U.S. Department of Transportation
Federal Highway Administration

South Carolina

1835 Assembly Street, Suite 1270
Columbia, South Carolina 29201
803-765-5411
803-253-3989

February 28, 2013

In Reply Refer To:
HDA-SC

Mr. Randall Williamson, P.E.
Environmental Engineer
South Carolina Department of Transportation
955 Park Street, P.O. Box 191
Columbia, South Carolina 29202

Dear Mr. Williamson:

We received your letter requesting a Finding of No Significant Impact (FONSI) determination for the proposed S.C. Route 41 Bridge Replacement over the Wando River in Berkeley and Charleston Counties, South Carolina. Based on the information provided to complete the environmental process we concur that the project will have no significant impacts; therefore a FONSI is justified. Project commitments made during the NEPA process shall be included in the project construction proposal and ultimately carried out.

Please proceed accordingly with the publication of the notice of availability of location and preliminary design approval and availability of the FONSI. The final documentation is to be made available to the public upon request. Also, a notice of the FONSI approval should be sent to the State inter-governmental review contacts established under Executive Order 12372.

By our adoption of the FONSI and completion of the public comment/hearing requirements of 23 U.S.C. 128, the SCDOT is authorized to proceed with further project development.

Sincerely,

J. Shane Belcher

(for) Robert L. Lee
Division Administrator

Enclosure

cc: Chad Long, SCDOT NEPA Coordinator, RPG 1
Jae Maddox, P.E., SCDOT Program Manager
File 8.158B

SC 41 BRIDGE REPLACEMENT OVER THE WANDO RIVER

BERKELEY AND CHARLESTON COUNTIES SOUTH CAROLINA

REQUEST FOR FINDING OF NO SIGNIFICANT IMPACT

Submitted Pursuant to 42 U.S.C.4332(2)(c) by the

U.S. Department of Transportation,
Federal Highway Administration
and
South Carolina Department of Transportation

In cooperation with the

U.S. Coast Guard

2-27-13
Date of Approval

S.C. Department of Transportation

2/28/13
Date of Approval

Federal Highway Administration

The following individuals may be contacted for additional information concerning the project:

Mr. Patrick Tyndall
Environmental Program Manager
Federal Highway Administration
1835 Assembly Street, Suite 1270
Columbia, S.C. 29202
(803) 765-5460

Mr. Jae Mattox, P.E.
Project Manager
S.C. Department of Transportation
P.O. Box 191
Columbia, S.C. 29202
(803) 737-1085

Project No. BR-BR08 (017)
Construction PIN 32098

South Carolina
Department of Transportation

February 27, 2013

Mr. Robert L. Lee
Division Administrator
Federal Highway Administration
1835 Assembly Street, Suite 1270
Columbia, South Carolina 29201

RE: BR-BR08 (017): Request for a Finding of No Significant Impact on the SC 41 Bridge Replacement over the Wando River in Berkeley and Charleston Counties, South Carolina, PIN 32098

Dear Mr. Lee:

The South Carolina Department of Transportation (SCDOT) received approval of an Environmental Assessment (EA) on the above-referenced project from the Federal Highway Administration (FHWA) on May 4, 2010, and the approved document was made available for review at five public locations in accordance with 23 CFR 771.119(d). These locations included SCDOT's Central Office in Columbia, SCDOT's District Office in North Charleston, the Berkeley, Charleston, and Dorchester Council of Governments Office in Charleston, the Town of Mount Pleasant Municipal Complex, and the Mount Pleasant Regional Library. Following availability of the environmental document, a public hearing was advertised in the *Post and Courier* newspaper on May 10, 2010, and subsequently conducted between 4:00 P.M. and 6:00 P.M. on May 25, 2010, in the gym of the Park West Recreation Complex located at 1251 Park West Boulevard in Mount Pleasant, South Carolina.

Subsequent to the public hearing and the comment period, SCDOT selected the single bascule, moveable span bridge as the preferred alternative. A request for a Finding of No Significant Impact (FONSI) was submitted to and approved by FHWA on December 22, 2010. As development of the project moved forward between 2010 and 2012, SCDOT determined that based on the current economic environment, it was neither feasible nor prudent to expend the additional funding necessary to build a bascule bridge over a fixed span bridge at this location. As a result, the SCDOT Commission voted at their April 2012 meeting to discontinue pursuit of the bascule bridge and to explore other alternatives in coordination with the U.S. Coast Guard, the Town of Mount Pleasant, and the public.

Following the Commission action, SCDOT staff resumed coordination with FHWA, the U.S. Coast Guard and the Town of Mount Pleasant regarding the construction of a 35-foot and 55-foot fixed span alternative. Based on coordination efforts with the U.S. Coast Guard, SCDOT decided to seek feedback from the public regarding the construction of a 55-foot fixed span alternative.

A public information meeting (PIM) was held on Tuesday, December 4, 2012, between 5:00 P.M. and 7:00 P.M. at the Mt. Pleasant Recreation Department's Park West Complex located at 1251 Park West Boulevard, Mt. Pleasant, South Carolina. The PIM was publicized in *The Post and Courier* on November 16, 2012, and *The Hanahan, Goose Creek & N Charleston News* on November 22, 2012. In addition to the newspaper advertisements, two large metal road signs denoting the date, location, and time of the meeting were placed at each end of the bridge.

One hundred fifty-seven people attended the public information meeting. A total of 47 written comments were received at the meeting and an additional 113 comments were received during the comment period. SCDOT received 111 written comments in support of the 55-foot fixed span alternative, 26 written comments in opposition to the 55-foot fixed span, and 23 written comments that did not reflect support or opposition to the 55-foot fixed span alternative. A summary of the comments received at the public information meeting is included in Enclosure A.

Agency Coordination

Since the approval of the EA in May 2010, the National Marine Fisheries Service (NMFS) issued a final determination to list two distinct population segments of the Atlantic Sturgeon in the southeast. In compliance with the Endangered Species Act of 1973, SCDOT prepared a biological assessment and initiated informal consultation with NMFS regarding the potential effects of the bridge on the Atlantic Sturgeon (see Enclosure B). Based on existing data regarding known populations of Atlantic Sturgeon and the results of a literature review, SCDOT determined that the project may affect, but is not likely to adversely affect, migratory pathways of the Atlantic Sturgeon. In an effort to reduce potential impacts to Atlantic Sturgeon during construction, SCDOT will restrict all in-water work between January 1 and April 15. The biological assessment and determination of effect was sent to NMFS on November 7, 2012. NMFS concurred with SCDOT's determination on February 19, 2013 (see Enclosure B).

Floodplains

The proposed project would involve construction (approximately 27 acres of Zone AE) within the regulated 100-year floodplain of the Wando River. The impacts would occur from the southern tip of the project limits north to the proposed intersection with Clements Ferry Road. Because base flow elevations have been established for the floodplains in the project area, FEMA requirements limit encroachment in the 100-year floodplain to activities that do not increase the base flood elevation by more than one-tenth foot, rounded to the nearest one-tenth foot, or "no-rise."

A bridge risk assessment form (Enclosure C) has been completed for the project and is included as an enclosure. Based on preliminary investigations and evaluations, the proposed project can be constructed to meet the "no-rise" requirements.

Conclusion

Based on information received during the public comment period combined with input from the Town of Mount Pleasant and the U.S. Coast Guard, SCDOT has selected the 55-foot fixed span bridge as the preferred alternative. The 55-foot fixed span bridge was previously evaluated in the EA that was signed on May 4, 2010. The studies conducted under the previously approved EA have been reviewed and remain valid for assessing the impacts associated with the 55-foot fixed span alternative. A summary table of the associated environmental impacts and environmental commitments is included in Enclosure C.

A copy of this letter and associated documentation is also being provided to the U.S. Coast Guard who has agreed to participate as a Cooperating Agency in this project. Based on a review of the administrative and environmental documentation to date, it is SCDOT's recommendation that the project be processed as a Finding of No Significant Impact.

If you have questions or need additional information, please feel free to contact me.

