
2008 AADT collected by SCDOT

4.2.2 Traffic Operations and Needs

4.2.2.1 Future Roadway Analysis

Projected levels of service for US 278 using the FDOT *Generalized Level of Service Tables* (2007) are shown in **Table 4.4**.

Table 4.4: Existing and Projected Level of Service for Study Area Roadways

	Segment	2008 Existing	2014 Short Range	2019 Medium Range	2024 Long Range
US 278	SC 46 to just west of Pinckney Island	E	E	F	F

Source: FDOT's *Generalized Level of Service Tables*, Table 4-2 - Transitioning into Urbanized Areas or Areas over 5,000 not in Urbanized Areas, Uninterrupted Flow Highways

Based on the results of this analysis, US 278 is currently and will continue to be congested. US 278 will need to be widened to accommodate future demand; if not, then alternative routes or other transportation mode options will need to be established.

4.2.2.2 Roadway Condition

US 278 is a four-lane divided highway with a posted speed limit of 55 mph. A full median opening currently exists at the refuge entrance. Beaufort County's C.C. Haigh Boat Landing is on the south side of this intersection. Improvements to the intersection may help alleviate side street delay. Studies should be conducted to determine if this intersection could benefit from signalization.

As traffic volumes on US 278 continue to increase, making left turns into and out of the refuge will become more difficult. An alternative to consider is the construction of an underpass under the bridge from Pinckney Island to Hilton Head Island, routing US 278 eastbound visitors to the refuge via the C.C. Haigh Boat Landing area, allowing them to access the north side of the refuge via the underpass of US 278, and vice versa for US 278 westbound visitors. With the underpass in place, the median opening could be closed, which would reduce the number of potential conflict points. As an alternative, the underpass could be constructed for use by pedestrians and bicyclists or refuge-operated vehicles only. **Figure 4.4** shows the general location under the bridge where a potential underpass could be constructed.

Figure 4.4: General Location for Potential US 278 Underpass

4.2.2.3 Posted Speed Limit

The posted speed limits on US 278 in the area around the refuge should be reviewed for consistency in conjunction with a speed study. The current speed limit varies from 45 mph to 55 mpg to 50 mph traveling eastbound.

4.2.2.4 Sight Distance

When exiting the refuge, a left-turn requires a two-step maneuver. The recommended sight distance for the design speed of 55 mph is 610 feet, as indicated in *A Policy on Geometric Design of Highways and Streets (2004)*. The existing sight distance observed in the field and measured from aerial photography is sufficient for both steps of the maneuver from both sides of US 278. The right-turn sight distance is also sufficient for exiting the refuge.

4.2.2.5 Bridge Conditions

The two US 278 bridges adjacent to the Pinckney Island NWR have multiple spans. All four spans had acceptable sufficiency ratings over 50, with three of the four ratings over 90.

4.2.2.6 Turn Lanes

Left- and right-turn lanes currently are installed to provide access to the refuge. Due to the geometric constraints of the US 278 bridges, the turn lanes cannot be lengthened without widening the bridge structures. As indicated in the *SCDOT Highway Design Manual* (2009), the recommended length for turn lanes (including taper and storage) is 325 feet for right turns and 375 feet for left turns. Existing turn lanes, as shown in **Figure 4.5** and **Figure 4.6**, range from 130 to 300 feet long, considerably shorter than the recommended distances.

Figure 4.5: Westbound Turn Lanes at Pinckney Island NWR

Figure 4.6: Eastbound Turn Lanes at Pinckney Island NWR

4.2.2.7 Wayfinding

Wayfinding signs for Pinckney Island NWR are currently on I-95 and US 278. Based on the *Wayfinding Inventory* (2009) and project team field review, the general condition of the signage for the refuge is good. When the signs are scheduled to be replaced, the USFWS prefers the addition of "National" to "Wildlife Refuge" and font changes, adding uppercase and lowercase text to make the signs more readable (in accordance with the most recent edition of the MUTCD). Updates to the wayfinding signs should be coordinated with SCDOT.

Based on the *Road Safety Audit* (2008), the Pinckney Island NWR wayfinding signs have poor visibility at night. When the signs are replaced, they should be upgraded with standard retroreflectivity.

Additional wayfinding signs could be used to alert drivers on US 278 of the upcoming turn into Pinckney Island. Wayfinding signs may be placed on the existing bridge structure, following coordination with SCDOT and Beaufort County. These signs may include advance warnings of vehicles entering the intersection using established MUTCD standards. Also, new wayfinding signs would be required to correctly direct drivers to and from the refuge if an underpass is constructed under US 278.

4.2.2.8 Parking

Based on projected future traffic on US 278, as well as increased development in the area, some increase in refuge visitation is expected, which may result in potential parking issues during peak periods. Additional overflow parking areas should be identified. This parking could be designated at the refuge or adjacent to the C.C. Haigh Boat Landing area.

4.2.2.9 Transit

Currently, no transit service operates to the refuge. However, cooperation with the Town of Bluffton, the Town of Hilton Head Island, the Hilton Head Island-Bluffton Chamber of Commerce, and Palmetto Breeze (the regional transit provider) to gauge interest may result in a scheduled service for residents and visitors to the refuge.

Palmetto Breeze operates transit service from Gifford, Gillisonville, Big Estate, Hampton, Allendale, Ruffin, and Bluffton to Hilton Head Island and the respective return routes. These routes pass by the Pinckney Island NWR.

If the median opening is closed, an internal refuge shuttle service could be implemented to take visitors from the C.C. Haigh Boat Landing area, under the US 278 bridge, to the Pinckney Island refuge information area.

4.2.2.10 Pedestrians and Bicyclists

USFWS should coordinate with the Town of Bluffton, the Town of Hilton Head Island, and the Greater Bluffton Pathways organization to provide future connections to the refuge for pedestrians and bicyclists. When US 278 is widened to six lanes, bicycle and pedestrian paths should be considered.

5. Alternatives Analysis

Based on the findings from the existing conditions review, the *Transportation Needs and Safety Report*, and comments from stakeholders, potential improvements to the refuges' transportation network were reviewed and roadway alternatives initially screened. These alternatives were then screened environmentally, socially, and financially in more detail to develop the preferred alternatives for each refuge.

5.1 Preliminary Alternatives

Preliminary alternatives for physical roadway construction and other improvements were selected for both refuges. These were further categorized by implementation time periods of short (5 years), medium (10 years), and long range (15 years). These alternatives are discussed further below. **Table 5.1** shows a matrix summary of the original alternatives and the suggested responsible partners for each alternative. The partner agencies on this project include the USFWS; SCDOT; GDOT; Beaufort County, SC; Jasper County, SC; the Lowcountry Council of Governments (LowCOG); Chatham County, GA; the City of Hardeeville, SC; the Town of Bluffton, SC; the Town of Hilton Head Island, SC; the City of Savannah, GA; the Chatham County-Savannah Metropolitan Planning Commission (MPC); the Savannah Area Chamber of Commerce; Hilton Head Island/Bluffton Chamber of Commerce; the SC Highway Patrol; the GA State Patrol; Chatham Area Transit (CAT); East Coast Greenway (ECG); Palmetto Breeze; and Greater Bluffton Pathways.

5.1.1 Savannah NWR

5.1.1.1 Roadway Segment Improvements

The following recommendations were identified as potential improvements to the roadways near and adjacent to the refuge. The suggested responsible partners are listed by each alternative.

Short Range Alternatives (2014)

- Add turn lanes into new Visitors Center (completed)
  Responsible Partners: SCDOT, USFWS
- Continue to maintain internal roadways (i.e., adding gravel, re-grading)
  Responsible Partner: USFWS
- Add left-turn lane into Wildlife Drive
  Responsible Partners: SCDOT, USFWS
- Lengthen right-turn lane into Wildlife Drive
  Responsible Partners: SCDOT, USFWS
- Implement a weigh station or weigh-in-motion station along SC 170
  Responsible Partner: SCDOT

Table 5.1: Proposed Stakeholder Responsibilities

		Alternatives	USFWS	SCDOT	GDOT	Jasper Co. (SC)	Chatham Co. (GA)	City of Hardeeville	City of Savannah	Lowcountry Council of Governments	MPC	Savannah Area Chamber of Commerce	SC Highway Patrol	GA State Patrol	Chatham Area Transit	East Coast Greenway
Savannah National Wildlife Refuge	S1	Maintain Internal Roadways	x													
	S2	Turn Lanes (Wildlife Drive)	x	x												
	S3	Turn Lanes (Visitors Center)	x	x												
	S4	Speed Study		x												
	S5	Weigh-in-Motion Station		x												
	S6	Internal Shuttle Service	x													
	S7a	Wildlife Drive Connection Trail (within Refuge)	x													
	S7b	Wildlife Drive Connection Trail (Bike Lane)		x		x				x						
	S7c	Wildlife Drive Connection Trail (Multiuse Path)		x		x				x						
	S8	Bridge Replacement on SC 170		x												
	Additional Recommendations															
		Speed Enforcement				x	x	x					x	x		
		Wayfinding Improvements	x	x	x											
		Trimming Vegetation		x	x											
		Encourage Pedestrians/Bicyclists	x			x		x	x	x	x					x
		Overflow Parking	x													
		ITS Applications	x	x	x	x	x									
		External Transit Service								x		x			x	

		Alternatives	USFWS	SCDOT	Beaufort Co. (SC)	Town of Hilton Head Island	Town of Bluffton	HHI-Bluffton Chamber of Commerce	Palmetto Breeze	Greater Bluffton Pathways
Pinckney Island National Wildlife Refuge	P1	Maintain Internal Roadway	x							
	P2	Median Opening Improvements	x	x	x	x				
	P3a	US 278 Underpass (Pedestrian/Bicycle)	x	x	x					
	P3b	US 278 Underpass (Refuge-only Vehicles)	x	x	x					
	P3c	US 278 Underpass (Public Vehicles)	x	x	x	x				
	P4	Widen US 278		x						
	P5	Turn Lanes at Entrance		x						
	Additional Recommendations									
		Review US 278 Speed Limits		x						
		Encourage Pedestrians/Bicyclists	x			x	x			x
		Wayfinding Improvements		x						
		External Transit Service	x			x	x	x	x	
		Additional Parking (with Underpass)	x							
		ITS Applications	x	x	x					

Short Range Alternatives
Medium Range Alternatives
Long Range Alternatives

Medium Range Alternatives (2019)

- Add ITS applications, such as variable speed signs, highway advisory message signs with flashing beacons, and vehicle entering highway sign, on SC 170, US 17, and GA 25
  Responsible Partners: USFWS, SCDOT, GDOT, Jasper County (SC), Chatham County (GA)

- Perform ongoing coordination on long range alternatives
  Responsible Partner: USFWS

Long Range Alternatives (2024)

- Develop connecting trail (or multi-use path) between Wildlife Drive exit and entrance
  Responsible Partners: SCDOT, USFWS, Jasper County (SC), LowCOG

- SC 170 bridge replacements
  Responsible Partner: SCDOT

5.1.1.2 Alternatives to Roadway Construction

The following improvements do not include construction on the roadways around the refuge. The suggested responsible partners are listed by each alternative.

Short Range Alternatives (2014)

- Increased law enforcement presence in the study area
  Responsible Partners: Georgia State Patrol, South Carolina Highway Patrol, Chatham County (GA), Jasper County (SC), City of Hardeeville (SC)

- Installation of speed limit signs along with speed detectors and similar ITS applications
  Responsible Partners: SCDOT, GDOT, Jasper County (SC), Chatham County (GA)

- Destination guide sign replacement on I-95 in Georgia
  Responsible Partner: GDOT

- Destination guide sign replacement for damaged sign on SC 170
  Responsible Partner: SCDOT

- Installation of new signs for Visitors Center
  Responsible Partners: SCDOT, USFWS

- Trim vegetation to increase sight distances where needed along SC 170
  Responsible Partner: SCDOT, USFWS

- Perform routine trimming of vegetation around all signs for visibility
  Responsible Partners: SCDOT, GDOT

- Perform speed study on SC 170 considering geometry, truck percentage, and traffic volume
  Responsible Partner: SCDOT

- Continued coordination with ECG
  Responsible Partners: ECG, USFWS

Medium Range Alternatives (2019)

- Identify potential areas for overflow parking
  Responsible Partner: USFWS

- Provide shuttle service between Visitors Center and Wildlife Drive
  Responsible Partner: USFWS

- Encourage the addition of pedestrian and bicycle trails to the refuge
  Responsible Partners: Chatham County-Savannah MPC, Jasper County (SC), City of Savannah (GA), City of Hardeeville (SC), ECG, LowCOG

- Upgrade entrance kiosk at Wildlife Drive to variable message for visitor and refuge information, weather conditions, shuttle schedule (if applicable), etc.
  Responsible Partner: USFWS

- Add variable message entrance kiosk at Visitors Center for visitor and refuge information, weather conditions, shuttle schedule (if applicable), etc.
  Responsible Partner: USFWS

- Coordinate road improvements with large development projects. Review traffic studies for large developments in the area.
  Responsible Partners: USFWS, City of Hardeeville (SC), Jasper Ocean Terminal, LowCOG, Jasper County (SC)

Long Range Alternatives (2024)

- Consider transit route to Visitors Center
  Responsible Partners: CAT, Savannah Area Chamber of Commerce, LowCOG

- Perform ongoing coordination with stakeholders
  Responsible Partners: USFWS, SCDOT, GDOT, Chatham County (GA), Jasper County (SC), City of Savannah (GA), City of Hardeeville (SC), LowCOG, MPC, ECG, Georgia Ports Authority, Jasper Ocean Terminal

5.1.2 Pinckney Island NWR

5.1.2.1 Roadway Segment Improvements

The following recommendations were identified as potential improvements to the roadways near and adjacent to the refuge. The suggested responsible partners are listed by each alternative.

Short Range Alternatives (2014)

- Continue to maintain internal roadways (i.e., adding gravel, re-grading)
  Responsible Partner: USFWS

- Improve intersection of Pinckney Island NWR/C.C. Haigh Boat Landing and US 278 by lengthening the median opening to better accommodate vehicles with trailers
  Responsible Partners: SCDOT, Beaufort County (SC), USFWS, Town of Hilton Head Island (SC)

- Study signalization, including the consideration of the installation of a flashing beacon at median opening
  Responsible Partners: SCDOT, Beaufort County (SC), USFWS

Medium Range Alternatives (2019)

- Add ITS applications, such as variable speed signs, highway advisory message signs with flashing beacons, and vehicle entering highway signs on US 278
  Responsible Partners: USFWS, SCDOT, Beaufort County (SC)

- Construct US 278 underpass and potentially close median opening
  Responsible Partners: USFWS, SCDOT, Beaufort County (SC), Town of Hilton Head Island (SC)
  - *Option a: Pedestrian and bicycle use only*
  - *Option b: Refuge-operated vehicle use only*
  - *Option c: Public vehicle use*

- Perform ongoing coordination on long range alternatives
  Responsible Partner: USFWS

Long Range Alternatives (2024)

- Widen US 278 bridges
  Responsible Partner: SCDOT

- Lengthen deceleration lanes for refuge entrance when US 278 bridges are widened
  Responsible Partner: SCDOT

5.1.2.2 Alternatives to Roadway Construction

The following improvements do not include construction on the roadways around the refuge. The suggested responsible partners are listed with each alternative.

Short Range Alternatives (2014)

- Review posted speed limits on US 278 for consistency
  Responsible Partner: SCDOT

- Perform ongoing pedestrian and bicycle coordination
  Responsible Partners: USFWS, Town of Bluffton (SC), Town of Hilton Head Island (SC), Greater Bluffton Pathways

- Provide wayfinding signage upgrades
  Responsible Partner: SCDOT

Medium Range Alternatives (2019)

- If underpass is constructed, provide additional parking and internal shuttle service from the C.C. Haigh Boat Landing parking area
  Responsible Partner: USFWS

- Upgrade refuge variable message kiosk for visitor and refuge information, weather conditions, shuttle schedule (if applicable), etc.
  Responsible Partner: USFWS

Long Range Alternatives (2024)

- Coordinate offsite transit to refuge
  Responsible Partners: USFWS, Town of Bluffton (SC), Town of Hilton Head Island (SC), Hilton Head Island-Bluffton Chamber of Commerce, Palmetto Breeze

- Perform ongoing coordination with stakeholders
  Responsible Partners: USFWS, SCDOT, Beaufort County (SC), Town of Bluffton (SC), Town of Hilton Head Island (SC)

5.2 Screening Criteria

These preliminary alternatives were screened using the following four categories to determine the preliminary candidate alternatives:

- ***Environmental and Cultural Impacts*** – Environmental and cultural impacts include issues pertaining to the physical environment (i.e., wetlands, floodplains, natural wildlife habitats) and social features (i.e., demographics, environmental justice).
- ***Constructability*** – Constructability refers to the reasonable issues and elements involved with the physical construction of a recommendation. For example, this criterion would review whether or not the improvement could be effectively implemented within the physical constraints of the study areas' existing conditions.
- ***Transportation Benefit*** – Transportation includes the review of the properties and conditions associated with existing and future roadways, safety, connectivity, and capacity of the transportation network for the study areas.
- ***Cost*** – Cost includes the financial obligations associated with implementing a recommendation, including design, construction, maintenance, and related expenses.

5.3 Preliminary Candidate Alternatives

The preliminary candidate alternatives represent the initial screening of the alternatives identified through the evaluation of the traffic and safety needs of the refuge. This includes a review of the no-build alternative for the refuges.

5.3.1 Savannah NWR

5.3.1.1 No-Build

The no-build alternative provides no improvements to the existing transportation facilities in the study area. Therefore, there also would be no improvement costs or impacts to the natural environment in the study area. With the region's anticipated growth, however, truck volumes and congestion issues are expected to increase on US 17 and SC 170 around the refuge. Such increases could negatively affect the visitor experience at the refuge.

5.3.1.2 Short Range Alternatives

Alternative S1 – Internal Roadway Condition Improvement

Maintain the existing internal roadway of the refuge by adding gravel to the unpaved surface and re-grading where necessary, providing transportation improvements at a low cost and relatively low impact to the surrounding area.

Alternative S2 –Turn Lanes at Wildlife Drive

A westbound left-turn lane at the Wildlife Drive entrance may have an impact on the natural environment, where SC 170 would be widened to provide right-of-way for the turn lane. Construction efforts would incur additional costs, but the addition of the turn lane could help improve the traffic capacity of SC 170 and potentially reduce the chance of rear-end crashes at the Wildlife Drive entrance.

The existing eastbound right-turn lane at Wildlife Drive was found to be considerably shorter than the storage and taper lengths recommended by guidelines in the *SCDOT Highway Design Manual*. If the roadway alignment is adjusted or widened to accommodate the construction of the turn lane, this alternative may have an impact on the natural environment.

Alternative S3 – Turn Lanes at the New Visitors Center

Design and construction of the turn lanes at the new Visitors Center are complete.

Alternative S4 – Speed Study

A speed study would assess the transportation aspects of the SC 170 corridor related to speed. The cost to conduct the study would be the only short range cost. Longer-term considerations would include the potential user benefit through improved safety and potential user costs through increased travel times.

Alternative S5 – Install a Weigh Station or Weigh-in-Motion Station on SC 170

The high truck volumes on SC 170 may be due, at least in part, to truck drivers' desire to avoid the weigh station at I-95 near mile marker 4 in South Carolina. Installation of a temporary weigh station or a weigh-in-motion station on SC 170 may impact short and long term truck travel patterns in the area and potentially reduce truck volume on SC 170. Due to the limited right-of-way and extensive wetlands along SC 170, the installation of a temporary weigh station would not be feasible. As an alternative, a weigh-in-motion station could be installed to monitor truck weights along SC 170.

5.3.1.3 Medium Range Alternatives

Alternative S6 – Shuttle Service between the New Visitors Center and Wildlife Drive

A shuttle service would require initial capital costs for the vehicle(s), as well as ongoing operations and maintenance costs.

5.3.1.4 Long Range Alternatives

Alternative S7 – Wildlife Drive Connection Trail

This alternative involves the construction of a trail to connect the Wildlife Drive exit and entrance.

Alternative S7a – Construct a trail within the refuge: This alternative would have an impact to the natural environment, as land would need to be made available for the location of the trail. Additional costs for this alternative would include the design, construction, and maintenance of the trail. There also may be constructability issues associated with the impoundment areas.

Alternative S7b – Construct a bike lane on SC 170: This alternative would likely require SC 170 to be widened. This option would impact the environment, as land would be graded for the widening of SC 170 and construction of the bike lane. Additional costs for this alternative would be associated with the design and construction.

Alternative S7c – Construct a multi-use path adjacent to SC 170: This alternative would require additional right-of-way adjacent to SC 170, more than that required for Alternative S7b. Unlike an on-street bike lane, a multi-use path would be separated from SC 170 by grass or other landscaping. This separation would offer both transportation safety and aesthetic benefits, but with increased costs and environmental impacts.

Alternative S8 – Bridge Replacement

Replacement and rehabilitation of the deficient bridges on SC 170 would involve substantial costs and construction effort. Maintenance of traffic on SC 170 would be required. Although these bridge improvements likely would be constructed in place (instead of on new alignment), there would be temporary impacts to the environment.

5.3.1.5 Additional Recommendations

The screening criteria did not apply to the following recommendations, which were brought forward in the study:

- Increased law enforcement presence to help reduce speeding
- Wayfinding and signage improvements in the study area
- Trimming vegetation to improve visibility conditions (sight distance)
- Community involvement to encourage visits to the NWR by pedestrians and bicyclists
- Designate potential overflow areas for parking
- Coordinate with local agencies to gauge transit interest

Figure 5.1 summarizes the preliminary candidate alternatives for the Savannah NWR.

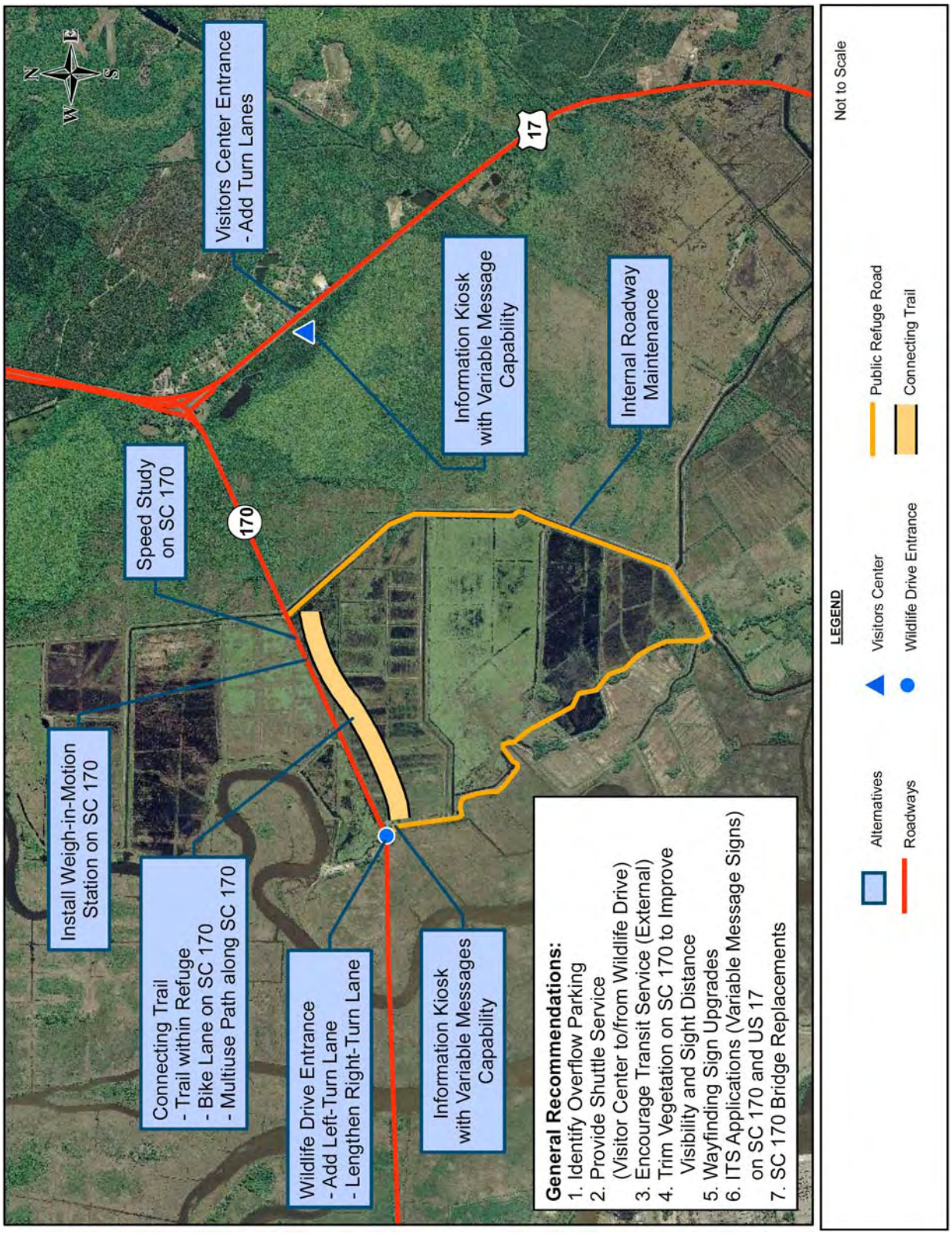


Figure 5.1: Preliminary Candidate Alternatives for the Savannah NWR

5.3.2 Pinckney Island NWR

5.3.2.1 No-Build

The no-build alternative provides no improvements to the existing transportation facilities in the study area. Therefore, there also would be no improvement costs or impacts to the natural environment in the study area. However, with existing congestion on US 278 and anticipated growth, increased traffic conflicts at the refuge entrance may occur. This could contribute to increased safety concerns for visitors, negatively affecting their experience at the Pinckney Island NWR.

5.3.2.2 Short Range Alternatives

Alternative P1 – Internal Roadway Condition Improvements

Maintaining the existing internal roadway of the refuge by adding gravel to the unpaved surface and re-grading where necessary, provides transportation improvements at a low cost and relatively low impact to the surrounding area.

Alternative P2 – Median Opening Modifications and Improvements

Laterally widening the median opening at the Pinckney Island NWR/C.C. Haigh Boat Landing and US 278 could allow for easier access to/from the refuge for larger vehicles as congestion on US 278 increases. This alternative would be expected to have only minor impacts to the environment.

5.3.2.3 Medium Range Alternatives

Alternative P3 – US 278 Underpass

Alternative P3 involves the construction of an underpass of US 278. All of these alternatives would likely involve a need to increase parking and may impact wetlands and archeological sites.

Alternative P3a – Pedestrian and Bicycle-Only Underpass: This option would have lower impacts on the natural environment along with a lower construction effort and cost than the other underpass alternatives.

Alternative P3b – Refuge-Only Vehicle Underpass (i.e., controlled-access shuttle bus, van, golf-carts): In this alternative, the underpass would be operated as a one-way road to shuttle visitors from the C.C. Haigh Boat Landing area to the wildlife information area (coordinated by the refuge). Costs would include initial capital, vehicle maintenance, and operation. The required right-of-way would be less than Alternative P3c.

Alternative P3c – Public Vehicle Underpass: The underpass would be a two-way road with public access to the refuge. This underpass alternative would incur the greatest construction effort and impacts to the environment of the three alternatives.

5.3.2.4 Long Range Alternatives

Alternative P4 – Widen US 278

To gain additional capacity for future traffic, bridges on US 278 will require widening.

Alternative P5 – Lengthen Turn Lanes at Pinckney Island NWR

Lengthening the turn lanes into the refuge should be considered when the US 278 bridges are widened.

5.3.2.5 Additional Recommendations

The screening criteria did not apply to the following other recommendations, which were brought forward in the study:

- Review US 278 speed limits for consistency
- Coordinate with local agencies to encourage pedestrians and bicyclists to visit the refuge
- Provide wayfinding and signage improvements in the study area
- Coordinate with local agencies to gauge transit interest from commuters and visitors, and potentially create a transit stop at Pinckney Island NWR.

Figure 5.2 summarizes the preliminary candidate alternatives for the Pinckney Island NWR.

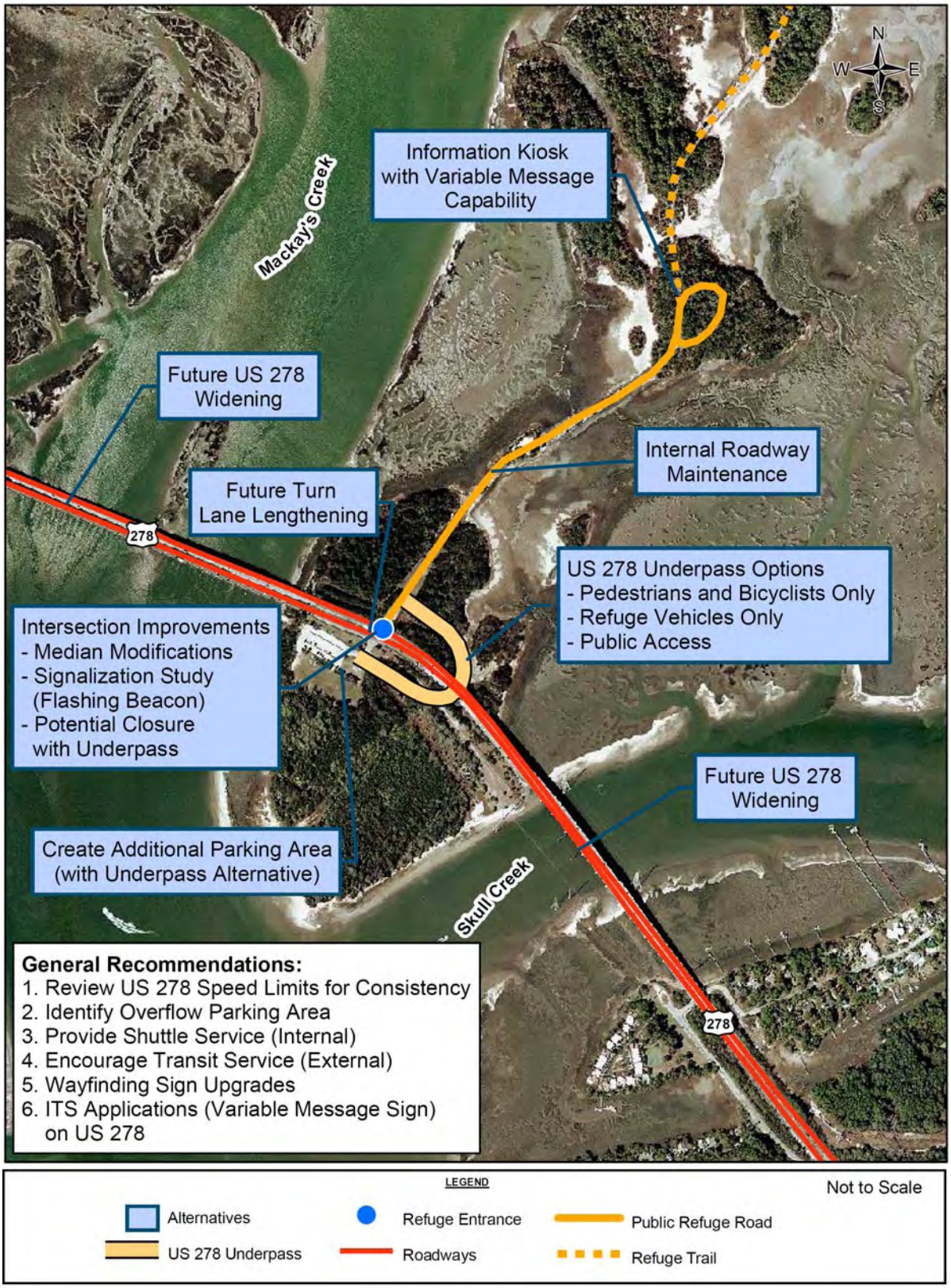


Figure 5.2: Preliminary Candidate Alternatives for the Pinckney Island NWR

5.4 Conceptual Alternatives

More detailed conceptual alternatives were developed from the preliminary candidate roadway alternatives to identify probable costs and impacts for each alternative. The results of this analysis are discussed below.

5.4.1 Savannah NWR

5.4.1.1 Alternative S2 – Turn lanes on SC 170 at Wildlife Drive

Alternative S2 (**Figure 5.3**) includes adding a left-turn lane on SC 170 into Wildlife Drive, and lengthening the right-turn lane on SC 170 into Wildlife Drive. The westbound left-turn lane would provide refuge visitors a designated turn lane out of the main flow of traffic, and potentially would reduce the chance of rear-end crashes at the Wildlife Drive entrance. The existing eastbound right-turn lane at Wildlife Drive is shorter than the taper and storage lengths recommended by the guidelines in the *SCDOT Highway Design Manual* (2009). This is a short range alternative. The construction cost estimate for this alternative is $230,000.

5.4.1.2 Alternative S7 – Wildlife Drive Connection Trail

Alternative S7 (**Figure 5.4**), a long range alternative, develops a connecting trail or multi-use path between the exit and entrance to Wildlife Drive. Three alignments have been considered:

Alternative S7-A (Figure 5.5): Construct a crushed stone trail within the refuge on an existing dike. The construction cost estimate for this alternative is $130,000. The stone trail would need to be maintained periodically, at an estimated cost of $25,000 per year. If the connection trail is placed on the existing John Hill Canal dike, the time frame for this option would be a short range alternative.

Alternative S7-B (Figure 5.6): Construct a westbound bike lane on SC 170. The construction cost estimate for this alternative is $630,000.

Alternative S7-C (Figure 5.7): Construct a multi-use path adjacent to SC 170. The construction cost estimate for a multi-use path approximately 30 feet from the edge of pavement is $2,320,000. If guardrail is installed along SC 170, the construction cost estimate is $1,140,000.