Sincerely,

Chad C. Long
RPG 1 NEPA Coordinator

CCL:ccl
Enclosures
cc: Program Manager, Jae Mattox, P.E.
File: Env/CCL

Introduction

The South Carolina Department of Transportation (SCDOT) proposes to replace the existing S.C. Route (SC) 41 swing-span bridge over the Wando River in Berkeley and Charleston Counties, South Carolina. Inspection reports found the bridge, built in 1941, to be structurally deficient and functionally obsolete. The limits of the project extend from Harpers Ferry Way and along a portion of Clements Ferry Road to its intersection with Reflectance Road, a distance of approximately 1.5 miles. The project, as proposed, would result in certain modifications to the human and natural environment. SCDOT has not identified any significant impacts that would occur as a result of the project's implementation; therefore, the project meets the criteria under 23 CFR 771.115(c) for processing as an Environmental Assessment (EA). The project is being funded through the Federal Highway Bridge Replacement and Rehabilitation Program.

Purpose and Need

The purpose of the proposed project is to replace an aging structurally deficient and functionally obsolete swing span bridge. The existing SC 41 bridge over the Wando River is a 70+ year old metal truss swing span determined to no longer meet the SCDOT's safety and design requirements for its transportation system. The existing bridge was evaluated in terms of its structural and functional efficiency and found to be structurally deficient and functionally obsolete. Structural deficiencies are characterized by deteriorated conditions and reduced load-carrying capacity; whereas functional obsolescence refers to the bridge not meeting current design standards. The bridge has received a sufficiency rating of 23.4 during evaluation. Structures given a sufficiency rating of 50 or less are eligible for replacement through the Federal Highway Bridge Replacement and Rehabilitation Program.

Revised Preferred Alternative

In developing this project over the past several years, the SCDOT has attempted to balance the concerns of the local community, requirements under the National Environmental Policy Act (NEPA), and the United States Coast Guard (USCG). In May of 2010, the SCDOT held a public hearing to seek input on two alternatives: a 55-foot vertical clearance fixed-span bridge and a low-level moveable bascule bridge. After receiving favorable responses from the public as well as the Town of Mount Pleasant (Town) on the low-level bascule bridge, the SCDOT received

approval in the form of a Finding of No Significant Impact (FONSI) from the Federal Highway Administration (FHWA) to build a bascule bridge. As development of the project moved forward between 2010-2012, the SCDOT determined that based on the current economic environment, it was neither feasible nor prudent, to expend the additional funding necessary to build a bascule bridge over a fixed span bridge at this location. As a result, the SCDOT Commission voted at the April 2012 meeting to discontinue the pursuit of a bascule bridge and to explore other alternatives in coordination with the US Coast Guard, the Town of Mount Pleasant, and the public.

Following the SCDOT Commission action, SCDOT staff resumed coordination with the USCG, the Town and FHWA regarding the proposed bridge replacement. Based on coordination efforts with the US Coast Guard, SCDOT decided to seek feedback from the public regarding the construction of a 55-foot fixed span alternative.

Public Involvement

A public information meeting (PIM) was held on Tuesday, December 4, 2012, between 5:00 p.m. and 7:00 p.m.at the Mt. Pleasant Recreation Department's Park West Complex located at 1251 Park West Boulevard, Mt. Pleasant, SC. The PIM was publicized in The Post and Courier newspaper on November 16, 2012 and The Hanahan, Goose Creek & N Charleston News on November 22, 2012. In addition to the newspaper advertisements, two large metal road signs denoting the date, location and time of the meeting were placed at each end of the bridge.

The format of the PIM was informal with several sets of displays attended by SCDOT engineers and the project team. A brief presentation was conducted at 6:00 p.m., with the time before and after scheduled for informal discussions. Comment forms were available for citizens to provide feedback on the project.

A total of 47 written comments were received at the meeting. An additional 113 comments were received during the comment period, for a total of 160 comments. (Additional comments were received after the comment period had closed. These comments are included in the appendix but are not part of the summary.) The comments are summarized in the following paragraphs.

Approve of a 55-foot Fixed Span Bridge – 111 comments noted

One hundred eleven written comments supported the construction of a 55-foot vertical clearance fixed span bridge; however, it must be noted that one of these comments actually consisted of three previously submitted letters and 16 pages of a petition with approximately 270 signatures. The letters and signatures were from 2010 and/or 2005; the petition, which is undated, requested "that the bridge be built to the current 55-foot standard minimum vertical clearance" and the resident who submitted this comment stated they will resume efforts to assure the river is accessible to sailboats if need be.

Residents who support the construction of a bridge with a vertical clearance of 55 feet cited reasons such as improved navigational clearance/waterway access; this type of bridge would be cheaper to build, support and maintain than a swing bridge; hurricane evacuation would be easier to accomplish; and property values north of the bridge would increase due to easier access by waterway. One commenter requested better bicycle and pedestrian accommodations be included in the design. Eighteen comments supported the design, with no specific reason given.

Oppose a 55-foot Fixed Span Bridge – 26 comments noted

Residents who oppose construction of a 55-foot vertical clearance support the construction of a lower fixed span bridge of between 25 and 40 feet or the 35-foot bascule bridge previously proposed. Reasons cited in the comments include environmental concerns such as increased noise levels, reduction in water quality, loss of scenic view, reduction in property values, loss of recreation value, and reduction in quality of life. Several comments stated that lack of funds was not a good reason to dismiss building the bascule bridge. Six comments stated that tall-mast boats were not that common upriver of the bridge and the bascule bridge could accommodate those few.

Non-committal comments – 23 comments noted

While 23 comments were received which did not state unequivocally whether the resident approved or opposed the 55-foot bridge, the comments seemed to support some type of replacement construction since they mostly discussed other desired improvements. Some such improvements included placing a traffic signal at the Clement's Ferry Road/SC 41 intersection or the US 17/SC 41 intersection, using the old bridge and its adjacent land as a fishing pier and/or boat landing, and providing for additional bicycle and pedestrian features on the bridge.

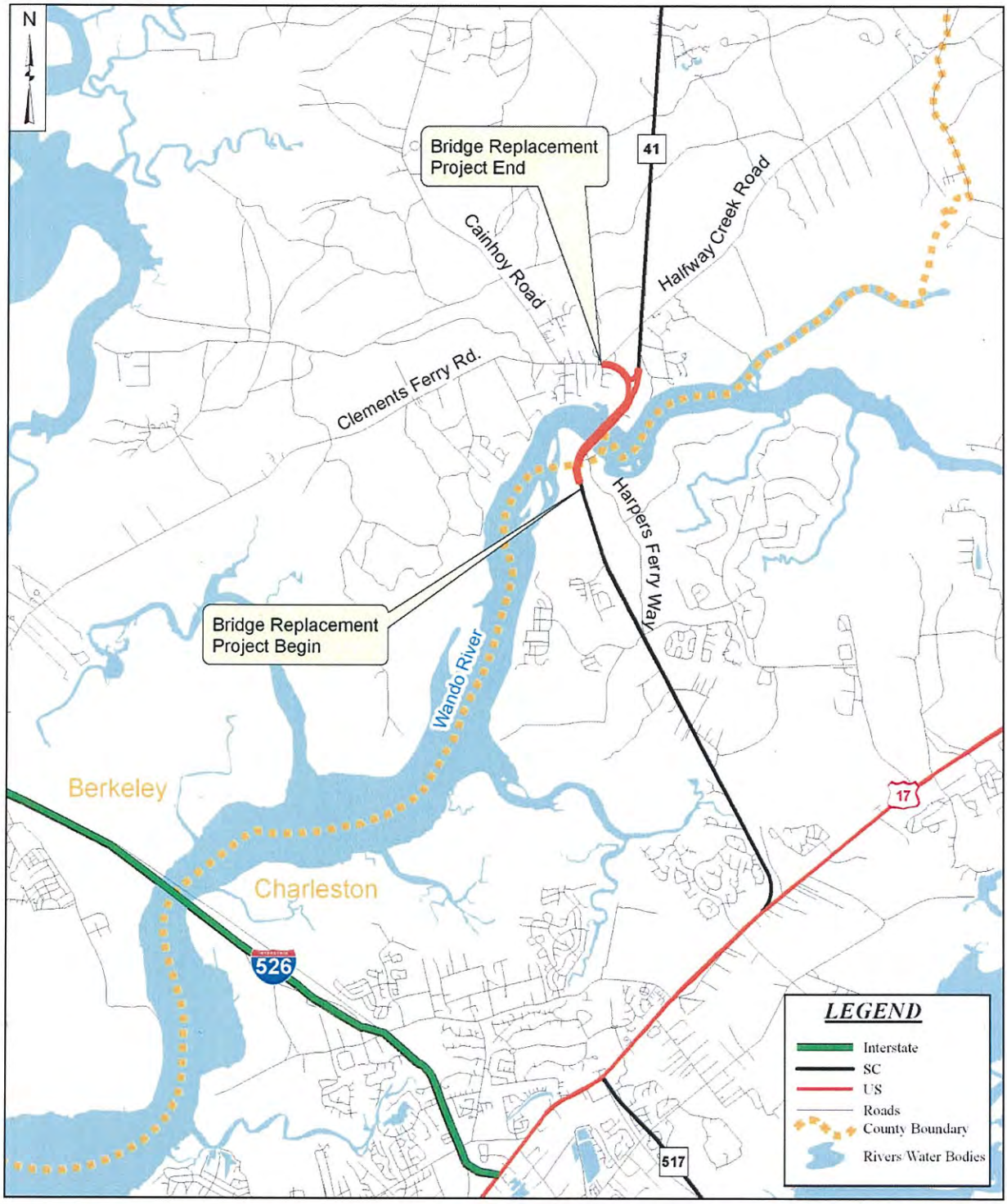
Based on input and comments received from citizens at the public information meeting and combined with the input of the Town of Mount Pleasant and the USCG, the Department has determined that the 55-foot fixed span bridge will better address the majority of the public's concerns and maintain adequate vertical clearance to meet the reasonable needs of waterway navigation.

Navigation (Rivers and Harbors Act of 1899)

The preferred alternative is a fixed-span bridge with a vertical clearance of 55 feet above mean high water, and a horizontal clearance of at least 90 feet between fenders. The depth of the navigational channel for the preferred alternative is approximately 22 feet below mean low water.

SCDOT has conducted multiple public meetings for the project, multiple upstream field reviews to locate existing boats, and reviewed all bridge opening logs for the last ten years. Based on all of the information gathered to date, the project design will meet the reasonable needs of navigation for this section of the Wando River.

Upon construction completion of the new bridge and the shifting of traffic onto the new bridge the existing bridge will be removed in its entirety. The piers and swing span substructures of the existing bride will be removed to the natural bottom in accordance with SCDOT stand specifications (Section 202.4.2.4).



Triplett-King & Associates, A DIVISION OF KCI TECHNOLOGIES INC. / Civil Engineering Consulting Services, Inc.	*SC-41 BRIDGE REPLACEMENT OVER THE WANDO RIVER* **PROJECT LOCATION**	SCDOT 0 1 2 Miles	DRAWN BY: JLS / DATE: 01/24/2013

Impacts Summary

Farmlands

This project involves the acquisition of minor amounts of new right of way in the vicinity of the bridge and its approaches. The right of way acquisition would not involve any farmland being converted to nonagricultural use. Through the use of county farmland listings provided by the Natural Resources Conservation Service (NRCS), it has been determined that the project area would not involve lands protected under the Farmland Protection Policy Act (FPPA). Under the FPPA, "Farmlands" do not include land already in or committed to urban development as shown in urbanized area mapping (7 CFR 658.2). The project corridor is included within the Charleston and Berkeley County Land Use Plan areas with portions of the project corridor incorporated into the Town of Mount Pleasant and the City of Charleston.

Water Quality

All stream reaches contained within the project corridor area have been classified by the South Carolina Department of Health and Environmental Control (SCDHEC) as shellfish harvesting waters (SFH). Class SFH are tidal saltwaters protected for shellfish harvesting and uses listed in class SA and class SB. Class SA and SB waters are suitable for primary and secondary contact recreation, crabbing, fishing, and for the survival and propagation of a balanced indigenous aquatic community of marine fauna and flora. However, SCDHEC may designate prohibited areas where shellfish harvesting for market purposes or human consumption is not allowed.

In addition to determining water quality classifications and standards, SCDHEC develops a priority list of water bodies that do not currently meet state water quality standards pursuant to Section 303(d) of the CWA and 40 CFR 130.7. This list is developed by SCDHEC on a biannual basis, and reviewed and approved by the United States Environmental Protection Agency (USEPA or EPA). It is commonly referred to as the 303(d) List of Impaired Waters and can be obtained from SCDHEC, Bureau of Water. The EPA also maintains an interactive geographic information systems (GIS) website which provides detailed information on impaired water bodies.

To monitor the Wando River's water quality, SCDHEC has established a shellfish monitoring station (09B-03) and an ambient water quality monitoring site (MD-115) located on the Wando River at the SC 41 bridge. Station MD-115 was listed in the 2006 edition of the 303(d) list for higher than standard levels of copper, but was delisted in 2008. The 2012 edition of the 303(d) list has not yet been approved by the EPA; however, the 2010 303(d) list was approved by the EPA on July 23, 2010 and lists station MD-115 for non-standard levels of dissolved oxygen.

The proposed bridge replacement project is not expected to exacerbate water quality problems in the watershed. The project was presented at the February 11, 2010, SCDOT Agency Coordination Effort meeting. SCDHEC recommended the consideration of a closed drainage and treatment system for stormwater discharge from the proposed bridge. Stormwater control measures, both during construction and post-construction, are required for SCDOT projects constructed in the vicinity of 303(d), TMDL, ORW, tidal, and shellfish beds in accordance with the SCDOT's MS4 permit. SCDOT will submit a drainage system plan that includes a closed drainage system design and water quality treatment plan to SCDHEC prior to finalizing construction plans. Coordination with the USACE and OCRM regarding the potential impacts of this project on surrounding water bodies will occur through the Section 401/404 permitting process. In addition, the contractor would be required to minimize potential impacts through implementation of construction best management practices, reflecting policies contained in 23 CFR 650 B and SCDOT's supplemental specifications on seeding and erosion control measures.

Wetlands and Waters of the US

Jurisdictional areas within the project study area were delineated and located using global positioning system (GPS) technology. The delineation was reviewed by the USACE Charleston District and by SCDHEC's Oceans and Coastal Resource Management (OCRM) Office for concurrence.

Wetlands were given special consideration during the development and design of the project. Measures were considered and implemented to avoid and minimize impacts to wetlands. The preferred alternative considered incorporates all prudent and feasible options that pose the least

disruption to wetlands in the project area. It appears that there is no practicable alternative to the project's construction in wetland areas.

Approximately 2.9-acres of wetlands are located within the proposed right of way for the preferred alternative and could be impacted by the final design. The SCDOT will finalize the impacts to waters of the U.S. during the final design and permitting processes.

Permits and Mitigation

Permit coordination will be carried out with the US Army Corps of Engineers (USACE) (Charleston District), SCDHEC, SCDHEC-OCRM, and the US Coast Guard (USCG) for the design and construction of the bridge and roadway improvements. The following permitting activities are anticipated:

Section 404 of the CWA requires a permit for the discharge of dredged or fill material into Waters of the U.S., including wetlands. Currently, SCDOT anticipates processing this activity through the USACE Individual Permit process unless avoidance and minimization measures can maintain wetland impacts at or below the thresholds of the SCDOT general permit

SCDHEC's 401 water quality certification, pursuant to Section 401 of the Federal Water Pollution Control Act of 1972 as amended by the CWA of 1977 and the Water Quality Act of 1987, will be required. Certification is required for activities permitted by the USACE for construction occurring in navigable waters or discharge of dredged or fill material into the State's waters.

The proposed bridge project is consistent with the state's Coastal Zone Management Program and the state's concurrence with the project will be confirmed through the issuance of a SCDHEC-OCRM permit for coastal zone management compliance.