Figure 5.3: Turn Lanes at Wildlife Drive - Alternative S2

Figure 5.4: Overview of the Savannah NWR Alternatives S7-A, S7-B, and S7-C

Figure 5.5: Connecting Tail on John Hill Canal Dike - Alternative S7-A

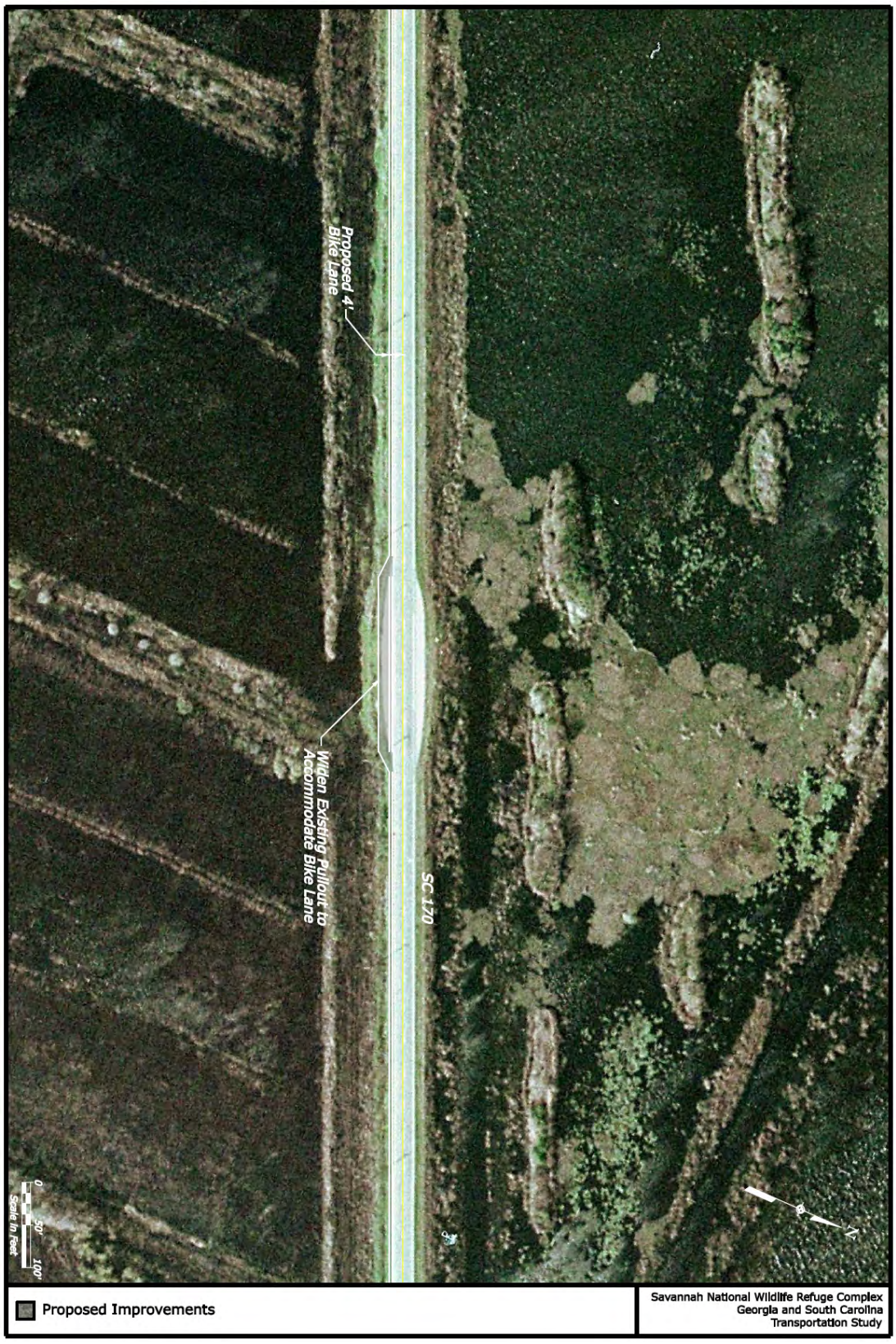


Figure 5.6: Bike Lane on SC 170 - Alternative S7-B

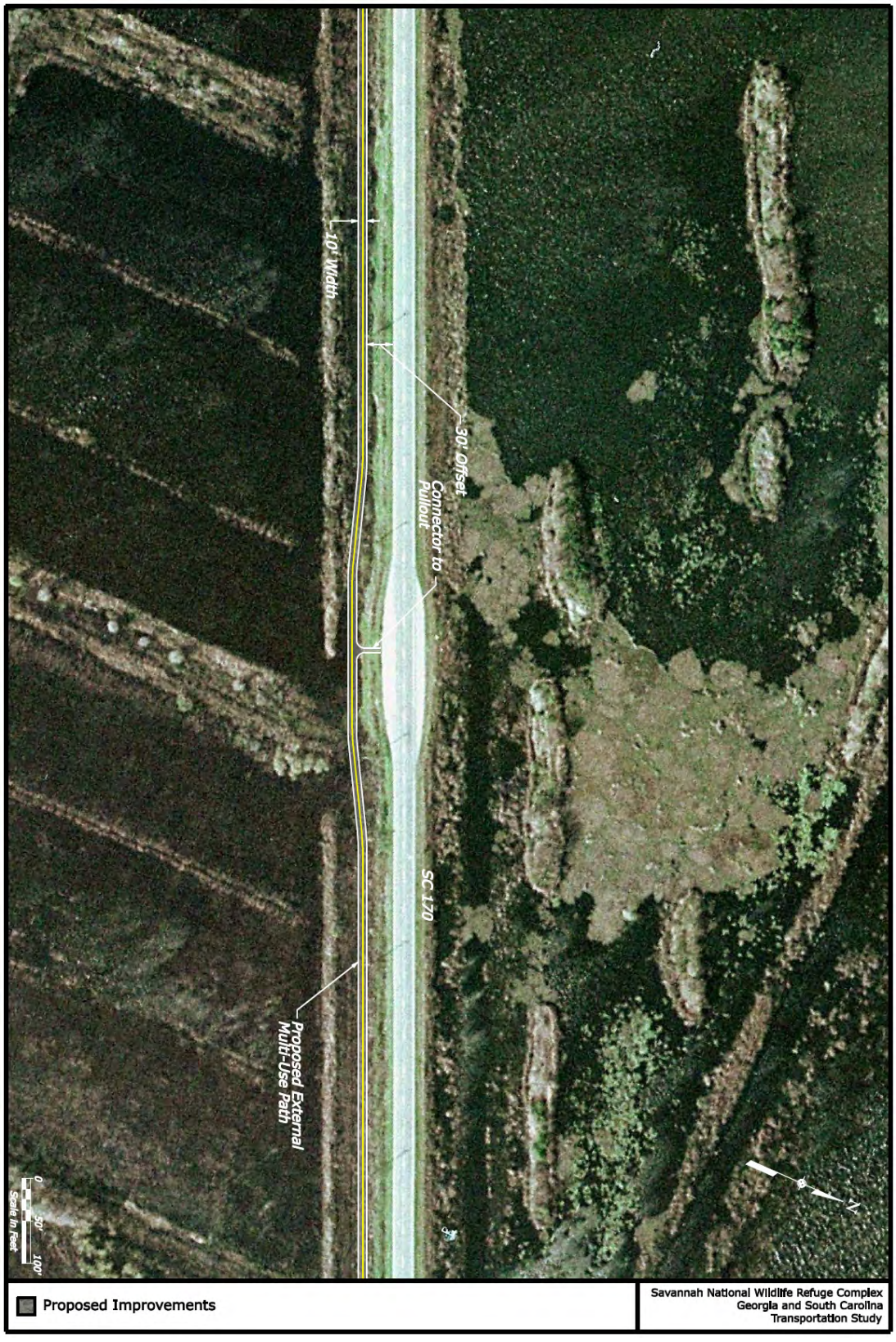


Figure 5.7: Multi-use Path on SC 170 - Alternative S7-C

5.4.2 Pinckney Island NWR

5.4.2.1 Alternative P3 – US 278 Underpass

Alternative P3, a medium range alternative, would construct an underpass at US 278 open to the public, and close the median opening. When the median is closed, the underpass must be able to accommodate eastbound and westbound vehicles accessing the refuge. Access from the main entrance north into the refuge may be limited in the future based on USFWS plans. If access to the existing parking area is limited, construction of a new visitor parking area on the south side of US 278 may be necessary.

To maximize turn lane lengths, the following three alignments have been proposed for the underpass:

Alternative P3-1 (Figure 5.8): A US 278 underpass on the east side of the Pinckney Island NWR entrance. The underpass would connect the south side (boat ramp parking) to the north side (refuge entrance). The construction cost estimate for this alternative is $630,000.

Alternative P3-2 (Figure 5.9): A US 278 underpass with shared acceleration and deceleration lanes on the north and south sides of US 278. This includes a clover-leaf type configuration with one-way on and off ramps. The construction cost estimate for this alternative is $1,030,000.

Alternative P3-3 (Figure 5.10): A US 278 underpass with new entrance locations to the refuge and the boat ramp. This alternative would maximize deceleration lengths. The construction cost estimate for this alternative is $1,010,000.

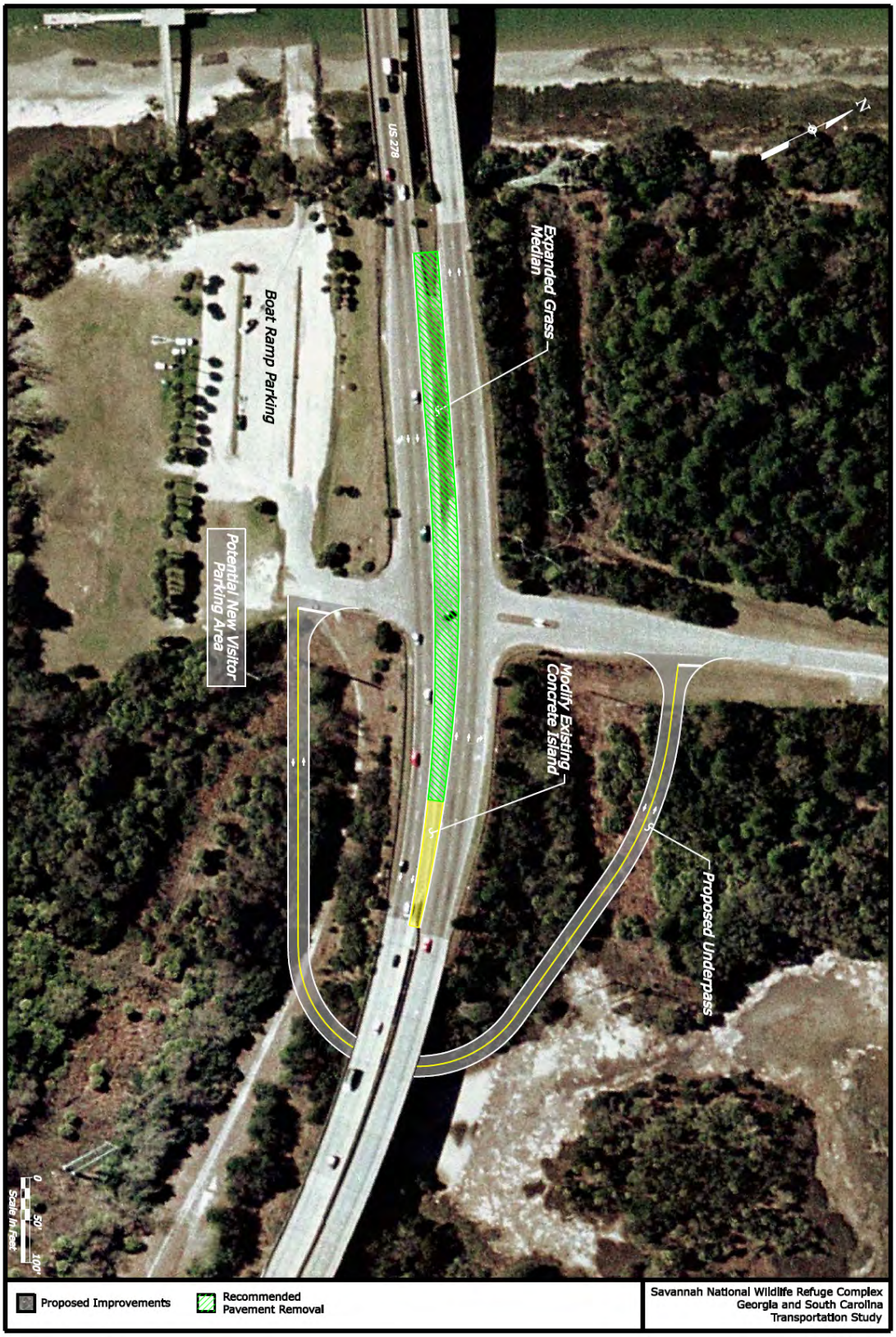


Figure 5.8: US 278 Underpass - Alternative P3-1

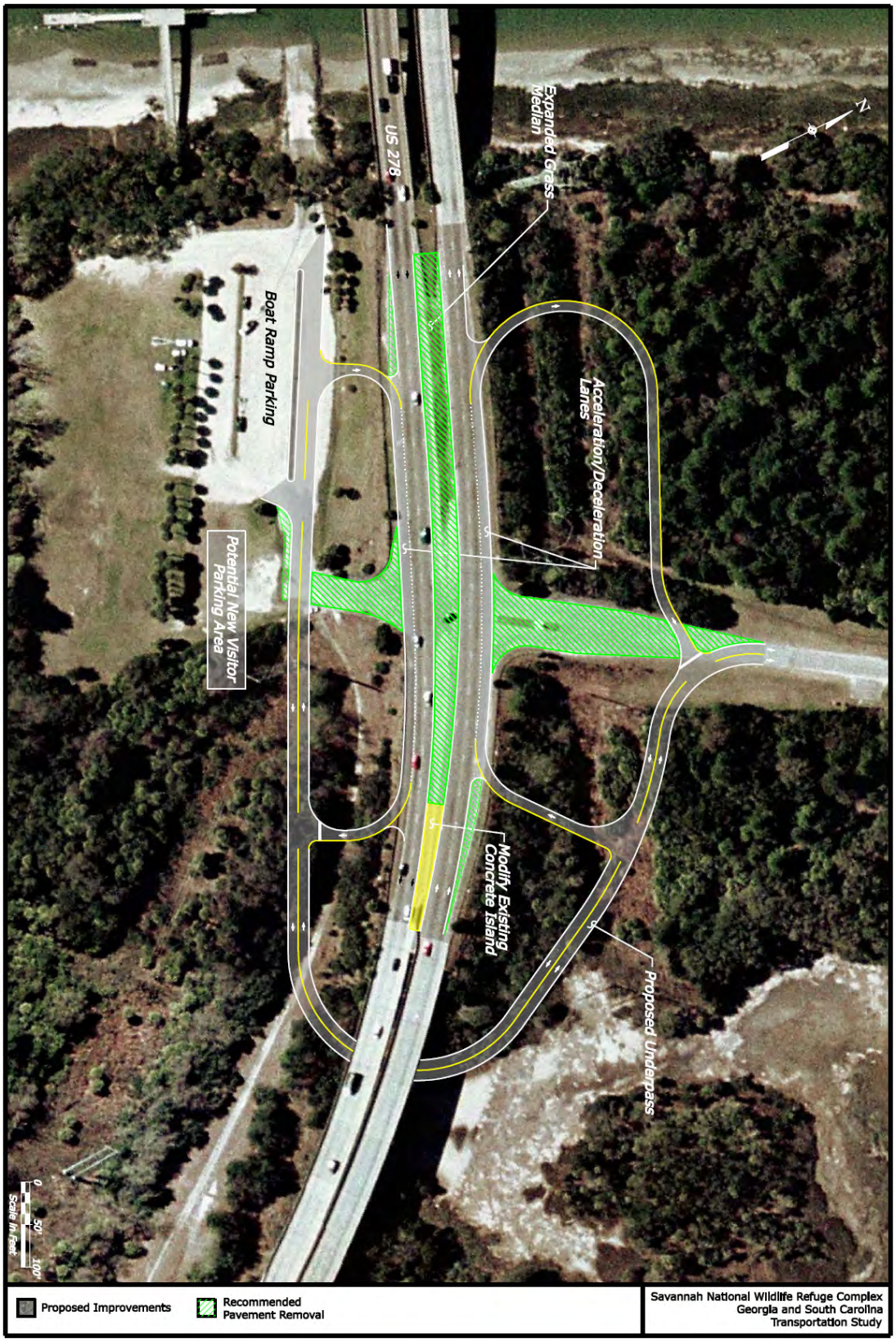


Figure 5.9: US 278 Underpass with Shared Acceleration and Deceleration Lanes - Alternative P3-2

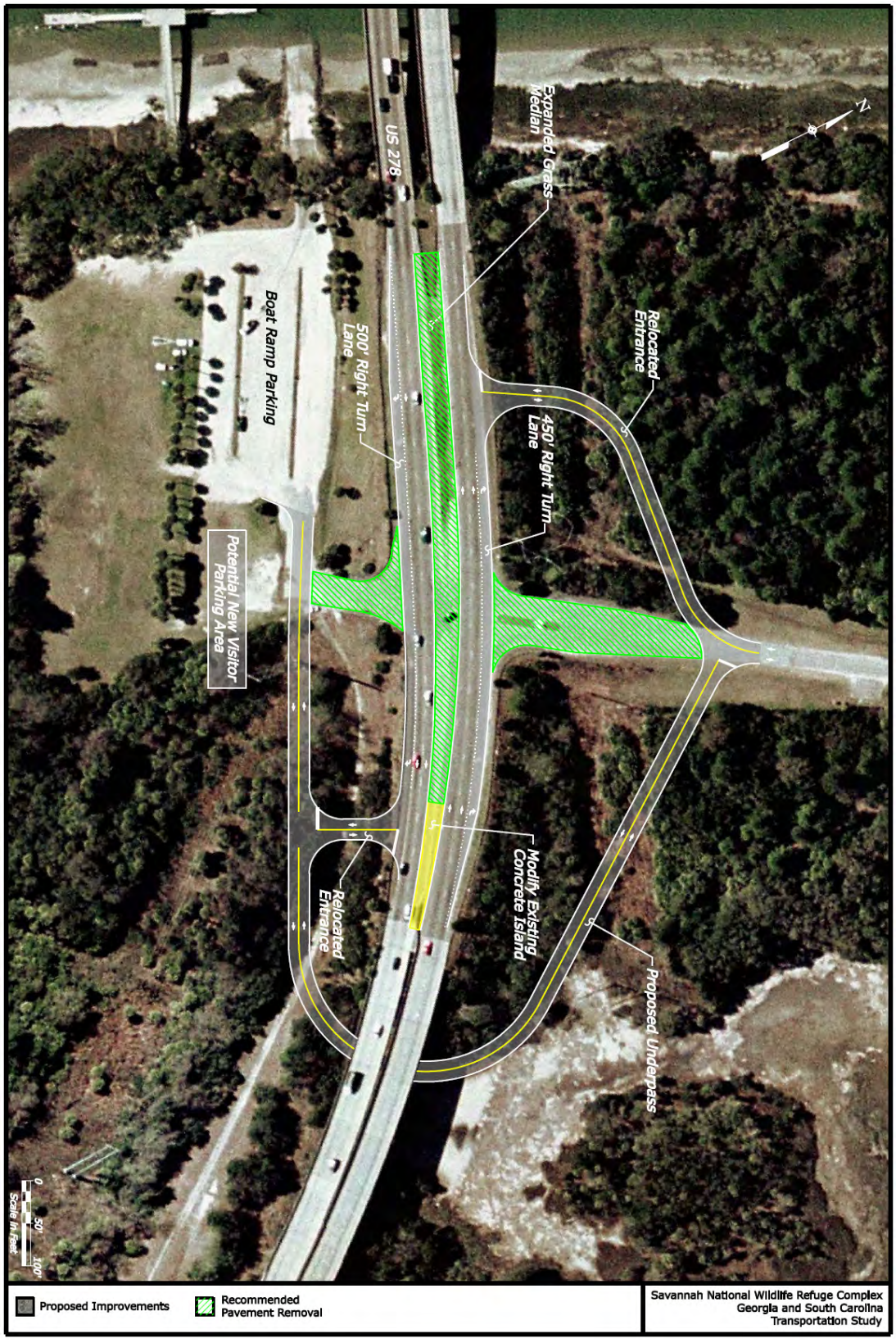


Figure 5.10: US 278 Underpass with Relocated Entrances- Alternative P3-3

5.5 Planning and Environmental Screening

This section describes the impact screening for the roadway improvement alternatives proposed at the Savannah National Wildlife Refuge (Alternatives S2 – Turn Lanes on SC 170 at Wildlife Drive and S7 – Wildlife Drive Connection Trail) and Pinckney Island National Wildlife Refuge (Alternative P3 – US 278 Underpass). Impacts are based on the preliminary footprints of the conceptual alternatives previously described.

The following categories were considered during the preliminary impact screening process:

- **Land Use** – Changes to existing and proposed land uses
- **Socioeconomic and Community Features** – Socioeconomic composition of affected communities and impacts to community features
- **Environmental Justice** – Impacts on minority or low-income populations
- **Cultural Resources** – Impacts to historic or archaeological resources
- **Transportation and Safety** – Changes in traffic patterns and safety for drivers, pedestrians, and bicyclists
- **Visitor Use and Experience** – Changes to visitor facilities and experiences
- **Wetlands** – Impacts to jurisdictional waters and wetlands based on National Wetland Inventory (NWI) mapping
- **Floodplains** – Changes to impervious area within floodplains and floodways based on Federal Emergency Management Agency (FEMA) mapping
- **Air Quality** – Changes to air quality as a result of traffic growth or changes in traffic patterns

Table 5.2 summarizes the results of the screening process.

5.5.1 Existing Conditions – Savannah NWR

Alternatives S2 and S7 are located at the Savannah NWR Wildlife Drive entrance. The following section briefly describes the existing natural and human environment within the potentially impacted area of the alternatives.

Land Use – Most of the area along SC 170 is currently grass or shrubs, and the land within the refuge along the proposed path is primarily grass and soil with some trees and shrubs. All of the potentially impacted area is currently owned by either SCDOT or USFWS.

Socioeconomic and Community Features – Alternatives S2 and S7 are on the border between Jasper County, South Carolina and Chatham County, Georgia. According to 2000 Census data, 58.7% of residents in Jasper County and 44.7% of residents in Chatham County are racial minorities, primarily Black. Approximately 5.8% of the Jasper County population and 2.3% of the Chatham County population is Hispanic. The 2005-2007 *American Community Survey* indicated that 14.9% of families in Jasper County and 11.1% of families in Chatham County are below the poverty level. However, the refuge draws visitors from across the region. There are no community features within the potentially impacted area.

Table 5.2: Summary Table of Impacts for Conceptual Alternatives							
Impact	**Alternative**						
	S2 (Turn Lanes on SC 170 at Wildlife Drive)	**S7-A (Wildlife Drive Connection Trail within Refuge)**	**S7-B (Wildlife Drive Connection Trail - Bike Lane)**	**S7-C (Wildlife Drive Connection Trail - Multi-use Path)**	**P3-1 (US 278 Underpass - Right-in/ Right-out)**	**P3-2 (US 278 Underpass - On and Off Ramps)**	**P3-3 (US 278 Underpass - Relocate Entrances)**
Total impact area	0.39 acres	1.86 acres	0.60 acres	1.46 acres	1.18 acres	2.14 acres	2.07 acres
Net impact to unpaved area	0.28 acres	No impact	No impact	No impact	0.24 acres	0.18 acres	0.24 acres
Community Features	No impact				No impact	No impact	No impact
Environmental Justice	No impact	No impact	No impact	No impact	No impact	No impact	No impact
Cultural Resources	No impacts anticipated	No impacts anticipated	No impacts anticipated	No impacts anticipated	Potential impact to two archaeological sites	Potential impact to three archaeological sites	Potential impact to three archaeological sites
Transportation and Safety	Increases capacity and improves safety	Improves safety by removing bikes and pedestrians from roadway	Improves safety by providing bike lane	Improves safety by removing bikes and pedestrians from roadway	Improves safety by closing median and preventing left turns; allow right turns	Improves safety by closing median and using on and off ramps	Improves safety by moving entrances and closing median
Visitor use and Experience	Allow easier access for visitors	Provides a safer, more direct route across refuge for bikes and pedestrians	Provides a safer, more direct route across refuge for bikes	Provides a safer, more direct route across refuge for bikes and pedestrians	Allows easier access between entrance and parking; improves safety at driveways	Allows easier access between entrance and parking; improves safety at driveways	Allows easier access between entrance and parking; improves safety at driveways
Wetlands	No impact	No impact	0.04 acres	1.68 acres	No impact	No impact	No impact
Floodplains	0.28 acres	1.86 acres	0.60 acres	1.46 acres	1.16 acres	1.92 acres	1.96 acres
Air Quality	No impact	No impact	No impact	No impact	No impact	No impact	No impact
Estimated Cost	$230,000	$130,000 ($25,000/yr maintenance)	$630,000	$2,320,000 ($1,140,000 with guardrail)	$630,000	$1,030,000	$1,010,000
Time Frame	Short Range	Short Range	Long Range	Long Range	Medium Range	Medium Range	Medium Range

Environmental Justice – Although the refuge is open to all visitors, residents in Jasper County and Chatham County may be likely to pass through this intersection more frequently due to its location near the county boundaries. Since the percentages of minority residents and families below poverty are higher in Jasper County than in the state of South Carolina, and higher in Chatham County than in the state of Georgia, environmental justice concerns were considered for this alternative.

Cultural Resources – One historic site (Laurel Hill Rice Mill) is located southwest of the entrance, and a cemetery is located north of the entrance.

Transportation and Safety – Alternatives S2 and S7 are located on SC 170 at Wildlife Drive.

Visitor Use and Experience – Wildlife Drive is currently the only existing public entrance to the refuge. A second public entrance has been added at the future Visitors center, which will open in 2010.

Wetlands – Based on NWI mapping, wetlands are located adjacent to SC 170 and throughout the refuge.

Floodplains – FEMA mapping indicates that the potential impacted area is entirely within the 100-year floodplain.

5.5.2 Potential Impacts – Savannah National Wildlife Refuge

5.5.2.1 Alternative S2 – Turn lanes on SC 170 at Wildlife Drive

Land Use – Alternative S2 will impact a total of 0.39 acres. Of this, 0.28 acres would be converted from unpaved area to pavement, and the remaining 0.11 acres have existing pavement that would be restriped or repaved. Most of the impacted unpaved area is currently grass or shrubs.

Socioeconomic and Community Features – This alternative will not directly impact any residents, communities, or community features.

Environmental Justice – Alternative S2 will improve the traffic capacity of SC 170 and potentially reduce the chance of rear-end crashes at the Wildlife Drive entrance. Construction of the turn lanes will result in temporary construction impacts to the road. There are no other negative direct impacts on the community. Therefore, this project will positively affect environmental justice communities.

Cultural Resources – No cultural resources impacts are anticipated as a result of Alternative S2.

Transportation and Safety – Alternative S2 will add a westbound left-turn lane on SC 170 into Wildlife Drive. It will also extend the storage and taper lengths of the eastbound right-turn lane, which are currently shorter than the lengths recommended by the *SCDOT Highway Design Manual* guidelines. These improvements are expected to improve the traffic capacity of SC 170 and potentially reduce the chance of rear-end crashes at the Wildlife Drive entrance.

Visitor Use and Experience – The improvements included as part of Alternative S2 will enhance the visitor experience by making it safer and easier to turn into Wildlife Drive.

Wetlands – No impacts to wetlands are anticipated based on NWI mapping.

Floodplains – The entire alternative would be within the 100-year floodplain, but the impact on the floodplain level would only be a result of new impervious area (0.28 acres).

Air Quality – No changes to air quality are anticipated. This alternative will not increase traffic volumes, and the new turn lanes will not move traffic closer to populated areas.

5.5.2.2 Alternative S7 – Wildlife Drive Connection Trail

Land Use – Alternative S7 would convert unpaved areas to either a pavement or packed-gravel trail. Most impacted areas are primarily grass and dirt with some trees and shrubs. Impacts for Alternative S7 include:

- Alternative S7-A (trail within refuge): 1.86 acres
- Alternative S7-B (bike lane on SC 170): 0.60 acres
- Alternative S7-C (multi-use path adjacent to SC 170): 1.46 acres. An additional 4.40 acres of temporary impacts are possible within the area between SC 170 and the new multi-use path. A guardrail between the road and multi-use path would reduce the temporary construction impacts.

Socioeconomic and Community Features – This alternative will not directly impact any residents, communities, or community features.

Environmental Justice – Alternative S7 will improve safety for bicyclists and motorists in this section of SC 170. One of the options, Alternative S7-B, would widen SC 170 to add a bike lane, which would result in temporary construction impacts to the road. If a guardrail is installed adjacent to the multi-use path in Alternative S7-C, there may also be temporary construction impacts along the road. There are no other negative direct impacts to residents in Jasper and Chatham Counties. Therefore, this project will positively affect environmental justice communities.

Cultural Resources – No cultural resources impacts are anticipated as a result of Alternative S7.

Transportation and Safety – The addition of the Wildlife Drive Connection Trail will remove pedestrians and bicyclists from the SC 170, which is anticipated to improve safety for all users. Alternatives S7-A and S7-C would have the most benefit, since they would provide accommodation for both bicyclists and pedestrians; whereas Alternative S7-B would provide a bike lane on SC 170.

Visitor Use and Experience – The connection trail will either provide a new trail within the refuge (Alternative S7-A), a new bike lane on SC 170 (Alternative S7-B), or a multi-use path adjacent to SC 170 (Alternative S7-C). All three options will improve visitors' experiences by providing them with a safer, more direct access route between the main entrance/parking area and the east side of the refuge.

Wetlands – Based on NWI mapping, Alternative S7-A would not impact any wetlands. Alternative S7-B would impact 0.04 acres of wetlands, and Alternative S7-C would impact 1.68 acres of wetlands.

Floodplains – The entire alternative would be within the 100-year floodplain, but the impact on the floodplain level would only be a result of new impervious area (1.86 acres for Alternative S7-A, 0.60 acres for Alternative S7-B, and 1.46 acres for Alternative S7-C).

Air Quality – No changes to air quality are anticipated. This alternative will not increase traffic volumes, and the new turn lanes will not move traffic closer to populated areas.

5.5.3 Existing Conditions – Pinckney Island NWR

Alternative P3 is located at the Pinckney Island NWR. The three P3 alternatives have different access options for the refuge - P3-1 has right-in/right-out access, P3-2 has on- and off-ramp access and P3-3 has relocated entrance access. The following section briefly describes the existing natural and human environment within the potentially impacted area.

Land Use – Most of the potentially impacted areas are currently forested, with some grass and soil areas under the bridge and adjacent to the road. All impacted area is currently owned by either SCDOT or USFWS. A section of Last End Point is currently leased to Beaufort County by USFWS for the C.C. Haigh Boat Landing.

Socioeconomic and Community Features – Alternative P3 is located in Beaufort County, South Carolina. As stated previously, according to 2000 Census data, 29.3% of residents in Beaufort County are racial minorities, primarily Black. Approximately 6.8% are Hispanic. The 2005-2007 *American Community Survey* indicated that 8.7% of families in Beaufort County are below the poverty level. However, the refuge draws visitors from across the region. There are no community features within the potentially impacted area.

Environmental Justice – Although the refuge is open to all visitors, residents in Beaufort County may be more likely to pass through this intersection more frequently due to its location within the county. The percentages of minority residents and families below poverty are lower in Beaufort County than in South Carolina. However, since the percentage of Hispanic residents is higher (6.8% versus 2.4%), environmental justice concerns were considered for this alternative.

Cultural Resources – Archaeological sites are located south of US 278, northeast of US 278, and northwest of US 278.

Transportation and Safety – Alternative P3 is located on US 278 at the refuge entrance. On the south side of the intersection is a parking lot for visitors accessing the County boat ramp. A new overflow NWR visitor parking lot may need to be constructed on Last End Point, depending on the USFWS plans for limiting visitor access to the north.

Visitor Use and Experience – This is currently the only existing public vehicular access to the refuge.

Wetlands – Based on NWI mapping, no wetlands are located within the potentially impacted area.

Floodplains – FEMA mapping indicates that the potential impacted area is entirely within the 100-year floodplain.

5.5.4 Potential Impacts – Pinckney Island NWR

5.5.4.1 Alternative P3 – US 278 Underpass

Land Use – **Table 5.3** summarizes the land use impacts of Alternative P3. Most unpaved areas are currently forested, with some grass and soil areas under the bridge and adjacent to the road.

Table 5.3: Land Use Impacts

Impact Type	Impacts for Alternative P3 Design Options (acres)		
	Alternative P3-1	Alternative P3-2	Alternative P3-3
Convert unpaved area to pavement	0.70	1.05	1.10
Convert pavement to unpaved area	0.46	0.87	0.86
Restripe pavement / repave	0.02	0.22	0.10
Total Impact Area	**1.18**	**2.14**	**2.07**
Net Impact on Unpaved Areas	**0.25**	**0.18**	**0.24**

Socioeconomic and Community Features – This alternative will not directly impact any residents, communities, or community features. Alternative P3-2 will impact the C.C. Haigh Boat Landing.

Environmental Justice – Alternative P3 will improve the traffic flow at the intersection of US 278 and the refuge entrance. There are no negative direct impacts on the community. Therefore, this project will positively affect environmental justice communities.

Cultural Resources – The three archaeological sites may be impacted by this alternative. Alternative P3-1 would likely have the fewest impacts to archaeological sites. More detailed analysis will be required during further development of designs and environmental documentation.

Transportation and Safety – Each of the three alignments would have different impacts on access to the north side of US 278 (existing entrance to the refuge) and the south side of US 278 (boat ramp parking and potential new visitor overflow parking lot). These changes are anticipated to improve the safety for drivers entering and exiting the refuge as well as travelers using US 278.

Alternative P3-1 would connect the south side to the north side via a new underpass east of the existing refuge entrance. Visitors from the west would pull into the parking area south of US 278 and take the new underpass under the bridges to the refuge entrance and existing parking area, or they would park at a new parking lot on Last End Point. Visitors from the east would turn into the entrance and park at a new parking lot on Last End Point or follow the underpass to the refuge entrance and existing parking area. Right-in/right-out access would still be allowed at both entrances. This would allow the median opening on US 278 to be closed and prevent left turns for both eastbound and westbound vehicles, while still permitting access to and from both directions on US 278.

Alternative P3-2 would connect the south side to the north side via a new underpass with new acceleration/deceleration lanes. This includes a median closure and a clover-leaf type configuration with one-way on- and off-ramps. Visitors would take a right-lane exit, and then follow the ramps to either the refuge entrance and existing parking area, or to a new parking area on Last End Point. All left turns would be shifted from US 278 to the new underpass, which would have lower traffic volumes and slower

speeds. This alternative would have a weaving area on both sides of US 278, with the same lane on each being used by both entering and exiting traffic.

Alternative P3-3 would connect the south side to the north side via a new underpass and would also move the entrance locations to the refuge and parking area. Moving the refuge entrance to the west and moving the Last End Point access road to the east would maximize deceleration lengths for drivers entering these areas while still allowing both right and left turns for exiting vehicles, without a shared weaving section.

Visitor Use and Experience – Alternative P3 will improve access to Pinckney Island NWR by making it safer to enter and exit the refuge and the south parking area. Alternative P3 will also improve access between the refuge entrance and the parking area by providing a designated connection.

Wetlands – No impacts to wetlands are anticipated based on NWI mapping. However, based on a limited field observation there may be some wetland impacts.

Floodplains – The entire alternative would be within the 100-year floodplain, but the impact on the floodplain level would only be a result of new impervious area (0.25 acres for Alternative P3-1, 0.18 acres for Alternative P3-2, and 0.24 acres for Alternative P3-3).

Air Quality – No changes to air quality are anticipated. This alternative will not increase traffic volumes, and the new turn lanes will not move traffic closer to populated areas.

6. Conclusion

With the cooperation of the project stakeholders, these alternatives should be placed on transportation plans and/or scheduled for further study as appropriate. Based on the preliminary impacts presented in Section 5, the following transportation improvement alternatives are recommended for each refuge during the noted timeframes. It should be noted that based on the recommendation for an internal Wildlife Drive connection trail built on an existing dike using gravel or crushed stone, the timeframe for this project was reduced from long to short range.

These recommendations will serve as a resource to the transportation component of the Comprehensive Conservation Plan for the Savannah and Pinckney Island NWRs.

Savannah NWR Transportation Recommendations

Short Range

- Provide Turn Lanes on US 17 at Visitors Center (completed)
- Provide Turn Lanes on SC 170 at Wildlife Drive
- Implement Wildlife Drive Internal Connection Trail
- Improve Internal Roadways
- Perform Speed Study on SC 170
- Install a Weigh Station / Weigh-in-Motion Station on SC 170
- Provide Wayfinding Improvements
- Improve Speed Enforcement

Medium Range

- Provide Internal Shuttle Service between Wildlife Drive and Visitors Center
- Identify Overflow Parking Areas
- Encourage Pedestrians & Bicyclists to Visit the Refuge

Long Range

- Replace Deficient SC 170 Bridges
- Provide External Transit Service

Pinckney Island NWR Transportation Recommendations

Short Range

- Improve Internal Roadway
- Review Posted Speed Limit on US 278 around the Refuge
- Improve Median Opening
- Provide Wayfinding Improvements
- Encourage Pedestrians & Bicyclists to Visit the Refuge

Medium Range

- Construct US 278 Underpass and Relocate Entrances
- Identify Additional Parking Area
- Provide External Transit Service

Long Range

- Widen US 278
- Lengthen Turn Lanes into Refuge (as part of widening US 278)

7. List of Preparers

Federal Highway Administration

Chris Jaeschke, P.E. – *Planning Engineer*

U.S. Fish and Wildlife Service

Jane Griess – *Project Leader*

Shaw Davis – *Deputy Project Leader*

Amy Ochoa – *Refuge Ranger*

Russ Webb – *Refuge Manager*

Kimley-Horn and Associates, Inc.