R. 19-450, et seq., Code of Laws of South Carolina, 1976 as amended, requires that a state navigable waters permit through SCDHEC will be necessary for construction of this project.

A USCG bridge permit will be required for construction within the navigational channel of the Wando River.

Pursuant to section 404 of the Clean Water Act, adverse impacts to jurisdictional waters of the U.S., including wetlands, must be avoided and minimized to the maximum extent practicable. For all unavoidable impacts, compensatory mitigation is required to replace the loss of impacted wetland and aquatic resources to the surrounding environment. Compensatory mitigation can be achieved through restoration, establishment, enhancement, and/or preservation of wetlands, streams and other aquatic resources. The responsibility for determining the appropriate form and amount of compensatory mitigation necessary is given to the USACE for all Department of the Army permit authorizations under Section 404 of the CWA and sections 9 and 10 of the Rivers and Harbors Act.

On April 10, 2008, the USACE and EPA published 940 CFR Part 230, the "Compensatory Mitigation for Losses of Aquatic Resources" (Final Rule). The final rule governs compensatory mitigation activities related to USACE issued permits, and establishes a hierarchy for preferred mitigation options. The most preferred option is mitigation bank credits.

As the primary form of compensatory mitigation, the SCDOT proposes to purchase credits from an approved mitigation bank for all unavoidable impacts to aquatic resources resulting from the project. Multiple mitigation banks are available to provide mitigation services to the project area, including Pigeon Pond Mitigation Bank (Berkeley County), Congaree Carton Mitigation Bank (Charleston County), and the SCDOT Huspa Creek Mitigation Bank (Beaufort County). Specific details of compensatory mitigation will be coordinated with the USACE during the permitting process.

Floodplains

Based on a study of the flood insurance rate maps (FIRM), published by FEMA, the proposed project would involve construction (approximately 27-acres of Zone AE) within the regulated 100-year floodplain of the Wando River. The 100-year floodplain elevation is 10.38 feet above mean sea level (NAVD 1988) at the proposed bridge location. The impacts would occur from the southern tip of the project limits north to the proposed intersection with Clements Ferry Road. The FIRMs reviewed for this project were panels 45015C0737D (dated 10/16/2003) in Berkeley County and 45019C0340J (dated 11/17/2004) in Charleston County. FIRMs depict all areas within the 100-year floodplain with zone distinctions of A and AE. Zone A classification

designates areas within the floodplain where base elevations and flood hazards have not been determined, whereas a zone AE classification identifies areas in which existing detailed studies have already determined base flood elevations. All floodplains within the project limits are designated zone AE. Because base flow elevations have been established for the floodplains in the project area, FEMA requirements limit encroachment in the 100-year floodplain to activities that do not increase the base flood elevation by more than one-tenth foot, rounded to the nearest one-tenth foot, or "no-rise".

A bridge risk assessment form has been completed for the project and is included in the appendix. Based on preliminary investigations and evaluations, the proposed project can be constructed to meet the "no-rise" requirements.

Based on these preliminary findings, the project is not expected to be a significant longitudinal encroachment as defined under the Code of Federal Regulations for the Location and Hydraulic Design of Encroachments on Floodplains (23 CFR 650A), nor is it expected to have an appreciable environmental impact on this base floodplain. Because the project would be constructed to be above the base floodplain elevation, the level of risk and consequences attributed to this encroachment is not expected to be any greater than that associated with the present roadway and bridge. Also, the project is not expected to have any increased potential for impact on those critical elements that would constitute a significant risk under 23 CFR 650A and will continue to meet the requirements of Executive Order 11988 for floodplain management.

Executive Order 11988 states that each agency shall provide leadership and shall take action to minimize the potential impacts of flooding and to restore and preserve the natural and beneficial values served by floodplains in carrying out federally assisted construction and improvements. To accomplish this, minimization and avoidance measures have been conducted and each agency will be provided the opportunity for public review and comment on the proposed project.

Wildlife and Plant Communities

Fragmentation and loss of wildlife habitat is an unavoidable consequence of highway development. However, the proposed project is not expected to result in adverse impacts to terrestrial wildlife due to the existing developed nature of the project corridor. Short-term

displacement of local wildlife populations are anticipated during construction. Most local species are habituated to human disturbances and are expected to move back into the vicinity of the construction area upon project completion.

Potential impacts to plant communities resulting from bridge construction reflect the relative abundance of communities adjacent to the project corridor. Impacts to plant communities are expected to be limited to cut-fill boundaries within the right of way limits of the corridor. With the exception of the bridge approaches the project corridor utilizes existing roadway footprints and no fragmentation of plant communities is expected.

Wild and Scenic Rivers

The Wando River is not listed as a wild and scenic river in South Carolina; therefore, no impacts to a scenic designated river will occur as a result of the project.

Threatened and Endangered Species

Field surveys for the presence of protected species were conducted during field visits and focused on identification of potential habitat areas and detailed searches of those areas. In a letter dated July 16, 2008, United States Fish and Wildlife Service (USFWS) concurred with the biological determinations for the terrestrial species. USFWS also recommended contacting the National Oceanic and Atmospheric Administration's Nation Marine Fisheries Service (NOAA-NMFS) for consultation regarding the shortnose and Atlantic sturgeon and sea turtles, pursuant to Section 7 of the ESA. Coordination letters were sent to NOAA-NMFS for consultation in 2010 and 2012. NMFS concurred with SCDOT's determinations on December 2, 2010 (shortnose sturgeon) and February 19, 2013 (Atlantic sturgeon).

No suitable habitat was found for the seabeach amaranth, flatwoods salamander, loggerhead sea turtle, piping plover, green sea turtle, leatherback sea turtle, Kemp's ridley sea turtle, or red-cockaded woodpecker. Therefore, a determination of "no effect" was concluded for these listed species.

Field surveys identified potential habitat for pondberry, Canby's dropwort, and American chaffseed. A finding of "no effect" was determined for these species since no occurrences were recorded during field studies.

Essential Fish Habitat

An Essential Fish Habitat (EFH) assessment was completed in compliance with the Magnuson Stevens Fishery Conservation and Management Act. The EFH assessment concluded that the proposed project would have, at most, minimal effects on EFH or aquatic species managed by the South Atlantic Fisheries Management Council. A copy of the EFH assessment was provided to the National Marine Fisheries Service on May 14, 2010 during the circulation of the EA for comments. A final EFH assessment will be completed during final design and submitted with the Section 404 permit application.

Air Quality

The purpose of this project is to replace a structurally deficient and functionally obsolete bridge. This project would not result in any meaningful changes in traffic volumes, vehicle mix, location of the existing facility, or any other factor that would cause an increase in emissions impacts relative to the No-build Alternative. As such, FHWA has determined that this project would generate minimal air quality impacts for Clean Air Act criteria pollutants and has not been linked with any special mobile source air toxics (MSAT) concerns. Consequently, this effort is exempt from MSAT analysis.

The project was evaluated with regards to the Clean Air Act Amendments of 1990 (CAAA) with a resultant determination that Charleston and Berkeley Counties remain in attainment of all automotive related air quality standards. The State Bureau of Air Quality Control has determined that transportation control strategies are not necessary to maintain the area's current status. Because of the absence of any transportation control measures, Section 770.9 (conformity) of 23 CFR 770 does not apply.

Noise

As stated in 23 CFR, Part 772; *Procedures for Noise Abatement of Highway Traffic Noise and Construction Noise* and *SCDOT Noise Abatement Policy*, traffic noise analysis is required for proposed federal-aid highway projects on new location or physically alter an existing highway, that will significantly change the horizontal or vertical alignment of the road, or will increase the number of through-traffic lanes. The project consists of constructing a bridge on a new location alignment approximately 110 feet upstream of the existing roadway; therefore, a noise study was conducted to determine potential future traffic noise impacts.

Representative receptors within 150 feet of each side of the centerline were modeled to determine the predicted noise levels at those locations. Ten commercial and seven residential receptors were modeled to determine if future noise impacts would occur.