John Martin, P.E. – *Program Manager*

Larry Meisner, P.E. – *Project Manager*

Jennifer Bihl, P.E. – *Project Engineer*

Teresa Gresham, P.E. – *Project Engineer*

Alex Shoemaker, E.I (AL) – *Project Analyst*

Appendix A

Supporting Documentation and References

List of Supporting Documentation

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- *Pinckney Island National Wildlife Refuge Wayfinding Inventory,* U.S. Fish and Wildlife Service, April 2009.
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Appendix B

Project Stakeholders

NAME	AGENCY & POSITION	ADDRESS	PHONE	EMAIL
Al Bungard	Chatham County, County Engineer	124 Bull Street, Room 430, Savannah, GA 31401	912-652-7800	coengineer@chathamcounty.org
Bob Bennett	Moffatt & Nichol	71 Sleepy Hollow Lane Belle Head, NJ 08502	908-875-7726	bbennett@moffattnichol.com
Brad Saxon	GDOT, District 5	PO Box 640, Jesup, GA 31598	912-427-5715	bsaxon@dot.ga.gov
Colin Kinton	Beaufort County, Transportation Engineer	PO Drawer 1228 Beaufort, SC 29901-1228	843-470-2631	ckinton@bcgov.net
Dale Terry	Jasper County	PO Box 1244, Ridgeland, SC 29936	843-726-7740	drterry@jaspercountysc.gov
Darrin Shoemaker	Town of Hilton Head Island	One Town Center Court Hilton Head Island, SC 29928	843 341-4774	darrins@hiltonheadislandsc.gov
Dave Jirousek	Jasper County	PO Box 1659 Ridgeland, SC 29936	843-717-3661	djirousek@jaspercountysc.gov
Ginnie Kozak	Lowcountry Council of Governments	PO Box 98, Yemassee, SC 29945	843 726-5536	gkozak@lowcountrycog.org
LeNolan Edge	City of Hardeeville	PO Box 609 Hardeeville, SC 29927	843-784-2231	ledge@cityofhardeeville.com
Mark Nesbit	SCDOT, District 6 Traffic Engineer	6355 Fain Blvd. North Charleston, SC 29406	843-740-1667 X118	nesbitdm@scdot.org
Mark Pleasant	SCDOT, Planning	955 Park Street Columbia, SC 29201	803-737-1437	pleasantmd@scdot.org
Mark Wilkes	MPC, Director of Transportation Services	PO Box 8246, Savannah, GA 31412	912-651-1440	wilkesm@thempc.org
Michael Black	SCDOT, District 6 Maintenance Engineer	2401 Maintenance Way, North Charleston, SC 29406	843 740-1655	blackjm@scdot.org
Mike Weiner	City of Savannah, Traffic Engineer	PO Box 1027, Savannah, GA 31402	912-651-6600	mweiner@savannahga.gov
Randy Weitman	Georgia Ports Authority	P.O. Box 2406 Savannah, GA 31402	912-964-3916	rweitman@gaports.com
Steve Bevington	East Coast Greenway, South Atlantic Trail Coordinator	27B North Road Wakefield, RI 02879	919-638-6250	steve@greenway.org

Appendix C

Stakeholder Meeting Notes

April 16, 2009

September 3, 2009

December 9, 2009

Savannah & Pinckney Island NWR Transportation Study
Federal Highway Administration
Eastern Federal Lands Highway Division
Contract No. DTFH71-09-D-00001

Initial Stakeholders Meeting
April 16, 2009, 10:00 AM

Savannah National Wildlife Refuge Complex
1000 Business Center Drive
Savannah, GA 31405

MEETING NOTES

Attendees:

Stakeholders
Nick Rebovich, SCDOT, District 6 (via conference call)
Colin Kinton, Beaufort County
Mark Wilkes, MPC
Brad Saxon, GDOT, District 5
Ginnie Kozak, LowcountryCOG
Bob Bennett, Moffatt & Nichol (representing Jasper Ocean Terminal)
Dave Jirousek, Jasper County
LeNolan Edge, City of Hardeeville

US Fish and Wildlife Service (USFWS)
Jane Griess
Shaw Davis
Amy Ochoa

Federal Highway Administration (FHWA)
Chris Jaeschke
Kris Riesenberg

Kimley-Horn and Associates, Inc. (KHA)
Larry Meisner
Jennifer Bihl
John Martin

Introduction

The stakeholders meeting for the Savannah & Pinckney Island National Wildlife Refuge (NWR) Transportation Study convened on April 16, 2009 at the USFWS offices. Attendees introduced themselves. Chris Jaeschke welcomed the stakeholders and provided the study background and purpose while Jane Griess described the study area. Chris thanked everyone for their participation in this study.

Background and Discussion

- The purpose of the stakeholders meeting was threefold: 1) to gain familiarity with the study scope, 2) to understand significant concerns and gain consensus of transportation issues, and, 3) to discuss and request assistance for data collection.
- There will be two other stakeholder meetings throughout the study. One will be in August to present the existing conditions and some preliminary alternatives and analysis. The second one is planned to occur in October to present the alternatives developed from public/stakeholder input. Each of these meetings will be followed by a public meeting.
- The overall schedule for the study is 8 – 9 months and is targeted for completion in January 2010.
- This transportation study will be an input to the Comprehensive Conservation Plan (CCP) required by law to be completed for the all National Wildlife Refuges. The CCP has a 15-year horizon or about the year 2025.
- A unique consideration for this study is to balance the protection of habitat with the safety of the users of their facilities. This study will look for mutually beneficial solutions for all stakeholders.
- This study focuses on two National Wildlife Refuges, Pinckney Island NWR and Savannah NWR. Each has approximately 150,000 – 200,000 guests per year. At Pinckney Island, Beaufort County has a 99-year lease on 6 acres on Last End Point (southern end of the island, south of US 278). This is currently being used as a boat landing and parking area.
- The following issues and concerns were listed regarding Pinckney Island and Savannah NWR.
    - Safety
        - Traffic volumes, type of vehicles, and speed
        - Truck traffic on SC 170 at the Savannah NWR
    - Road conditions (sight distance, pavement width and markings, clear zone)
    - Turn lane needs
        - Pinckney Island NWR
            - Right turn lanes are short due to bridge constraints
        - Savannah NWR
            - Visitor Center on US 17
                - Right-turn lane approved
                - Left-turn lane designed but working on funding and SCDOT permit
            - Wildlife Drive and US 170
                - Left-turn lane needed?

- New developments and proposals having significant transportation impacts in the area
    - Jasper Ocean Terminal
    - Riverport Development
    - Eventual widening of US 17
    - Eventual widening of US 278 bridge from Pinckney Island to Hilton Head Island
- Wayfinding
    - USFWS has performed an inventory
    - Additional advance signing at Pinckney Island NWR?
- Intermodal Connectivity
    - Boat
    - Bike
    - Pedestrian
    - Transit (tram, school buses, etc.)
    - Regional trail coordination (Pedestrian and Bike)

- Data needs from stakeholders were then discussed. The following data was identified and if available the designated group is identified.
    - Roadway Plans and As-builts
        - SCDOT for US 278 and SC 170 in the areas around the Refuges
        - Bluffton Parkway plans from Beaufort County
    - Traffic Counts and Accident Data
        - AADT data is available on SCDOT and GDOT websites
        - SCDOT, Dist. 6 will provide traffic count at Windmill Harbor and will check for more in these areas
        - Beaufort County will provide the truck study for US 278
        - Detailed accident data from Road Safety Audit
        - Other turning movement count data at NWR entrances, if available
    - Traffic Projections and Model
        - 2025 Jasper County traffic model will be completed in 6 weeks (toward the end of May)
        - Beaufort County model will have US 278 data
        - GA models don't cross the river
    - Bridge Inspection Reports
        - On GDOT's website for any GA bridges
        - Will need to get from SCDOT for bridges on SC 170
    - GIS data
        - Beaufort County, Jasper County, City of Hardeeville, and LowcountryCOG have data – Kimley-Horn to let them know what is needed
    - Tourism Visitor Data
        - Hilton Head Island-Bluffton Chamber of Commerce
        - Savannah Area Chamber of Commerce
        - Coastal Touring Club
        - East Coast Greenway

- Bike/Pedestrian
    - Beaufort County plan is online
    - GDOT Statewide Plan is online
- Transit
    - No transit service between GA and SC
- Other reports and projects
    - Beaufort County did counts at the County Boat Landing two years ago
    - Back River Bridge replacement (planned for two lanes) on US 17 is still moving forward, GDOT is working on the geotech now
    - No current plans for SC 170 from GA state line to US 17
    - Map for potential corridors in this area related to the Jasper Ocean Terminal – LowcountryCOG to provide
    - Environmental work currently being performed for widening the two-lane section of US 17 by SCDOT
    - State Infrastructure Bank application for proposed exit 3 on I-95 by Hardeeville is available
    - Scenic Highway Corridor Management Plan – from LowcountryCOG
    - Business Plan for fixed bus service from I-95 to Hilton Head Island – from LowcountryCOG
    - US 17 APPR – from LowcountryCOG
    - GA 25 bridge being replaced over the Norfolk Southern railroad.
    - There are no plans for Jimmy Deloach Parkway to be extended to GA 25 at this time – this could divert truck traffic off of SC 170

It was suggested that the following additional stakeholders be added to the group for the next meeting:

- Darrin Shoemaker, Town of Hilton Head
- Mark Pleasant, SCDOT Planning
- Randy Weitman, Georgia Ports Authority
- East Coast Greenway representative

<u>Summary</u>

The meeting was adjourned after the discussion noted above. Kimley-Horn will follow-up with stakeholders to collect data discussed at this meeting.

Savannah & Pinckney Island NWR Transportation Study
Federal Highway Administration
Eastern Federal Lands Highway Division
Contract No. DTFH71-09-D-00001

Stakeholders Meeting
September 3, 2009, 2:00 PM

Savannah National Wildlife Refuge Complex
1000 Business Center Drive
Savannah, GA 31405

MEETING NOTES

Attendees:

Stakeholders
Nick Rebovich, SCDOT, District 6 (via conference call)
Mark Pleasant, SCDOT, Planning (via conference call)
Mark Wilkes, MPC
Brad Saxon, GDOT, District 5
Ginnie Kozak, Lowcountry Council of Governments (LowCOG)
Bob Bennett, Moffatt & Nichol, representing Jasper Ocean Terminal
Darrin Shoemaker, Town of Hilton Head Island
Randy Weitman, Georgia Ports Authority

US Fish and Wildlife Service (FWS)
Jane Griess
Shaw Davis
Amy Ochoa
Russ Webb

Federal Highway Administration (FHWA)
Chris Jaeschke

Kimley-Horn and Associates, Inc. (KHA)
Larry Meisner
Jennifer Bihl
Alex Shoemaker

Introduction

The second stakeholders meeting for the Savannah and Pinckney Island National Wildlife Refuges (NWR) Transportation Study convened on September 3, 2009 at the USFWS offices. Attendees introduced themselves and Chris Jaeschke welcomed everyone and provided a brief description and the purpose of the meeting in regards to reviewing the preliminary candidate alternatives identified in the study.

Review of Deliverables

Larry Meisner discussed the three deliverables submitted to date for the transportation study, which included the following:

- Existing Conditions Report
- Traffic Needs and Safety Report
- Preliminary Candidate Alternatives Report

Larry reviewed what each of the reports covered and the purpose of each one. He then focused on the specific issues identified during the study and the preliminary candidate alternatives identified. A preliminary stakeholder matrix was displayed and included in handouts showing each alternative matched with the relevant stakeholders to determine potential partnering opportunities. The subsequent discussion followed the figures showing the alternatives and the matrix.

In addition to the initial discussion on the alternatives, additional discussion is noted below as well as possible actions and/or follow-up items pertaining to the future implementation of the preliminary candidate alternatives for each refuge.

Savannah National Wildlife Refuge (SNWR)

- *Visitors Center and US 17*
    - Turn Lanes on US 17 – As part of SCDOT'S review, Nick Rebovich has seen the plans for the new turns lanes on US 17 for the Visitors Center. FWS is still pursuing funding for the turn lanes. FWS staff emphasized the need to maintain safe conditions for access on US 17. The only planned access point for the refuge on US 17 is at the new Visitors Center, mainly due to extensive wetlands along US 17.
    - Implement variable message signs (ITS applications) – Such signs could be used to provide incident management, guidance for roadway incidents, future transit arrival/departure times, identification of conditions ahead, and additional real time information. Any variable message sign installed should be solar powered.
    - US 17 widening – Environmental studies are currently being performed for the planned future widening of US 17. If widening occurs on the west side, it would take land from SNWR, resulting in a potential Section 4(f) impact and requirement for mitigation. FWS voiced concerns over the increased traffic for the proposed interchange at Exit 3 on I-95 and the planned RiverPort development.

- *SC 170*
    - Bridge Weight Limits – Replace or post a weight limit on the bridges with low sufficiency ratings. FWS has a concern over the existing bridges on SC 170, noting that they are required to obtain permits for their equipment to traverse the bridges, while commercial trucks continue to travel on the same bridges with no apparent restrictions.

        - **[Action Item]** The consultant will check with SCDOT's bridge division to determine if these bridges are included in the two-year program to be replaced.
        - **[Action Item]** The consultant will contact Mark Nesbit at SCDOT District 6 to obtain the inspection reports of the existing bridges. A Freedom of Information Act (FOIA) request may be needed.
        - Based on contents of inspection reports, it may be appropriate to recommend posting weight limits on bridges.
        - Brad Saxon indicated that the bridges on Georgia Route 25 should be adequate, including the historic Houlihan bridge.
    - High Truck Volume on SC 170 – High truck volumes on this two-lane road may be a result of trucks desiring to avoid weigh stations on I-95. A recommendation to consider installing weigh-in-motion stations to monitor trucks on SC 170 could potentially change the truck traffic pattern on SC 170. Installation of a weigh-in-motion station would cost approximately $25,000 and would need to be requested for installation with SCDOT. The Georgia Ports Authority does not determine or have any influence on the routes trucks take once leaving their facility. Rather, trucks will travel on the easiest path available. It was indicated that the I-95/US 21 interchange is difficult for truck drivers to navigate, resulting in trucks using alternative paths.
    - Speed Study on SC 170 – Conduct a speed study to review existing speeds and to determine if additional speed enforcement and/or reduction (such as traffic calming techniques) are warranted. **[Action Item]** For SCDOT to perform a speed study a formal request must be placed through SCDOT (District 6). SCDOT and GDOT have no direct control over enforcement agencies pertaining to speed limit enforcement and would need to ask the local law enforcement agency to assist in reducing the speeding problems in the study area.
    - Wayfinding Improvements – **[Action Item]** Submit sign inventory and recommendations developed by FWS to SCDOT & GDOT. Requests to GDOT should be submitted to Brad Saxon. Requests to SCDOT should be submitted to Mark Nesbit. For signs on Interstate 95 in Georgia, contact Nicky Booser.
    - Implement variable message signs (ITS applications) – See discussion above.

- *Wildlife Drive*
    - Add left-turn lane on westbound SC 170, lengthen existing eastbound right-turn lane
    - Implement variable message signs (ITS applications) – See discussion above.
    - Continue to maintain internal roadways
    - Construct a connector trail between Wildlife Drive entrance and exit, either along SC 170 or internally on existing dikes – The addition of bike lanes/multiuse path on SC 170 could be accomplished through the use of Rural Enhancement Funds. Jasper County would need to be involved, but the county is allowed one rural enhancement project per year. The next submittal timeframe is in approximately six months. Improvements should also be placed on the Lowcountry Council of Governments (LowCOG) Long Range Plan (LRP). Also, MPC is developing a non-motorized transportation plan.

- Provide shuttle service between Wildlife Drive and Visitors Center – An external transit and route is not believed to be feasible at this time. Any service would have to be a specialized shuttle, most likely originating from Savannah, GA.
- Construct a bike path from Wildlife Drive and the Visitors Center – A graded trail would raise concerns with wetland impact. Also, due to annual controlled burns in portions of the NWR a boardwalk is not feasible.

Pinckney Island National Wildlife Refuge (PINWR)

- Provide access improvements at US 278.
  - Lengthening turn lanes is restricted by existing US 278 bridges, but should be considered when US 278 bridges are widened. Widening of the bridges is currently not included in any improvement programs. There is potential for local opposition to widening US 278 bridges.
  - With Hilton Head Island approximately 85% built out, it is expected that an increase in reverse commuting to Bluffton will occur, balancing peak flows somewhat.
  - Beaufort County is currently reviewing possible lengthening of the median opening at PINWR to better accommodate vehicles pulling boats on trailers.
  - A US 278 underpass would enable the median opening to be closed and make access to the refuge, "right in/right out." Long term goal of FWS is to have a Visitors Center on the southern portion of PI. FWS and other stakeholders agreed that the underpass should be open for public access (Option 3).
  - The Town of Hilton Head Island (HHI) recognizes the need to improve US 278, the only access to island, and is willing to assist in measures that increase capacity and reduce vehicle conflicts.
  - It is not feasible to signalize US 278 and PINWR access, due to safety concerns and the potential of creating a bottleneck issue.
  - There is concern with the completion of Bluffton Parkway in regards to lane balance (5 eastbound lanes narrowing to 2 across the bridge).
  - The potential for a toll on the US 278 bridges would not be well received.
  - Potential concept of shared acceleration and deceleration lanes with median closure (dual loops, plus loop under bridge.
    - **[Action Item]** The consultant will review the design feasibility and limitations for this alternative.
    - FWS wants to keep vehicles off the west side of the island
- Provide additional parking south of US 278 – Consider existing parking at County boat ramps. Commercial ferry service at the boat ramp is not allowed in the lease agreement between Beaufort County and FWS.
- ITS Applications – Variable message signs could be used to provide incident management, transit arrival/departure times, conditions ahead, and additional real time information. Any variable message sign installed should be solar powered.
- Fixed Route Transit on US 278
  - Opposition to a transit service exists with HHI elected officials.
  - If and when HHI approves a public transit service, a route to PINWR would be considered.

- Lowcountry Adventure, who provides tours to PINWR, may be able to gauge interest in a private shuttle service from local resorts to the refuge.
- Wayfinding Improvements. **[Action Item]**Submit sign inventory and recommendations developed by FWS to Mark Nesbit at SCDOT.

Stakeholders were encouraged to send any additional comments regarding the information presented in the deliverables or meeting to the team.

The next steps for the transportation study include:

- Refine and further screen alternatives
- Provide list of recommendations
- Meet again in early November to review recommendations, at the new Visitors Center with stakeholders and public
- Include recommendations in the CCP
- Final meeting

Savannah & Pinckney Island NWR Transportation Study
Eastern Federal Lands Highway Division
Federal Highway Administration
Contract No. DTFH71-09-D-00001

Stakeholders Meeting
December 9, 2009, 2:00 PM

Kimley-Horn and Associates, Inc
710 Boundary Street, Suite 1D
Beaufort, SC 29902

MEETING NOTES

Attendees:

Stakeholders
Colin Kinton, Beaufort County, Transportation Engineer
Mark Nesbit, SCDOT, District 6
Brad Saxon, GDOT, District 5
Darrin Shoemaker, Town of Hilton Head Island

US Fish and Wildlife Service (FWS)
Russ Webb
JoAnn Clark, Region 4, Regional Office

Federal Highway Administration (FHWA)
Chris Jaeschke

Kimley-Horn and Associates, Inc. (KHA)
Larry Meisner
Jennifer Bihl
Alex Shoemaker

Introduction

The third stakeholders meeting for the Savannah and Pinckney Island National Wildlife Refuges (NWR) Transportation Study convened on December 9, 2009 at the Kimley-Horn and Associates, Inc office in Beaufort, SC. The Savannah NWR Visitors Center was not available due to an accident that had occurred that morning. Attendees introduced themselves and Larry Meisner welcomed everyone and provided a brief summary of previous meetings and deliverables.

Purpose of Meeting

The purpose of this meeting was to review the recommendations presented in the latest report, the *Short and Long Range Transportation Plan*, and discus the potential partnerships with the stakeholders in determining what necessary steps are required for implantation strategies.

Discussion

The discussion of recommendation and action items for the Savannah and Pinckney Island NWR is summarized below.

Savannah National Wildlife Refuge (SNWR)

- Turn Lanes at Wildlife Drive
    - Wildlife Drive is the principle access into the refuge. Adding a WB left-turn lane and lengthening the right-turn lane would provide safer conditions.
    - SCDOT would administer issuance of encroachment permits.
    - **[Action Item – KHA]** Contact Lowcountry COG (Ginnie Kozak) to determine eligibility for enhancement funds.
- Turn Lanes at Visitors Center: completed
- SC 170 Resurfacing
    - **[Action Item – Mark Nesbit]** Determine if SC 170 is on SCDOT's resurfacing list.
    - There may be a potential for shoulder paving (2 ft minimum for safety).
- SC 170 Bridges
    - The bridge inspection reports were reviewed and discussed.
    - Continue to investigate getting bridges on replacement/rehab list.
    - **[Action Item -KHA]** Investigate if these bridges should be posted with weight limits; contact: Curtis Brice, District Bridge Maintenance Engineer, 843-740-1695.
- Internal Connecting Trail
    - Construct internal trail to provide safe access for pedestrians and bicyclist to return to Wildlife Drive entrance. Trail would be located on the raised dike adjacent to John Hill Canal
        - Top of dike is approximately 11 ft above sea level, with 3:1 slopes.
        - One 75 ft section has experienced some settling and will need grading.
        - Surface is compacted, currently used occasionally by USFWS vehicles – closed to public access.
    - Crushed stone is recommended to provide for a more stable surface for bicyclists, but final decision will be made in design.
- Encourage pedestrian/bicyclist use
    - **[Action Item - KHA]** Contact Jasper County to see if bicycle route is being considered on SC 170.
- Wayfinding Improvements
    - USFWS Submitted Wayfinding Inventory to GDOT, SCDOT.
    - GDOT is currently responding to requests of inventory and will coordinate with USFWS. Damaged/missing signs are being replaced.
    - **[Action Item – Mark Nesbit]** Determine status of SCDOT review of sign inventory.
- Additional Recommendations
    - SCDOT to conduct speed study on SC 170 to determine if speed reduction is warranted.
    - SCDOT to install portable weigh station or weigh-in-motion station on SC 170.
        - Monitor truck weights and potentially reduce high truck volumes on SC 170.

        - Reducing the truck traffic may help relieve stress on deficient bridges.

Pinckney Island National Wildlife Refuge (PINWR)

- Median Improvements/Underpass Alternatives
    - Need to review specific locations of potential archeological sites that may be impacted by plan.
    - County currently considering widening the existing median
        - Safer for vehicles with boat trailers turning out
    - Design revisions to recommended plan:
        - Discourage wrong way movements by signing and channelization.
        - Consider free flow entrance from EB entrance to site, stop traffic on loops.
        - Provide sufficient radii for entering vehicles pulling trailers.
    - Potential sources of funding for underpass/new entrance locations include USFWS, SCDOT, Town of Hilton Head Island, Beaufort County
        - **[Action Item – KHA]** Contact Lowcountry COG (Ginnie Kozak) to determine eligibility for enhancement funds
        - Town may fund improvements to US 278 east of Simmonsville Rd if it improves access into the island; however, funds may be tied up for Marshland Road resurfacing in near term
- Wayfinding
    - Consider alternatives to improve safety conditions using additional signage
        - Consider additional caution signs "slow left turning traffic ahead" or consider detector and ITS signs – "Vehicle entering intersection when flashing."
        - Consider signs directing people to left lane to enter refuge (EB) or boat ramp (WB).
        - **[Action Item – KHA to review MUTCD standards]**
        - **[Action Item – KHA contact SCDOT bridge section]** Signs attached to bridge structure need special approvals.
        - There may be resistance from HHI residents to locating signs on bridge.
    - Consider additional wayfinding signs per USFWS inventory recommendations.
    - Supplement the historical marker signs on HHI to include PINWR
- Speeds on bridge
    - Existing speed limits entering from Bluffton are 45 mph, increase to 55 mph on the bridges, and decrease to 50 mph on HHI
    - Consider lowering speed on bridges to 50 mph

The next steps for the transportation study include:

- Contact remaining stakeholders with updates and solicit any additional comments, particularly Bob Bennett and Randy Weitman.
- Perform action items and incorporate comments from stakeholders into final recommendations.
- Develop and submit draft and final Transportation Study Report.

Appendix D

Supporting Data Tables

Table A.1: Income information for Study Area Counties and States Including National Information

	Jasper County, SC		Beaufort County, SC		Chatham County, GA		Effingham County, GA		South Carolina		Georgia		US	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Total Households	7,306	100%	56,539	100%	96,627	100%	16,568	100%	1,664,561	100%	3,364,749	100%	100,294,911	100%
Less than $10,000	749	10.30%	3,508	6.20%	10,255	10.60%	1,051	6.30%	161,845	9.70%	283,341	8.40%	10,067,027	10.04%
$10,000 to $14,999	727	10.00%	2,213	3.90%	6,071	6.30%	462	2.80%	112,222	6.70%	190,132	5.70%	6,657,228	6.64%
$15,000 to $24,999	1,125	15.40%	6,076	10.70%	11,659	12.10%	1,558	9.40%	214,400	12.90%	368,512	11.00%	13,536,965	13.50%
$25,000 to $34,999	1,134	15.50%	6,613	11.70%	11,535	11.90%	1,917	11.60%	206,904	12.40%	376,022	11.20%	13,519,242	13.48%
$35,000 to $49,999	1,290	17.70%	8,297	14.70%	14,424	14.90%	2,949	17.80%	259,536	15.60%	507,414	15.10%	12,202,061	12.17%
$50,000 to $74,999	1,221	16.70%	10,623	18.80%	17,621	18.20%	4,232	25.50%	309,570	18.60%	637,913	19.00%	20,540,604	20.48%
$75,000 to $99,999	546	7.50%	7,158	12.70%	10,289	10.60%	1,982	12.00%	182,691	11.00%	402,841	12.00%	10,799,245	10.77%
$100,000 to $149,999	354	4.80%	7,203	12.70%	8,512	8.80%	1,779	10.70%	141,833	8.50%	363,953	10.80%	8,147,826	8.12%
$150,000 to $199,999	160	2.20%	2,197	3.90%	2,954	3.10%	340	2.10%	39,615	2.40%	121,125	3.60%	2,322,038	2.32%
$200,000 or more	0	0.00%	2,651	4.70%	3,307	3.40%	298	1.80%	35,945	2.20%	113,496	3.40%	2,502,675	2.50%
Median household income (dollars)	33,959		52,595		43,443		51,422		42,405		48,540		41,994	

Source: 2005-2007 *American Community Survey* 3 year estimates

Table A.2: Income information for Study Area Municipalities

	Hardeeville SC*		Bluffton, SC*		Garden City, GA*		Hilton Head Island, SC		Port Wentworth, GA*		Savannah, GA	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Total Households	**556**	**100**	**396**	**100**	**3,929**	**100**	15425	100%	**1,286**	**100**	**51,732**	**100%**
Less than $10,000	119	21.4	18	4.5	469	11.9	733	4.80%	89	6.9	7,818	15.10%
$10,000 to $14,999	43	7.7	23	5.8	336	8.6	463	3.00%	56	4.4	4,796	9.30%
$15,000 to $24,999	83	14.9	48	12.1	724	18.4	1,243	8.10%	231	18	7,673	14.80%
$25,000 to $34,999	78	14	49	12.4	710	18.1	1,730	11.20%	142	11	6,960	13.50%
$35,000 to $49,999	83	14.9	65	16.4	656	16.7	1,719	11.10%	267	20.8	8,325	16.10%
$50,000 to $74,999	96	17.3	130	32.8	685	17.4	2,804	18.20%	264	20.5	7,917	15.30%
$75,000 to $99,999	41	7.4	39	9.8	205	5.2	2,211	14.30%	168	13.1	3,866	7.50%
$100,000 to $149,999	3	0.5	16	4	121	3.1	2,407	15.60%	53	4.1	2,763	5.30%
$150,000 to $199,999	2	0.4	8	2	8	0.2	761	4.90%	7	0.5	1,013	2.00%
$200,000 or more	8	1.4	0	0	15	0.4	1,354	8.80%	9	0.7	601	1.20%
Median household income (dollars)	28,977		48,611		29,718		65,214		42,241		32,616	

Source: 2005-2007 *American Community Survey* 3 year estimates

* indicates 2005-2007 was not available so 2000 US Census Bureau figures were used

Table A.3: Demographic Information for Study Area Municipalities, Counties, and States Including National Information

	White		Black or African American		American Indian and Alaska Native		Asian		Native Hawaiian and Other Pacific Islander		Some other race		Total population	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Jasper County, SC	8,909	41.30%	10,593	49.10%							1,935	9.00%	21,569	100%
Beaufort County, SC	107,959	75.30%	31,237	21.80%	827	0.60%	1,840	1.30%	272	0.20%	3,213	2.20%	145,348	100%
Hardeeville*	834	46.50%	733	40.90%	21	1.20%	15	0.80%	7	0.40%	204	11.40%	1814	100%
Bluffton*	810	63.50%	414	32.50%	7	0.50%	7	0.50%			41	3.20%	1279	100%
Hilton Head Island	31,697	87.40%	3,187	8.80%	158	0.40%	370	1.00%			952	2.60%	36,364	100%
Chatham County, GA	136,407	55.80%	99,999	40.90%	1,528	0.60%	6,113	2.50%	276	0.10%	3,089	1.30%	244,296	100%
Effingham County, GA	40,912	84.30%	7,356	15.20%									48,527	100%
Savannah	49,985	39.20%	74,262	58.20%	904	0.70%	2,375	1.90%			1,785	1.40%	127,526	100%
Garden City*	6,292	55.70%	4,602	40.80%	124	1.10%	153	1.40%	26	0.20%	385	3.40%	11,582	100%
Port Wentworth*	2,730	83.30%	474	14.50%	24	0.70%	41	1.30%	3	0.10%	29	0.90%	3,301	100%
State of Georgia	5,912,984	63.40%	2,817,444	30.20%	59,014	0.60%	280,065	3.00%	8,743	0.10%	381,958	4.10%	9,331,515	100%
State of South Carolina	2,959,701	68.30%	1,266,373	29.20%	30,183	0.70%	59,159	1.40%	3,694	0.10%	66,540	1.50%	4,330,933	100%
US*	211,460,626	75.14%	34,658,190	12.32%	2,475,956	0.88%	10,242,998	3.64%	398,835	0.14%	15,359,073	5.46%	281,421,906	100%

Source: 2005-2007 *American Community Survey* 3 year estimates

* indicates 2005-2007 was not available so 2000 US Census Bureau figures were used

Appendix E

Bridge Inspection Reports

THE OFFICE OF BRIDGE MAINTENANCE

NATIONAL BRIDGE INVENTORY
STRUCTURE INVENTORY AND APPRAISAL REPORT

IDENTIFICATION

(1) State Name - SOUTH CAROLINA — Code 454
(8) Structure Number — # 0002740017000100
(5) Inventory Route (On/Under) — On - 141001700
(2) State Highway Department District — 6
(3) County Code 53 — (4) Place Code
(6) Features Intersected LITTLE BACK RIV-GA. LINE
(7) Facility Carried SC 170
(9) Location @ GA/SC LN
(11) Milepoint — 0.010
(12) Base Highway Network -PART OF NET — Code 1
(13) LRS Inventory Route & Subroute — 00SC00170000
(16) Latitude 32 Degrees 9 Minutes 42.00 Seconds
(17) Longitude 81 Degrees 7 Minutes 54.00 Seconds
(98) Border Bridge State Code — % SHARE %
(99) Border Bridge Structure No. #

STRUCTURE TYPE AND MATERIAL

(43) Structure Type Main: MATERIAL -STEEL
Type - 2 — Code 302
(44) Structure Type Appr: MATERIAL -CONCRETE
Type - TEE BEAM — Code 104
(45) Number of Spans in Main Unit — 1
(46) Number of Approach Spans — 77
(107) Deck Structure Type -CONCRETE CAST-IN-PLC — Code 1
(108) Wearing Surface / Protective System:
A) Type of Wearing Surface - BITUMINOUS — Code 6
B) Type of Membrane - UNKNOWN — Code 8
C) Type of Deck Protection - UNKNOWN — Code 8

AGE AND SERVICE

(27) Year Built — 1940
(106) Year Reconstructed — 1953
(42) Type of Service On -HIGHWAY
Under - WATERWAY — Code 5
(28) Lanes: On Structure = 2 — Under Structure = 0
(29) Average Daily Traffic — 5200
(30) Year of ADT 2008 — (109) Truck ADT — 06 %
(19) Bypass, Detour Length — 0 MI

GEOMETRIC DATA

(48) Length of Maximum Span — 49 FT
(49) Structure Length — 1987 FT
(50) Curb or Sidewalk: Left 1.5 FT — Right 1.5 FT
(51) Bridge Roadway Width Curb to Curb — 28 FT
(52) Deck Width Out to Out — 31.5 FT
(32) Approach Roadway Width (W/Shoulders) — 40 FT
(33) Bridge Median -NONE — Code 0
(34) Skew 0 Deg — (35) Structure Flared — NO
(10) Inventory Route Min Vert Clear — 99 FT 99 IN
(47) Inventory Route Total Horz Clear — 28.0 FT
(53) Min Vert Clear Over Bridge Roadway — 99 FT 99 IN
(54) Min Vert Underclear Ref - NOT HWY OR RX — 0 FT 0 IN
(55) Min Lat Underclear Right Ref -NOT HWY OR RXR — 99.9 FT
(56) Min Lat Underclear Left — 0.0 FT

NAVIGATION DATA

(38) Navigation Control -NONE — Code 0
(111) Pier Protection - — Code
(39) Navigation Vertical Clearance — FT
(116) Vert-Lift Bridge Nav Min Vert Clear — FT
(40) Navigation Horizontal Clearance — FT

Sufficiency Rating = 48.5
Functionally Obsolete = NO
Structurally Deficient = YES

CLASSIFICATION — Code

(112) NBIS Bridge Length - — YES
(104) Highway System - NOT NHS — 0
(26) Functional Class - RURAL-MIN ART — 03
(100) Strahnet Highway - NOT STRAH HWY — 0
(101) Parallel Structure - NONE EXIST — N
(102) Direction of Traffic - 2-WAY TRAFFIC — 2
(103) Temporary Structure -
(105) Federal Lands Highways -N/A — 0
(110) Designated National Network - NO — 0
(20) Toll - ON FREE ROAD — 3
(21) Maintain - SCDOT — 1
(22) Owner - SCDOT — 1
(37) Historical Significance - NOT DETERMINABLE — 4

CONDITION — Code

(58) Deck - SATISFACTORY — 6
(59) Superstructure - POOR — 4
(60) Substructure - SATISFACTORY — 6
(61) Channel and Channel Protection - BANKS PROT — 8
(62) Culverts - NOT APPLICABLE — N

LOAD RATING AND POSTING — Code

(31) Design Load - HS 15 — 3
(64) Operating Rating - AS — 37
(66) Inventory Rating - AS — 27
(70) Bridge Posting - EQUAL/ABOVE LEGAL LOADS — 5
(41) Structure Open, Posted or Closed - — A
Description -OPEN, NO RESTRICT

APPRAISAL — Code

(67) Structure Evaluation - MEETS MIN TOLER LIMITS — 4
(68) Deck Geometry — 4
(69) Underclearances, Vertical and Horizontal — N
(71) Waterway Adequacy — 6
(72) Approach Roadway Alignment — 8
(36) Traffic Safety Features — 0010
(113) Scour Critical Bridges - SCOUR WITHIN LIMITS — 5

PROPOSED IMPROVEMENTS

(75) Type of Work - REPLACE/LOAD CAPACITY — Code 311
(76) Length of Structure Improvement — 1987.0 FT
(94) Bridge Improvement Cost — $6,630,000
(95) Roadway Improvement Costs — $1,658,000
(96) Total Project Cost — $9,945,000
(97) Year of Improvement Cost Estimate — 2009
(114) Future ADT — 8268
(115) Year of Future ADT — 2028

INSPECTIONS

(90) Inspection Date 02/2008 — (91) Frequency 24 Mo
(92) Critical Feature Inspection: — (93) CFI Date
A) Fracture Crit Detail NO Mo — A)
B) Underwater Insp NO Mo — B)
C) Other Special Insp NO Mo — C)

NATIONAL BRIDGE INVENTORY
STRUCTURE INVENTORY AND APPRAISAL REPORT

IDENTIFICATION

(1) State Name - SOUTH CAROLINA Code 454
(8) Structure Number # 0002740017000200
(5) Inventory Route (On/Under) On - 141001700
(2) State Highway Department District 6
(3) County Code 53 (4) Place Code
(6) Features Intersected LAURA HILL SWAMP
(7) Facility Carried SC 170
(9) Location NR GA/SC LN
(11) Milepoint 1.420
(12) Base Highway Network -PART OF NET Code 1
(13) LRS Inventory Route & Subroute 00SC00170000
(16) Latitude 32 Degrees 10 Minutes 0.00 Seconds
(17) Longitude 81 Degrees 6 Minutes 36.00 Seconds
(98) Border Bridge State Code % SHARE %
(99) Border Bridge Structure No. #

STRUCTURE TYPE AND MATERIAL

(43) Structure Type Main: MATERIAL -CONCRETE
Type - 4 Code 104
(44) Structure Type Appr: MATERIAL -OTHER OR N/A
Type - OTHER OR N/A Code 000
(45) Number of Spans in Main Unit 17
(46) Number of Approach Spans 0
(107) Deck Structure Type -CONCRETE CAST-IN-PLC Code 1
(108) Wearing Surface / Protective System:
A) Type of Wearing Surface - BITUMINOUS Code 6
B) Type of Membrane - UNKNOWN Code 8
C) Type of Deck Protection - UNKNOWN Code 8

AGE AND SERVICE

(27) Year Built 1940
(106) Year Reconstructed 1953
(42) Type of Service On -HIGHWAY
Under - WATERWAY Code 5
(28) Lanes: On Structure = 2 Under Structure = 0
(29) Average Daily Traffic 5200
(30) Year of ADT 2008 (109) Truck ADT 06 %
(19) Bypass, Detour Length 0 MI