None of the residential or commercial receptors along the project corridor are receiving or would receive future noise impacts approaching or exceeding their Noise Abatement Criteria (NAC) thresholds as a result of the proposed bridge replacement project.

Hazardous Waste and Underground Storage Tanks (HAZMAT)

An Initial Site Assessment (ISA) was conducted by ARM Environmental Services, Inc. to identify possible sites involving the presence and/or past use of underground storage tanks (USTs), above ground storage tanks (ASTs), and/or other hazardous materials within the project corridor. Federal and State regulatory databases were reviewed to further identify any known sources of contamination located on or adjacent to the project study area. Federal records searched during this assessment included sites which handle or dispose of hazardous materials, and sites which otherwise have been identified to have air, soil, or groundwater contamination. State records reviewed included hazardous waste sites, landfills, and sites with registered or leaking underground storage tanks.

Based on an initial survey of potential hazardous material sites within the study area, it is highly probable that the current and/or proposed project right of way has been impacted by contaminants from the sites noted below.

Detyen's Shipyard

The regulatory status of the Detyen's Shipyard is limited to an entry in the ERNS. ERNS is a database that records and stores information on reported releases of oil and hazardous substances. However, the ERNS and ERNS incident reports provided no information pertaining to any releases. An additional query of standard incident reports provided through a National Response Center (NRC) website returned details regarding three fuel releases that occurred at or near the Detyen's Shipyard site. All three of the releases were observed in the Wando River. This site has adversely affected the environmental conditions due to the large magnitude of the repair activities conducted at the site, the presence of potentially hazardous substances at the site, and the existence of documented adverse environmental impacts at the site.

Pantry #879

The Pantry #879 is a retail gasoline sales facility located in the study area. There are three 10,000 gallon USTs and one AST on site. The site is responsible for a fuel release reported to DHEC in November 1991. A No Further Action (NFA) status was issued by DHEC in March 2003. This project would result in the relocation of this property and proposed right of way is required; therefore, the USTs would likely be removed. SCDHEC would require additional assessment of the shallow soil and groundwater present near the UST basins as part of the tank closure activities.

Former SCDOT Wando Section Shed

The former SCDOT Wando Shed formerly utilized two relatively small USTs for the storage of diesel fuel. A fuel release has been reported for the site and the 1,000 gallon and 560 gallon USTs formerly present at the site were abandoned by removal. A NFA status was issued for the site in May 1990. Due to the former utilization of USTs at the site and the resulting fuel release, the potential exists for subsurface petroleum based contamination to remain at the site. However, based on available information, the potential for impact to the study area from the release is considered to be low.

Former Wando Grocery

The former Wando Grocery is a former UST site responsible for a fuel release reported by DHEC in 1991. Five USTs were present at the location including one 1,000 gallon, two 550 gallon, and two 6,000 gallon USTs. The site has received a relatively high SCDHEC priority ranking of 2BB, primarily due to the presence of drinking water supply wells adjacent to the site. Based on documentation of a previous fuel release on the Wando Grocery property, it appears

that additional investigation of the utilization of USTs at the site and an evaluation of the subsurface environmental conditions of the site is warranted.

Cohen Gaskins Jr. Parcel

The Cohen Gaskins Jr. Parcel contains a concrete feature very similar to a former petroleum product dispenser island. However, no prominent features indicative of the former existence of a gasoline station on the property were apparent. Based on the presence of the potential former dispenser island on the property, it appears that the site formerly served as a retail gasoline sales facility. The SCDHEC UST databases were reviewed and they listed UST sites in the Wando area, but not specifically for this site. No regulatory information is available for this site. An environmental assessment was conducted in November 2000 that indicated substantially elevated concentrations of petroleum based contamination in the shallow soil samples on the site.

Based on the environmental conditions documented on the Cohen Gaskins Jr. parcel, the environmental conditions of the project area have been adversely impacted by petroleum based contamination. Additionally, the concentrations of Contaminant of Concern (CoC) detected in the soil and groundwater during the assessment are significantly elevated above the Risk Based screening Levels (RBSLs) established by DHEC as a lower threshold for conditions that represent a significant risk to human health and to the environment.

A Phase II Subsurface Assessment was completed in June of 2005 on five sites in and around the project study area. The two sites believed most critical to the project are the Pantry and Cohen sites where low levels of all contaminants were found. It is likely that the USTs at the Pantry will require removal and that contaminated soils at both sites will require special treatment during the removal and disposal of these soils. No information was revealed that suggested the need for changes to the project's current location or design. The project's current design shifts away from Detyen's Shipyard, the Former DOT Wando Shed, and the Former Wando Grocery.

It is SCDOT's practice to avoid the acquisition of underground storage tanks and other hazardous materials, if possible. If avoidance is not a viable alternative, tanks and other

hazardous materials would be tested and removed and/or treated in accordance with the U.S. Environmental Protection Agency (USEPA) and SCDHEC requirements. Cost of necessary remedial actions would be considered during the right of way appraisal and acquisition process.

Cultural Resources

Cultural resources studies in the vicinity of the SC 41 Wando River Bridge have been conducted, including areas of potential new right of way for the replacement project. The cultural resources survey was designed to identify and assess all historic architectural resources, archaeological sites, and underwater sites in the Area of Potential Effects (APE).

Intensive Archaeological Survey

The archaeological survey involved the pedestrian traverse of transects parallel to the existing SC 41 roadway, a portion of Cainhoy Road, and an area of new right of way. The project archaeologist revisited two sites in the APE (38BK1810 and 38BK1621). The archaeological survey consisted of the excavation of 30-by-30-cm (1.0-by-1.0-ft) shovel tests every 30 meters (100 feet) along one survey transect on each side of the existing highway adjacent to the existing right of way. The archaeological and archaeological terrestrial surveys identified no new archaeological sites or isolated finds.

Intensive Architectural Survey

Five new historic architectural resources (0809-0813) were identified in the architectural survey and are recommended not eligible for NRHP. Site 066 0006, the Wando River Bridge, is recommended eligible for the NRHP under Criterion C, because it embodies distinctive characteristics of a bridge type, bridge construction period, and method of construction; its replacement will be an adverse affect to the resource. A Programmatic Section 4(f) Evaluation was completed and a Memorandum of Agreement (MOA) to mitigate the adverse impact to the bridge was executed between FHWA, SCDOT and the SHPO on September 27, 2010.

Section 4(f) Resources

The Wando River Bridge at SC 41 was constructed in 1941. The proposed bridge replacement would affect the bridge, which is an architectural site eligible for the National Register of Historic

Places (NRHP). This bridge has been determined to no longer meet the State's safety and design requirements for its transportation system, and would be replaced immediately upstream of its existing alignment. Replacement of the existing bridge is deemed the only feasible and prudent alternative to continue providing a safe and efficient transportation network. This resource represents the only Section 4(f) issue associated with the proposed project. No other recreational areas or wildlife refuges were found within the project corridor. A Programmatic Section 4(f) Evaluation has been prepared in accordance to 23 CFR 771.135(i).

Relocations

The proposed project would not result in the displacement of any churches, community centers, or residences. One commercial displacement would occur, a gas station/convenience store. One outdoor advertising sign would also be displaced. Additional right of way impacts would result in the displacement of two self storage buildings and a portion of the parking lot at Wando Boat Landing & Self Storage. Additionally a portion of the parking lot from Carolina Boatyard would be required for the construction of an access drive to Carolina Boatyard, Detyens Shipyard, and Wando Boat Landing & Self Storage. The relocation program will be conducted in accordance with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (Public Law 91-646, as amended by 100-17; 49 CFR Part 24).

Social and Economic

As few right of way impacts are anticipated, no appreciable change in the existing land use or impacts to the local population in the area should occur as a result of the project.

The project's construction would require minor alterations in the area's traffic flow; however, no adverse effects on traffic or emergency services are anticipated. Traffic in both directions would be maintained during construction.

The project should not result in an adverse effect to communities, schools, local government finances, employment patterns, or local population trends. The acquisition of only minor amounts of new right of way is not anticipated to adversely impact either county's property tax base. The project should not specifically benefit, harm, or disproportionately impact any

population group including elderly, handicapped, non-drivers, low-income, or minority groups. Upon completion, the benefits to Berkeley and Charleston Counties should be indirectly realized in the form of a structurally safer and more modern transportation facility, an important transportation link for the residents of the counties in meeting daily transportation needs, and an improved hurricane evacuation route for coastal Charleston County.

The social and economic impacts are not anticipated to differ from the existing conditions upon completion of the bridge's construction.

Indirect and Cumulative Effects

The purpose of the project is to replace a structurally deficient bridge with a modern bridge. The direct effects of the project on the surrounding environment are discussed in the various sections of the environmental assessment and are summarized in this document. The proposed bridge would be built to accommodate four travel lanes while being striped for two lanes. Replacement of the bridge combined with improvements to the roadway could improve traffic flow within the area making it desirable for new businesses and residential neighborhoods to locate to the area. Potential induced development in future years could be considered an indirect effect of the combined reasonably foreseeable actions.

A potential for a cumulative effect to the future water quality of the Wando River exists. Greater population densities and increased travel demand in the area could potentially impact water quality in the Wando River. Residential and commercial development increases untreated stormwater runoff from impervious surfaces. Fertilizers and lawn care products in landscaping runoff could potentially impact future dissolved oxygen levels in the river, and fecal coli form from pet or animal waste could impact bacteria levels in the river.

While the bridge replacement alone would not cause the cumulative effect, it along with the planned improvements to SC 41 and the current growth rates and increased development in the area may. A lessening of this potential effect could be substantially reduced by local and county planning officials through proactive zoning requirements and stormwater capture/retention ordinances.

Project Commitments

The following special commitments have been agreed to by the SCDOT:

Commitment	EA Reference Page
South Carolina Department of Transportation (SCDOT) will provide the project's environmental document to local planning officials to assist Charleston and Berkeley Counties and the Town of Mount Pleasant to regulate land use consistency adjacent to the proposed project.	Section 4.1 Land use; page 15
Coordination with the Charleston District of the U.S. Army Corps of Engineers (USACE) and South Carolina Department of Health and Environmental Control – Office of Ocean and Coastal Resource Management (OCRM) regarding the potential impacts of this project on the Wando River and surrounding water bodies will occur through the Section 401/404 permitting process. In addition, the contractor would be required to minimize potential impacts through implementation of construction best management practices, reflecting policies contained in 23 CFR 650 B and SCDOT's Supplemental Specifications on Seeding and Erosion Control Measures.	Section 4.5 Permits, page 26
SCDOT will submit a stormwater drainage plan that includes a closed drainage system design to SCDHEC prior to finalizing construction plans.	Section 4.3 Water Quality, page 16
Stormwater control measures, both during construction and post-construction, and treatment are required for SCDOT projects constructed in the vicinity of 303(d), TMDL, ORW, tidal, and shellfish beds in accordance with the SCDOT's MS4 Permit.	Not included in EA
SCDOT will comply with Executive Order 11990 regarding the protection of wetlands. The implementation of appropriate sediment and erosion control measures will be required of the contractor to ensure compliance with policies reflected in 23 CFR 650B. Reclamation of wetland areas disturbed during construction activities will involve returning the areas to their original elevations to allow for natural reforestation.	Section 4.4 Wetlands and Waters of the US, Page 24

Commitment	EA Reference Page
Permit coordination will be carried out with the USACE and the U.S. Coast Guard for the design and construction of the Wando River Bridge and roadway improvements and specific mitigation requirements will be established during the permitting process. A USACE Individual Permit is anticipated for the project.	Section 4.5 Permits, page 26
Floodplains will be crossed in such a way as to not increase the height of the base flood elevation by more than 0.1 foot during the 100-year storm.	Section 4.7 Floodplains, page 27
A copy of the finalized hydraulic report will be delivered to the floodplain administrators within Charleston and Berkeley Counties for review and comment/concurrence. This coordination will take place during the USACE permitting process.	Section 4.7 Floodplains, page 29
Asbestos containing materials may be present in buildings in the project corridor, therefore surveys of any buildings to be demolished will be conducted as required by SCDHEC and materials should be handled in accordance with state and federal regulations.	Section 4.13 Hazardous Waste and underground Storage Tanks (HAZMAT), Page 40
If avoidance of Underground Storage Tanks (USTs) is not a viable alternative, tanks and other hazardous materials will be tested and removed and/or treated in accordance with the U.S. Environmental Protection Agency (EPA) and South Carolina Department of Health and Environmental Control (SCDHEC) requirements. Costs necessary for clean up would be taken into consideration during the right of way appraisal and acquisition process.	Section 4.13 Hazardous Waste and underground Storage Tanks (HAZMAT), Page 41
SCDOT will comply with the stipulations of the Memorandum of Agreement executed on September 27, 2010 between FHWA, SCDOT, and the SHPO for resolving adverse effects to the Wando River Bridge (Resource No. 066 0006).	Section 4.14 Cultural Resources, page 44

Commitment	EA Reference Page
If unanticipated cultural materials or human skeletal remains are discovered during construction activities, the SCDOT County Resident Construction Engineer shall be immediately notified and all work in the vicinity of the discovered materials shall cease until an evaluation can be made by an SCDOT archaeologist in consultation with the SHPO.	Section 4.14 Cultural Resources, page 44
Property owners will be fairly compensated for the right of way acquired for the project and for any damages to remaining property, in accordance with SCDOT policy and the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended	Section 4.16 Relocations, page 45
The Department will submit a final EFH assessment with the Section 404 permit application. The design-build contractor will be responsible for preparing the final EFH assessment.	Not included in EA
Upon construction completion of the new bridge and the shifting of traffic onto the new bridge the existing bridge will be removed in its entirety. The piers and swing span substructures of the existing bride will be removed to the natural bottom in accordance with SCDOT stand specifications (Section 202.4.2.4).	Not included in EA
SCDOT has decided to implement a seasonal construction moratorium for all in-water work related to this bridge replacement project for the period of January 1 to April 15. The following condition will apply: SCDOT will implement a seasonal construction moratorium for all in-water work related to this bridge replacement project for the period of January 1 to April 15. In-water work is defined as any activity that that could result in the physical destruction or alteration (e.g. excavation, fill, pile driving, drilled shaft construction) of important spawning habitats. During the moratorium, the contractor would be allowed to work from a barge in order to construct columns, caps, and bridge superstructure. The contractor would be allowed to move barges between shafts	Not included in EA

Commitment	EA Reference Page
during the moratorium; however, barges must be secured by cables as placement of spuds to secure barges will not be allowed during the moratorium. Equipment and materials used during the construction of the bridge will not obstruct or impede passage through more than 50 percent of the channel.	

FHWA Decision

The FHWA has determined that this project will have no significant impact on the human or natural environment. This Finding of No Significant Impact is based on the Environmental Assessment and other supporting information, which have been independently evaluated by the FHWA and determined to adequately and accurately discuss the need, environmental issues, and impacts of the proposed project and appropriate mitigation measures. The Environmental Assessment provided sufficient evidence and analysis for determining that an Environmental Impact Statement is not required. The FHWA takes full responsibility for the accuracy, scope, and content of the Environmental Assessment and other environmental documentation for this project.