GEOMETRIC DATA

(48) Length of Maximum Span 25 FT
(49) Structure Length 423 FT
(50) Curb or Sidewalk: Left 1.5 FT Right 1.5 FT
(51) Bridge Roadway Width Curb to Curb 28 FT
(52) Deck Width Out to Out 31.5 FT
(32) Approach Roadway Width (W/Shoulders) 40 FT
(33) Bridge Median -NONE Code 0
(34) Skew 0 Deg (35) Structure Flared NO
(10) Inventory Route Min Vert Clear 99 FT 99 IN
(47) Inventory Route Total Horz Clear 28.0 FT
(53) Min Vert Clear Over Bridge Roadway 99 FT 99 IN
(54) Min Vert Underclear Ref - NOT HWY OR R> 0 FT 0 IN
(55) Min Lat Underclear Right Ref -NOT HWY OR RXR 99.9 FT
(56) Min Lat Underclear Left 0.0 FT

NAVIGATION DATA

(38) Navigation Control -NONE Code 0
(111) Pier Protection - Code
(39) Navigation Vertical Clearance FT
(116) Vert-Lift Bridge Nav Min Vert Clear FT
(40) Navigation Horizontal Clearance FT

Sufficiency Rating = 48.5
Functionally Obsolete = NO
Structurally Deficient = YES

CLASSIFICATION

		Code
(112)	NBIS Bridge Length -	YES
(104)	Highway System - NOT NHS	0
(26)	Functional Class - RURAL-MIN ART	03
(100)	Strahnet Highway - NOT STRAH HWY	0
(101)	Parallel Structure - NONE EXIST	N
(102)	Direction of Traffic - 2-WAY TRAFFIC	2
(103)	Temporary Structure -	
(105)	Federal Lands Highways -N/A	0
(110)	Designated National Network - NO	0
(20)	Toll - ON FREE ROAD	3
(21)	Maintain - SCDOT	1
(22)	Owner - SCDOT	1
(37)	Historical Significance - NOT DETERMINABLE	4

CONDITION

		Code
(58)	Deck - GOOD	7
(59)	Superstructure - POOR	4
(60)	Substructure - SATISFACTORY	6
(61)	Channel and Channel Protection - BANKS PROT	8
(62)	Culverts - NOT APPLICABLE	N

LOAD RATING AND POSTING

		Code
(31)	Design Load - HS 15	3
(64)	Operating Rating - AS	37
(66)	Inventory Rating - AS	27
(70)	Bridge Posting - EQUAL/ABOVE LEGAL LOADS	5
(41)	Structure Open, Posted or Closed - Description -OPEN, NO RESTRICT	A

APPRAISAL

		Code
(67)	Structure Evaluation - MEETS MIN TOLER LIMITS	4
(68)	Deck Geometry	4
(69)	Underclearances, Vertical and Horizontal	N
(71)	Waterway Adequacy	6
(72)	Approach Roadway Alignment	8
(36)	Traffic Safety Features	0000
(113)	Scour Critical Bridges - SCOUR WITHIN LIMITS	5

PROPOSED IMPROVEMENTS

(75)	Type of Work - REPLACE/LOAD CAPACITY	Code	311
(76)	Length of Structure Improvement	452.9	FT
(94)	Bridge Improvement Cost	$1,511,000	
(95)	Roadway Improvement Costs	$378,000	
(96)	Total Project Cost	$2,267,000	
(97)	Year of Improvement Cost Estimate	2009	
(114)	Future ADT	8268	
(115)	Year of Future ADT	2028	

INSPECTIONS

(90) Inspection Date 02/2008 (91) Frequency 24 Mo
(92) Critical Feature Inspection: (93) CFI Date
A) Fracture Crit Detail NO Mo A)
B) Underwater Insp NO Mo B)
C) Other Special Insp NO Mo C)

NATIONAL BRIDGE INVENTORY
STRUCTURE INVENTORY AND APPRAISAL REPORT

IDENTIFICATION

(1) State Name - SOUTH CAROLINA — Code 454
(8) Structure Number — # 0002740017000400
(5) Inventory Route (On/Under) — On - 141001700
(2) State Highway Department District — 6
(3) County Code 53 — (4) Place Code
(6) Features Intersected — SAVANNAH RIVER OVERFLOW
(7) Facility Carried — SC 170
(9) Location — NR GA/SC LN
(11) Milepoint — 2.140
(12) Base Highway Network -PART OF NET — Code 1
(13) LRS Inventory Route & Subroute — 00SC00170000
(16) Latitude 32 Degrees 10 Minutes 12.00 Seconds
(17) Longitude 81 Degrees 5 Minutes 54.00 Seconds
(98) Border Bridge State Code — % SHARE %
(99) Border Bridge Structure No. — #

STRUCTURE TYPE AND MATERIAL

(43) Structure Type Main: MATERIAL -CONCRETE
Type - 4 — Code 104
(44) Structure Type Appr: MATERIAL -OTHER OR N/A
Type - OTHER OR N/A — Code 000
(45) Number of Spans in Main Unit — 14
(46) Number of Approach Spans — 0
(107) Deck Structure Type -CONCRETE CAST-IN-PLC — Code 1
(108) Wearing Surface / Protective System:
A) Type of Wearing Surface - BITUMINOUS — Code 6
B) Type of Membrane - UNKNOWN — Code 8
C) Type of Deck Protection - UNKNOWN — Code 8

AGE AND SERVICE

(27) Year Built — 1940
(106) Year Reconstructed — 1953
(42) Type of Service On -HIGHWAY
Under - WATERWAY — Code 5
(28) Lanes: On Structure = 2 — Under Structure = 0
(29) Average Daily Traffic — 5200
(30) Year of ADT 2008 — (109) Truck ADT — 06 %
(19) Bypass, Detour Length — 0 MI

GEOMETRIC DATA

(48) Length of Maximum Span — 25 FT
(49) Structure Length — 350 FT
(50) Curb or Sidewalk: Left 1.5 FT — Right 1.5 FT
(51) Bridge Roadway Width Curb to Curb — 24 FT
(52) Deck Width Out to Out — 27.0 FT
(32) Approach Roadway Width (W/Shoulders) — 40 FT
(33) Bridge Median -NONE — Code 0
(34) Skew 0 Deg — (35) Structure Flared — NO
(10) Inventory Route Min Vert Clear — 99 FT 99 IN
(47) Inventory Route Total Horz Clear — 24.0 FT
(53) Min Vert Clear Over Bridge Roadway — 99 FT 99 IN
(54) Min Vert Underclear Ref - NOT HWY OR R> — 0 FT 0 IN
(55) Min Lat Underclear Right Ref -NOT HWY OR RXR — 99.9 FT
(56) Min Lat Underclear Left — 0.0 FT

NAVIGATION DATA

(38) Navigation Control -NONE — Code 0
(111) Pier Protection - — Code
(39) Navigation Vertical Clearance — FT
(116) Vert-Lift Bridge Nav Min Vert Clear — FT
(40) Navigation Horizontal Clearance — FT

Sufficiency Rating = 48.2
Functionally Obsolete = YES
Structurally Deficient = NO

CLASSIFICATION — Code

(112) NBIS Bridge Length - — YES
(104) Highway System - NOT NHS — 0
(26) Functional Class - RURAL-MIN ART — 03
(100) Strahnet Highway - NOT STRAH HWY — 0
(101) Parallel Structure - NONE EXIST — N
(102) Direction of Traffic - 2-WAY TRAFFIC — 2
(103) Temporary Structure - —
(105) Federal Lands Highways -N/A — 0
(110) Designated National Network - NO — 0
(20) Toll - ON FREE ROAD — 3
(21) Maintain - SCDOT — 1
(22) Owner - SCDOT — 1
(37) Historical Significance - NOT DETERMINABLE — 4

CONDITION — Code

(58) Deck - GOOD — 7
(59) Superstructure - FAIR — 5
(60) Substructure - SATISFACTORY — 6
(61) Channel and Channel Protection - BANKS PROT — 8
(62) Culverts - NOT APPLICABLE — N

LOAD RATING AND POSTING — Code

(31) Design Load - HS 15 — 3
(64) Operating Rating - AS — 37
(66) Inventory Rating - AS — 20
(70) Bridge Posting - EQUAL/ABOVE LEGAL LOADS — 5
(41) Structure Open, Posted or Closed - — A
Description -OPEN, NO RESTRICT

APPRAISAL — Code

(67) Structure Evaluation - MEETS MIN TOLER LIMITS — 4
(68) Deck Geometry — 2
(69) Underclearances, Vertical and Horizontal — N
(71) Waterway Adequacy — 6
(72) Approach Roadway Alignment — 8
(36) Traffic Safety Features — 0000
(113) Scour Critical Bridges - SCOUR WITHIN LIMITS — 5

PROPOSED IMPROVEMENTS

(75) Type of Work - REPLACE/LOAD CAPACITY — Code 311
(76) Length of Structure Improvement — 383.5 FT
(94) Bridge Improvement Cost — $1,280,000
(95) Roadway Improvement Costs — $320,000
(96) Total Project Cost — $1,920,000
(97) Year of Improvement Cost Estimate — 2009
(114) Future ADT — 8268
(115) Year of Future ADT — 2028

INSPECTIONS

(90) Inspection Date 02/2008 — (91) Frequency 24 Mo
(92) Critical Feature Inspection: — (93) CFI Date
A) Fracture Crit Detail NO Mo — A)
B) Underwater Insp NO Mo — B)
C) Other Special Insp NO Mo — C)

NATIONAL BRIDGE INVENTORY
STRUCTURE INVENTORY AND APPRAISAL REPORT

IDENTIFICATION

(1) State Name - SOUTH CAROLINA — Code 454
(8) Structure Number — # 0002740017000500
(5) Inventory Route (On/Under) — On - 141001700
(2) State Highway Department District — 6
(3) County Code 53 — (4) Place Code
(6) Features Intersected BEACH HILL CANAL
(7) Facility Carried SC 170
(9) Location NR GA/SC LN
(11) Milepoint — 2.390
(12) Base Highway Network -PART OF NET — Code 1
(13) LRS Inventory Route & Subroute — 00SC00170000
(16) Latitude 32 Degrees 10 Minutes 18.00 Seconds
(17) Longitude 81 Degrees 5 Minutes 36.00 Seconds
(98) Border Bridge State Code — % SHARE %
(99) Border Bridge Structure No. #

STRUCTURE TYPE AND MATERIAL

(43) Structure Type Main: MATERIAL -CONCRETE
Type - 4 — Code 104
(44) Structure Type Appr: MATERIAL -OTHER OR N/A
Type - OTHER OR N/A — Code 000
(45) Number of Spans in Main Unit — 8
(46) Number of Approach Spans — 0
(107) Deck Structure Type -CONCRETE CAST-IN-PLC — Code 1
(108) Wearing Surface / Protective System:
A) Type of Wearing Surface - BITUMINOUS — Code 6
B) Type of Membrane - UNKNOWN — Code 8
C) Type of Deck Protection - UNKNOWN — Code 8

AGE AND SERVICE

(27) Year Built — 1940
(106) Year Reconstructed — 1953
(42) Type of Service On -HIGHWAY
Under - WATERWAY — Code 5
(28) Lanes: On Structure = 2 — Under Structure = 0
(29) Average Daily Traffic — 5200
(30) Year of ADT 2008 — (109) Truck ADT — 06 %
(19) Bypass, Detour Length — 0 MI

GEOMETRIC DATA

(48) Length of Maximum Span — 25 FT
(49) Structure Length — 198 FT
(50) Curb or Sidewalk: Left 1.5 FT — Right 1.5 FT
(51) Bridge Roadway Width Curb to Curb — 28 FT
(52) Deck Width Out to Out — 31.5 FT
(32) Approach Roadway Width (W/Shoulders) — 40 FT
(33) Bridge Median -NONE — Code 0
(34) Skew 0 Deg — (35) Structure Flared — NO
(10) Inventory Route Min Vert Clear — 99 FT 99 IN
(47) Inventory Route Total Horz Clear — 28.0 FT
(53) Min Vert Clear Over Bridge Roadway — 99 FT 99 IN
(54) Min Vert Underclear Ref - NOT HWY OR RX — 0 FT 0 IN
(55) Min Lat Underclear Right Ref -NOT HWY OR RXR — 99.9 FT
(56) Min Lat Underclear Left — 0.0 FT

NAVIGATION DATA

(38) Navigation Control -NONE — Code 0
(111) Pier Protection - — Code
(39) Navigation Vertical Clearance — FT
(116) Vert-Lift Bridge Nav Min Vert Clear — FT
(40) Navigation Horizontal Clearance — FT

Sufficiency Rating = 47.9
Functionally Obsolete = NO
Structurally Deficient = YES

CLASSIFICATION — Code

(112) NBIS Bridge Length - — YES
(104) Highway System - NOT NHS — 0
(26) Functional Class - RURAL-MIN ART — 03
(100) Strahnet Highway - NOT STRAH HWY — 0
(101) Parallel Structure - NONE EXIST — N
(102) Direction of Traffic - 2-WAY TRAFFIC — 2
(103) Temporary Structure -
(105) Federal Lands Highways -N/A — 0
(110) Designated National Network - NO — 0
(20) Toll - ON FREE ROAD — 3
(21) Maintain - SCDOT — 1
(22) Owner - SCDOT — 1
(37) Historical Significance - NOT DETERMINABLE — 4

CONDITION — Code

(58) Deck - SATISFACTORY — 6
(59) Superstructure - POOR — 4
(60) Substructure - GOOD — 7
(61) Channel and Channel Protection - BANKS PROT — 8
(62) Culverts - NOT APPLICABLE — N

LOAD RATING AND POSTING — Code

(31) Design Load - HS 15 — 3
(64) Operating Rating - LF — 49
(66) Inventory Rating - LF — 29
(70) Bridge Posting - EQUAL/ABOVE LEGAL LOADS — 5
(41) Structure Open, Posted or Closed - — A
Description -OPEN, NO RESTRICT

APPRAISAL — Code

(67) Structure Evaluation - MEETS MIN TOLER LIMITS — 4
(68) Deck Geometry — 4
(69) Underclearances, Vertical and Horizontal — N
(71) Waterway Adequacy — 6
(72) Approach Roadway Alignment — 8
(36) Traffic Safety Features — 0000
(113) Scour Critical Bridges - SCOUR WITHIN LIMITS — 5

PROPOSED IMPROVEMENTS

(75) Type of Work - REPLACE/LOAD CAPACITY — Code 311
(76) Length of Structure Improvement — 229.9 FT
(94) Bridge Improvement Cost — $767,000
(95) Roadway Improvement Costs — $192,000
(96) Total Project Cost — $1,151,000
(97) Year of Improvement Cost Estimate — 2009
(114) Future ADT — 8268
(115) Year of Future ADT — 2028

INSPECTIONS

(90) Inspection Date 02/2008 — (91) Frequency 24 Mo
(92) Critical Feature Inspection: — (93) CFI Date
A) Fracture Crit Detail NO Mo — A)
B) Underwater Insp NO Mo — B)
C) Other Special Insp NO Mo — C)

THE OFFICE OF BRIDGE MAINTENANCE

NATIONAL BRIDGE INVENTORY STRUCTURE INVENTORY AND APPRAISAL REPORT

IDENTIFICATION

(1) State Name - SOUTH CAROLINA Code 454
(8) Structure Number # 0002740017000600
(5) Inventory Route (On/Under) On - 141001700
(2) State Highway Department District 6
(3) County Code 53 (4) Place Code
(6) Features Intersected SAVANNAH RIVER SWAMP
(7) Facility Carried SC 170
(9) Location NR GA/SC LN
(11) Milepoint 2.980
(12) Base Highway Network -PART OF NET Code 1
(13) LRS Inventory Route & Subroute 00SC00170000
(16) Latitude 32 Degrees 10 Minutes 30.00 Seconds
(17) Longitude 81 Degrees 5 Minutes 6.00 Seconds
(98) Border Bridge State Code % SHARE %
(99) Border Bridge Structure No. #

STRUCTURE TYPE AND MATERIAL

(43) Structure Type Main: MATERIAL -CONCRETE
Type - 4 Code 104
(44) Structure Type Appr: MATERIAL -OTHER OR N/A
Type - OTHER OR N/A Code 000
(45) Number of Spans in Main Unit 7
(46) Number of Approach Spans 0
(107) Deck Structure Type -CONCRETE CAST-IN-PLC Code 1
(108) Wearing Surface / Protective System:
A) Type of Wearing Surface - BITUMINOUS Code 6
B) Type of Membrane - UNKNOWN Code 8
C) Type of Deck Protection - UNKNOWN Code 8

AGE AND SERVICE

(27) Year Built 1940
(106) Year Reconstructed
(42) Type of Service On -HIGHWAY
Under - WATERWAY Code 5
(28) Lanes: On Structure = 2 Under Structure = 0
(29) Average Daily Traffic 5200
(30) Year of ADT 2008 (109) Truck ADT 06 %
(19) Bypass, Detour Length 0 MI

GEOMETRIC DATA

(48) Length of Maximum Span 30 FT
(49) Structure Length 210 FT
(50) Curb or Sidewalk: Left 0.0 FT Right 0.0 FT
(51) Bridge Roadway Width Curb to Curb 24 FT
(52) Deck Width Out to Out 25.0 FT
(32) Approach Roadway Width (W/Shoulders) 34 FT
(33) Bridge Median -NONE Code 0
(34) Skew 0 Deg (35) Structure Flared NO
(10) Inventory Route Min Vert Clear 99 FT 99 IN
(47) Inventory Route Total Horz Clear 24.0 FT
(53) Min Vert Clear Over Bridge Roadway 99 FT 99 IN
(54) Min Vert Underclear Ref - NOT HWY OR RX 0 FT 0 IN
(55) Min Lat Underclear Right Ref -NOT HWY OR RXR 99.9 FT
(56) Min Lat Underclear Left 0.0 FT

NAVIGATION DATA

(38) Navigation Control -NONE Code 0
(111) Pier Protection - Code
(39) Navigation Vertical Clearance FT
(116) Vert-Lift Bridge Nav Min Vert Clear FT
(40) Navigation Horizontal Clearance FT

Sufficiency Rating = 39.4
Functionally Obsolete = YES
Structurally Deficient = YES

CLASSIFICATION — Code

(112) NBIS Bridge Length - YES
(104) Highway System - NOT NHS 0
(26) Functional Class - RURAL-MIN ART 03
(100) Strahnet Highway - NOT STRAH HWY 0
(101) Parallel Structure - NONE EXIST N
(102) Direction of Traffic - 2-WAY TRAFFIC 2
(103) Temporary Structure -
(105) Federal Lands Highways -N/A 0
(110) Designated National Network - NO 0
(20) Toll - ON FREE ROAD 3
(21) Maintain - SCDOT 1
(22) Owner - SCDOT 1
(37) Historical Significance - NOT ELIGIBLE 5

CONDITION — Code

(58) Deck - SATISFACTORY 6
(59) Superstructure - POOR 4
(60) Substructure - SATISFACTORY 6
(61) Channel and Channel Protection - BANKS PROT 8
(62) Culverts - NOT APPLICABLE N

LOAD RATING AND POSTING — Code

(31) Design Load - H 15 2
(64) Operating Rating - LF 37
(66) Inventory Rating - LF 22
(70) Bridge Posting - EQUAL/ABOVE LEGAL LOADS 5
(41) Structure Open, Posted or Closed - A
Description -OPEN, NO RESTRICT

APPRAISAL — Code

(67) Structure Evaluation - MEETS MIN TOLER LIMITS 4
(68) Deck Geometry 2
(69) Underclearances, Vertical and Horizontal N
(71) Waterway Adequacy 6
(72) Approach Roadway Alignment 8
(36) Traffic Safety Features 0010
(113) Scour Critical Bridges - SCOUR WITHIN LIMITS 5

PROPOSED IMPROVEMENTS

(75) Type of Work - REPLACE/LOAD CAPACITY Code 311
(76) Length of Structure Improvement 242.4 FT
(94) Bridge Improvement Cost $809,000
(95) Roadway Improvement Costs $202,000
(96) Total Project Cost $1,214,000
(97) Year of Improvement Cost Estimate 2009
(114) Future ADT 8268
(115) Year of Future ADT 2028

INSPECTIONS

(90) Inspection Date 02/2008 (91) Frequency 24 Mo
(92) Critical Feature Inspection: (93) CFI Date
A) Fracture Crit Detail NO Mo A)
B) Underwater Insp NO Mo B)
C) Other Special Insp NO Mo C)

10/19/2009

Appendix F

Construction Cost Estimates

Kimley-Horn
and Associates, Inc.