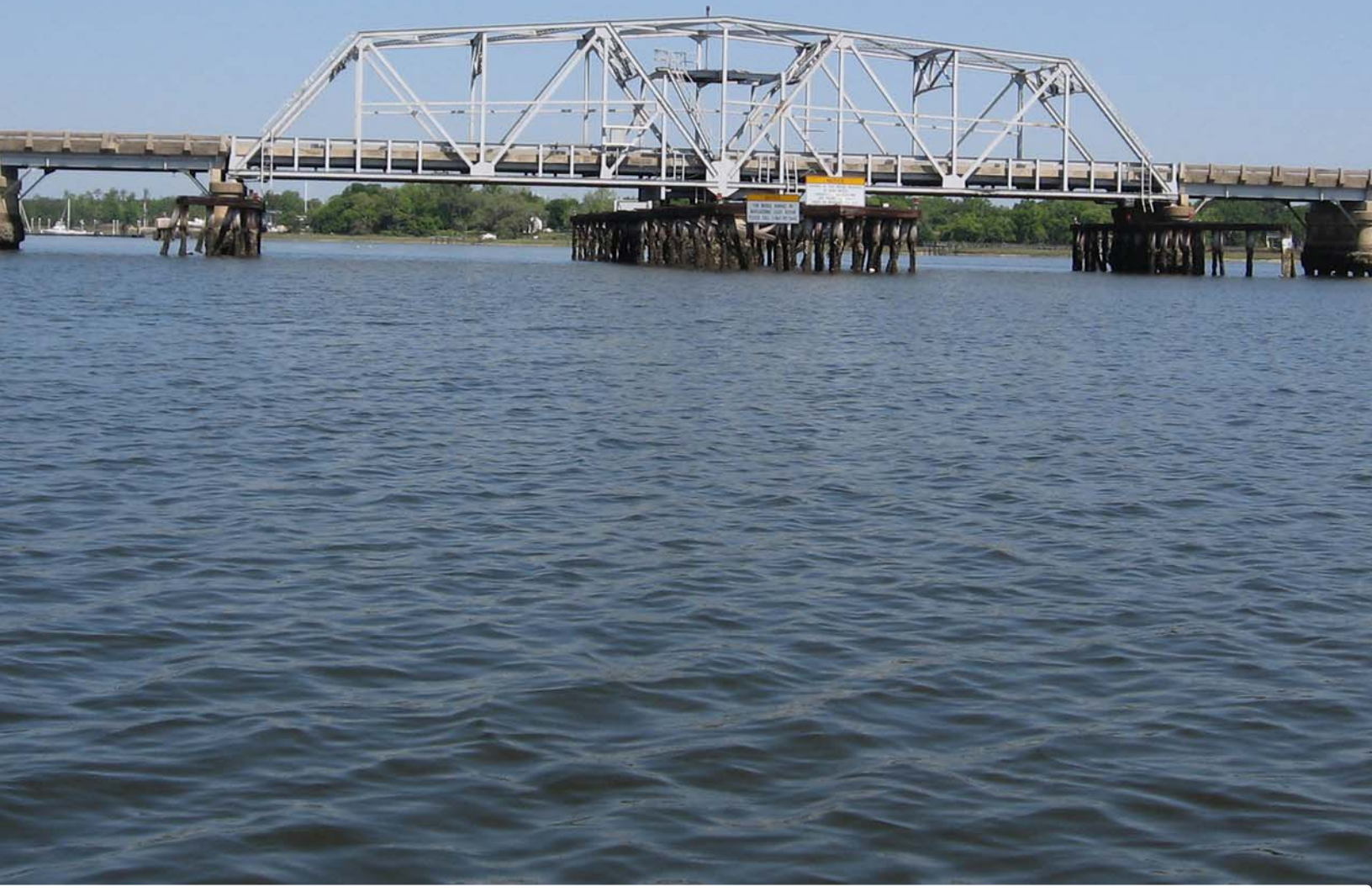
Date: 2/28/13

J. Shane Belcher

(for) Robert L. Lee
Division Administrator

SC 41 Bridge Replacement over the Wando River

Berkeley and Charleston Counties, South Carolina



May 2010

Submitted by:

Civil Engineering Consulting Services, Inc.

SC-41 BRIDGE REPLACEMENT OVER THE WANDO RIVER

BERKELEY AND CHARLESTON COUNTIES SOUTH CAROLINA

ENVIRONMENTAL ASSESSMENT & DRAFT PROGRAMMATIC SECTION 4(F) EVALUATION

Submitted Pursuant To 42 U.S.C. 4332 (2)(c)
by
The U.S. Department of Transportation,
Federal Highway Administration
and
South Carolina Department of Transportation,
Environmental Management Office

5/4/10
Date of Approval

S.C. Department of Transportation

5/4/10
Date of Approval

Federal Highway Administration

The following individuals may be contacted for additional information concerning the project:

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(803) 737-9932

Project No. BR-BR08 (017)
Construction PIN 32098

PROJECT COMMITMENTS

Environmental personnel, engineers, and roadway designers worked closely together to incorporate suggestions from citizens and regulatory and resource agencies to avoid and minimize impacts to the surrounding human and natural environments during the project's design and development.

Project commitments to avoid and minimize impacts include:

- South Carolina Department of Transportation (SCDOT) will provide the project's environmental document to local planning officials to assist Charleston and Berkeley Counties and the Town of Mount Pleasant to regulate land use consistency adjacent to the proposed project. (see page 14)

- Coordination with the Charleston District of the U.S. Army Corps of Engineers (USACE) and South Carolina Department of Health and Environmental Control – Office of Ocean and Coastal Resource Management (OCRM) regarding the potential impacts of this project on the Wando River and surrounding water bodies will occur through the Section 401/404 permitting process. In addition, the contractor would be required to minimize potential impacts through implementation of construction best management practices, reflecting policies contained in 23 CFR 650 B and SCDOT's Supplemental Specifications on Seeding and Erosion Control Measures. (see pages 15 and 19)

- SCDOT will submit a stormwater drainage plan to SCDHEC prior to finalizing construction plans. (see page 15)

- SCDOT will comply with Executive Order 11990 regarding the protection of wetlands. The implementation of appropriate sediment and erosion control measures will be required of the contractor to ensure compliance with policies reflected in 23 CFR 650B. Reclamation of wetland areas disturbed during construction activities will involve returning the areas to their original elevations to allow for natural reforestation. (see page 23)

- Permit coordination will be carried out with the USACE and the U.S. Coast Guard for the design and construction of the Wando River Bridge and roadway improvements and specific mitigation requirements will be established during the permitting process. A USACE Individual Permit is anticipated for the project. (see page 24)

- Floodplains will be crossed in such a way as to not increase the height of the base flood elevation by more than 0.1 foot during the 100-year storm. (see page 27)

- SCDOT will inform local planning officials of future, generalized noise levels expected to occur in the project vicinity. (see page 35)

- Asbestos containing materials may be present in buildings in the project corridor, therefore surveys of any buildings to be demolished will be conducted as required by SCDHEC and materials should be handled in accordance with state and federal regulations. (see page 38)

- If avoidance of Underground Storage Tanks (USTs) is not a viable alternative, tanks and other hazardous materials will be tested and removed and/or treated in accordance with the U.S. Environmental Protection Agency (EPA) and South Carolina Department of Health and Environmental Control (SCDHEC) requirements. Costs necessary for clean up would be taken into consideration during the right of way appraisal and acquisition process. (see page 39)

- A draft Memorandum of Agreement (MOA) to mitigate the adverse impact to the bridge is being developed between the SCDOT and SHPO. A copy of the signed MOA will be included in the request for a Finding of No Significant Impact (FONSI). (see page 42)

- If unanticipated cultural materials or human skeletal remains are discovered during construction activities, the SCDOT County Resident Construction Engineer shall be immediately notified and all work in the vicinity of the discovered materials shall cease until an evaluation can be made by an SCDOT archaeologist in consultation with the SHPO. (see page 42)

- Property owners will be fairly compensated for the right of way acquired for the project and for any damages to remaining property, in accordance with SCDOT policy and the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. (see page 43)

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APPENDIX

1.0 INTRODUCTION

The South Carolina Department of Transportation (SCDOT) proposes to replace the existing S.C. Route (SC) 41 moveable-span bridge over the Wando River in Berkeley and Charleston Counties, South Carolina. The limits of the project extend from Harpers Ferry Way and along a portion of Clements Ferry Road to its intersection with Reflectance Road. The project, as proposed, would result in certain modifications to the human and natural environment. SCDOT has not identified any significant impacts that would occur; therefore, the project meets the criteria under 23 CFR 771.115(c) for processing as an Environmental Assessment (EA). Specific preliminary environmental studies conducted in the early stages of project development and an understanding of the scope of work to be performed were considered in this decision.