Project: Savannah, Pinckney Island NWR- Transportation Study, Alternative S2
Prepared for: Eastern Federal Lands Highway Design
By: Kimley-Horn and Associates, Inc.
Date: October 2009

Preliminary Cost Estimate

Pay Item Number	Pay Item Description	Units	Quantity	Unit Price	Item Cost
15101-0000	MOBILIZATION (10%)	LS	1	$ 19,000.00	$ 19,000.00
15201-0000	CONSTRUCTION SURVEY AND STAKING (5%)	LS	1	$ 10,000.00	$ 10,000.00
15401-0000	CONTRACTOR TESTING (5%)	LS	1	$ 10,000.00	$ 10,000.00
20101-0000	CLEARING & GRUBBING	AC	0.3	$ 12,000.00	$ 3,600.00
20401-0000	ROADWAY EXCAVATION	CUYD	375	$ 25.00	$ 9,375.00
40101-0600	SUPERPAVE PAVEMENT, 1/2-INCH NMSA, 0.3 TO <3 MILLSION ESAL	TON	600	$ 110.00	$ 66,000.00
40101-1000	SUPERPAVE PAVEMENT, 3/4-INCH NMSA, 0.3 TO <3 MILLSION ESAL	TON	150	$ 110.00	$ 16,500.00
40101-1400	SUPERPAVE PAVEMENT, 1-INCH NMSA, 0.3 TO <3 MILLSION ESAL	TON	345	$ 110.00	$ 37,950.00
SPECIAL	MISC. DRAINAGE	LS	1	$ 5,000.00	$ 5,000.00
SPECIAL	EROSION CONTROL	LS	1	$ 12,000.00	$ 12,000.00
SPECIAL	TRAFFIC CONTROL (TEMPORARY AND PERMANENT)	LS	1	$ 10,000.00	$ 10,000.00
SPECIAL	CONTINGENCY (20%)	LS	1	$ 32,000.00	$ 32,000.00
				TOTAL	$ 230,000.00

Notes: The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

A contingency of 20% was added to the estimate to account for any additional items which are not quantified at this level of plan development.

Kimley-Horn
and Associates, Inc.

Project: Savannah, Pinckney Island NWR- Transportation Study, Alternative S7a
Prepared for: Eastern Federal Lands Highway Design
By: Kimley-Horn and Associates, Inc.
Date: October 2009

Preliminary Cost Estimate

Pay Item Number	Pay Item Description	Units	Quantity	Unit Price	Item Cost
15101-0000	MOBILIZATION (10%)	LS	1	$ 11,000.00	$ 11,000.00
15201-0000	CONSTRUCTION SURVEY AND STAKING (5%)	LS	0	$ 6,000.00	$ -
15401-0000	CONTRACTOR TESTING (5%)	LS	1	$ 6,000.00	$ 6,000.00
20101-0000	CLEARING & GRUBBING	AC	0.0	$ 12,000.00	$ -
20401-0000	ROADWAY EXCAVATION	CUYD	0	$ 25.00	$ -
30101-1000	AGGREGATE BASE, GRADING C	TON	2,200	$ 40.00	$ 88,000.00
40101-0600	SUPERPAVE PAVEMENT, 1/2-INCH NMSA, 0.3 TO <3 MILLSION ESAL	TON	0	$ 110.00	$ -
SPECIAL	MISC. DRAINAGE	LS	0	$ 5,000.00	$ -
SPECIAL	EROSION CONTROL	LS	1	$ 5,000.00	$ 5,000.00
SPECIAL	TRAFFIC CONTROL (TEMPORARY AND PERMANENT SIGNAGE)	LS	0	$ 5,000.00	$ -
SPECIAL	CONTINGENCY (20%)	LS	1	$ 19,000.00	$ 19,000.00
				TOTAL	$ 130,000.00

Notes: The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

A contingency of 20% was added to the estimate to account for any additional items which are not quantified at this level of plan development.

Kimley-Horn
and Associates, Inc.

Project: Savannah, Pinckney Island NWR- Transportation Study, Alternative S7b
Prepared for: Eastern Federal Lands Highway Design
By: Kimley-Horn and Associates, Inc.
Date: October 2009

Preliminary Cost Estimate

Pay Item Number	Pay Item Description	Units	Quantity	Unit Price	Item Cost
15101-0000	MOBILIZATION (10%)	LS	1	$ 52,000.00	$ 52,000.00
15201-0000	CONSTRUCTION SURVEY AND STAKING (5%)	LS	1	$ 26,000.00	$ 26,000.00
15401-0000	CONTRACTOR TESTING (5%)	LS	1	$ 26,000.00	$ 26,000.00
20101-0000	CLEARING & GRUBBING	AC	1.7	$ 12,000.00	$ 20,400.00
20401-0000	ROADWAY EXCAVATION	CUYD	975	$ 25.00	$ 24,375.00
20404-0000	UNCLASSIFIED BORROW	CUYD	5,500	$ 30.00	$ 165,000.00
40101-0600	SUPERPAVE PAVEMENT, 1/2-INCH NMSA, 0.3 TO <3 MILLSION ESAL	TON	340	$ 110.00	$ 37,400.00
40101-1000	SUPERPAVE PAVEMENT, 3/4-INCH NMSA, 0.3 TO <3 MILLSION ESAL	TON	350	$ 110.00	$ 38,500.00
40101-1400	SUPERPAVE PAVEMENT, 1-INCH NMSA, 0.3 TO <3 MILLSION ESAL	TON	900	$ 110.00	$ 99,000.00
SPECIAL	MISC. DRAINAGE	LS	1	$ 5,000.00	$ 5,000.00
SPECIAL	EROSION CONTROL	LS	1	$ 35,000.00	$ 35,000.00
SPECIAL	TRAFFIC CONTROL (TEMPORARY AND PERMANENT SIGNAGE)	LS	1	$ 10,000.00	$ 10,000.00
SPECIAL	CONTINGENCY (20%)	LS	1	$ 87,000.00	$ 87,000.00
				TOTAL	$ 630,000.00

Notes: The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

A contingency of 20% was added to the estimate to account for any additional items which are not quantified at this level of plan development.

Kimley-Horn
and Associates, Inc.

Project: Savannah, Pinckney Island NWR- Transportation Study, Alternative S7c
Prepared for: Eastern Federal Lands Highway Design
By: Kimley-Horn and Associates, Inc.
Date: October 2009

Preliminary Cost Estimate

Pay Item Number	Pay Item Description	Units	Quantity	Unit Price	Item Cost
15101-0000	MOBILIZATION (10%)	LS	1	$ 193,000.00	$ 193,000.00
15201-0000	CONSTRUCTION SURVEY AND STAKING (5%)	LS	1	$ 97,000.00	$ 97,000.00
15401-0000	CONTRACTOR TESTING (5%)	LS	1	$ 97,000.00	$ 97,000.00
20101-0000	CLEARING & GRUBBING	AC	7.1	$ 12,000.00	$ 85,200.00
20404-0000	UNCLASSIFIED BORROW	CUYD	42,500	$ 30.00	$ 1,275,000.00
30101-1000	AGGREGATE BASE, GRADING C	TON	1,700	$ 40.00	$ 68,000.00
40101-0600	SUPERPAVE PAVEMENT, 1/2-INCH NMSA, 0.3 TO <3 MILLSION ESAL	TON	850	$ 110.00	$ 93,500.00
SPECIAL	MISC. DRAINAGE	LS	1	$ 20,000.00	$ 20,000.00
SPECIAL	EROSION CONTROL	LS	1	$ 60,000.00	$ 60,000.00
SPECIAL	TRAFFIC CONTROL (TEMPORARY AND PERMANENT SIGNAGE)	LS	1	$ 10,000.00	$ 10,000.00
SPECIAL	CONTINGENCY (20%)	LS	1	$ 322,000.00	$ 322,000.00
				TOTAL	$ 2,320,000.00

Notes: The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

A contingency of 20% was added to the estimate to account for any additional items which are not quantified at this level of plan development.

Kimley-Horn
and Associates, Inc.

Project: Savannah, Pinckney Island NWR- Transportation Study, Alternative S7c, Guardrail Option
Prepared for: Eastern Federal Lands Highway Design
By: Kimley-Horn and Associates, Inc.
Date: October 2009

Preliminary Cost Estimate

Pay Item Number	Pay Item Description	Units	Quantity	Unit Price	Item Cost
15101-0000	MOBILIZATION (10%)	LS	1	$ 95,000.00	$ 95,000.00
15201-0000	CONSTRUCTION SURVEY AND STAKING (5%)	LS	1	$ 47,000.00	$ 47,000.00
15401-0000	CONTRACTOR TESTING (5%)	LS	1	$ 47,000.00	$ 47,000.00
20101-0000	CLEARING & GRUBBING	AC	7.1	$ 12,000.00	$ 85,200.00
20404-0000	UNCLASSIFIED BORROW	CUYD	12,000	$ 30.00	$ 360,000.00
30101-1000	AGGREGATE BASE, GRADING C	TON	1,700	$ 40.00	$ 68,000.00
40101-0600	SUPERPAVE PAVEMENT, 1/2-INCH NMSA, 0.3 TO <3 MILLSION ESAL	TON	850	$ 110.00	$ 93,500.00
61701-1200	GUARDRAIL SYSTEM	LNFT	6,150	$ 15.00	$ 92,250.00
SPECIAL	MISC. DRAINAGE	LS	1	$ 20,000.00	$ 20,000.00
SPECIAL	EROSION CONTROL	LS	1	$ 60,000.00	$ 60,000.00
SPECIAL	TRAFFIC CONTROL (TEMPORARY AND PERMANENT SIGNAGE)	LS	1	$ 10,000.00	$ 10,000.00
SPECIAL	CONTINGENCY (20%)	LS	1	$ 158,000.00	$ 158,000.00
				TOTAL	$ 1,140,000.00

Notes: The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

A contingency of 20% was added to the estimate to account for any additional items which are not quantified at this level of plan development.

Kimley-Horn
and Associates, Inc.

Project: Savannah, Pinckney Island NWR- Transportation Study, Alternative P3-1
Prepared for: Eastern Federal Lands Highway Design
By: Kimley-Horn and Associates, Inc.
Date: October 2009

Preliminary Cost Estimate

Pay Item Number	Pay Item Description	Units	Quantity	Unit Price	Item Cost
15101-0000	MOBILIZATION (10%)	LS	1	$ 53,000.00	$ 53,000.00
15201-0000	CONSTRUCTION SURVEY AND STAKING (5%)	LS	1	$ 26,000.00	$ 26,000.00
15401-0000	CONTRACTOR TESTING (5%)	LS	1	$ 26,000.00	$ 26,000.00
20101-0000	CLEARING & GRUBBING	AC	1.6	$ 12,000.00	$ 19,200.00
20303-1600	REMOVAL OF PAVEMENT, ASPHALT	SY	570	$ 10.00	$ 5,700.00
20401-0000	ROADWAY EXCAVATION	CUYD	300	$ 25.00	$ 7,500.00
20404-0000	UNCLASSIFIED BORROW	CUYD	5,000	$ 25.00	$ 125,000.00
30101-1000	AGGREGATE BASE, GRADING C	TON	2,600	$ 40.00	$ 104,000.00
40101-0600	SUPERPAVE PAVEMENT, 1/2-INCH NMSA, 0.3 TO <3 MILLSION ESAL	TON	400	$ 110.00	$ 44,000.00
40101-1000	SUPERPAVE PAVEMENT, 3/4-INCH NMSA, 0.3 TO <3 MILLSION ESAL	TON	400	$ 110.00	$ 44,000.00
61503-1000	MEDIAN, CONCRETE	SY	420	$ 70.00	$ 29,400.00
SPECIAL	MISC. DRAINAGE	LS	1	$ 30,000.00	$ 30,000.00
SPECIAL	EROSION CONTROL	LS	1	$ 20,000.00	$ 20,000.00
SPECIAL	TRAFFIC CONTROL (TEMPORARY AND PERMANENT SIGNAGE)	LS	1	$ 10,000.00	$ 10,000.00
SPECIAL	CONTINGENCY (20%)	LS	1	$ 88,000.00	$ 88,000.00
				TOTAL	$ 630,000.00

Notes: The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

A contingency of 20% was added to the estimate to account for any additional items which are not quantified at this level of plan development.

Kimley-Horn
and Associates, Inc.

Project: Savannah, Pinckney Island NWR- Transportation Study, Alternative P3-3
Prepared for: Eastern Federal Lands Highway Design
By: Kimley-Horn and Associates, Inc.
Date: October 2009

Preliminary Cost Estimate

Pay Item Number	Pay Item Description	Units	Quantity	Unit Price	Item Cost
15101-0000	MOBILIZATION (10%)	LS	1	$ 84,000.00	$ 84,000.00
15201-0000	CONSTRUCTION SURVEY AND STAKING (5%)	LS	1	$ 42,000.00	$ 42,000.00
15401-0000	CONTRACTOR TESTING (5%)	LS	1	$ 42,000.00	$ 42,000.00
20101-0000	CLEARING & GRUBBING	AC	2.3	$ 12,000.00	$ 27,600.00
20303-1600	REMOVAL OF PAVEMENT, ASPHALT	SY	2,600	$ 10.00	$ 26,000.00
20401-0000	ROADWAY EXCAVATION	CUYD	425	$ 25.00	$ 10,625.00
20404-0000	UNCLASSIFIED BORROW	CUYD	8,000	$ 25.00	$ 200,000.00
30101-1000	AGGREGATE BASE, GRADING C	TON	3,900	$ 40.00	$ 156,000.00
40101-0600	SUPERPAVE PAVEMENT, 1/2-INCH NMSA, 0.3 TO <3 MILLSION ESAL	TON	650	$ 110.00	$ 71,500.00
40101-1000	SUPERPAVE PAVEMENT, 3/4-INCH NMSA, 0.3 TO <3 MILLSION ESAL	TON	660	$ 110.00	$ 72,600.00
61503-1000	MEDIAN, CONCRETE	SY	420	$ 70.00	$ 29,400.00
SPECIAL	MISC. DRAINAGE	LS	1	$ 50,000.00	$ 50,000.00
SPECIAL	EROSION CONTROL	LS	1	$ 35,000.00	$ 35,000.00
SPECIAL	TRAFFIC CONTROL (TEMPORARY AND PERMANENT SIGNAGE)	LS	1	$ 20,000.00	$ 20,000.00
SPECIAL	CONTINGENCY (20%)	LS	1	$ 140,000.00	$ 140,000.00
				TOTAL	$ 1,010,000.00

Notes: The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

A contingency of 20% was added to the estimate to account for any additional items which are not quantified at this level of plan development.

Kimley-Horn and Associates, Inc.

Project: Savannah, Pinckney Island NWR- Transportation Study, Alternative P3-3
Prepared for: Eastern Federal Lands Highway Design
By: Kimley-Horn and Associates, Inc.
Date: October 2009

Preliminary Cost Estimate

Pay Item Number	Pay Item Description	Units	Quantity	Unit Price	Item Cost
15101-0000	MOBILIZATION (10%)	LS	1	$ 84,000.00	$ 84,000.00
15201-0000	CONSTRUCTION SURVEY AND STAKING (5%)	LS	1	$ 42,000.00	$ 42,000.00
15401-0000	CONTRACTOR TESTING (5%)	LS	1	$ 42,000.00	$ 42,000.00
20101-0000	CLEARING & GRUBBING	AC	2.3	$ 12,000.00	$ 27,600.00
20303-1600	REMOVAL OF PAVEMENT, ASPHALT	SY	2,600	$ 10.00	$ 26,000.00
20401-0000	ROADWAY EXCAVATION	CUYD	425	$ 25.00	$ 10,625.00
20404-0000	UNCLASSIFIED BORROW	CUYD	8,000	$ 25.00	$ 200,000.00
30101-1000	AGGREGATE BASE, GRADING C	TON	3,900	$ 40.00	$ 156,000.00
40101-0600	SUPERPAVE PAVEMENT, 1/2-INCH NMSA, 0.3 TO <3 MILLSION ESAL	TON	650	$ 110.00	$ 71,500.00
40101-1000	SUPERPAVE PAVEMENT, 3/4-INCH NMSA, 0.3 TO <3 MILLSION ESAL	TON	660	$ 110.00	$ 72,600.00
61503-1000	MEDIAN, CONCRETE	SY	420	$ 70.00	$ 29,400.00
SPECIAL	MISC. DRAINAGE	LS	1	$ 50,000.00	$ 50,000.00
SPECIAL	EROSION CONTROL	LS	1	$ 35,000.00	$ 35,000.00
SPECIAL	TRAFFIC CONTROL (TEMPORARY AND PERMANENT SIGNAGE)	LS	1	$ 20,000.00	$ 20,000.00
SPECIAL	CONTINGENCY (20%)	LS	1	$ 140,000.00	$ 140,000.00
				TOTAL	$ 1,010,000.00

Notes: The Engineer has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Engineer at this time and represent only the Engineer's judgment as a design professional familiar with the construction industry. The Engineer cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

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