2.0 PURPOSE AND NEED FOR ACTION

SC-41 provides an important transportation link for the residents of Berkeley and Charleston Counties in meeting daily transportation needs as well as serving as a hurricane evacuation route for coastal Charleston County (Figure 1-1: Project Location Map).

2.1 Purpose

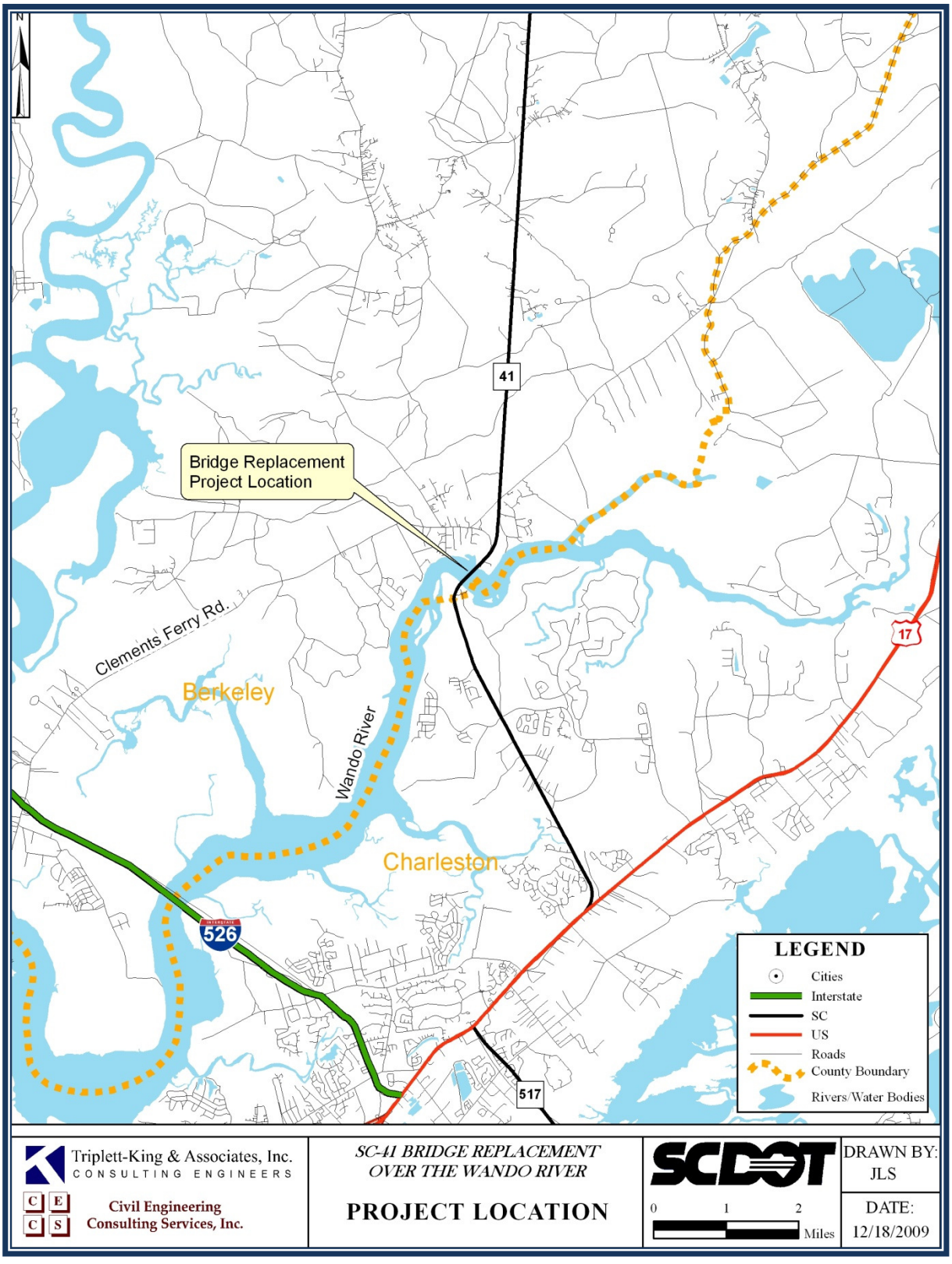
The purpose of the proposed project is to replace a structurally deficient and functionally obsolete facility to correct existing roadway deficiencies.

2.2 Need

The existing SC-41 Bridge over the Wando River is a 69 year old metal truss swing span determined to no longer meet the SCDOT's safety and design requirements for its transportation system. The existing bridge was evaluated in terms of its structural and functional efficiency and found to be structurally deficient and functionally obsolete. Structural deficiencies are characterized by deteriorated conditions and reduced load-carrying capacity; whereas functional obsolescence refers to the bridge not meeting current design standards. The SC-41 Bridge over the Wando River received a sufficiency rating of 24.4 during evaluation. Structures given a sufficiency rating of 50 or less are placed in the state bridge replacement program.

Existing SC-41 Bridge

Figure 1-1: Project Location Map



The replacement of this bridge currently ranks 12th on SCDOT's 2010 Federal Aid Bridge Program located with the 2010-2015 Statewide Transportation Improvement Program (STIP). Additionally, the bridge continues to require greater maintenance efforts and costs to keep the structure protected from natural elements and its mechanical parts fully functional.

The swing span is no longer mechanically operated and must be manually opened and closed. It is opened by prescheduled appointment through the Berkeley County Maintenance Office. SCDOT records show that in 2005, the bridge was opened eight times, 14 times in 2006, 13 times in 2007, seven times in 2008, and eight times in 2009.

Prior to the development of the EA an alternative concept report (located on the disc in the back of the document) was developed for the project and a public information meeting (results in Section 5.1) was held to provide the citizens with an opportunity to provide input into the project.

2.2 Existing Facility

Currently, SC-41 is a two-lane roadway with earthen shoulders and roadside ditches oriented in a north-south direction. The project corridor terrain is flat with the surface runoff drainage flowing to roadside ditches. The existing land use along the project boundaries is a mixture of residential, commercial, industrial, wetlands, and woodlands. The posted speed limit for the existing SC-41 Bridge is 35 miles per hour (mph) and increases to 55 mph at the southern end of the project in Charleston County.

The bridge over the Wando River was constructed in 1941 with a 168-foot through truss swing span over the channel and 40-foot concrete spans supported on steel beams for the bridge approaches. The existing channel width, when open, is approximately 63 feet. The bridge is 1,690 feet long with a 22-foot wide roadway and 10-inch curb provided on both sides. The roadway right of way to either side of the bridge is currently 37.5 feet.

Existing SC-41

3.0 ALTERNATIVES

Various alternative corridors were developed and considered for the roadway and bridge as it traverses the Wando River. During early project coordination and development the SCDOT decided that the new bridge would be designed for four future lanes of traffic to support the Charleston Area Transportation Study's (CHATS) Long Range Transportation Plan (2005-2030) to widen and improve SC-41 from US-17 to the current project. This decision would save money in the long run by anticipating future transportation improvements and accommodating them into the existing project. The roadway approaches to the proposed new bridge; however, would be designed for two lanes of traffic. Future roadway widening improvements could be accomplished without requiring costly bridge widening or replacement options over the Wando River.

Based upon this travel lane concept, alternative corridors were developed for consideration and evaluation. All of the corridors were transitioned to match the existing horizontal and vertical roadway alignments as quickly as possible to minimize the length of the project while still maintaining the desired design criteria. Identifying the location (upstream, on alignment, or downstream) and limits of the alternative corridors relative to the existing SC-41 alignment was critical in assessing potential impacts to the surroundings and evaluating corridors against each other. The vertical clearance of the new bridge over the river's channel would remain sufficient to maintain river navigation by vessels. A bridge vertical clearance of 45 feet above mean high water (MHW) was assumed for cost estimates and to ensure the project footprint of each alternative corridor was consistent for comparative purposes. The location of each alternative corridor was also selected so that the existing swing span could remain in service during the construction of each potential alternative corridor considered.

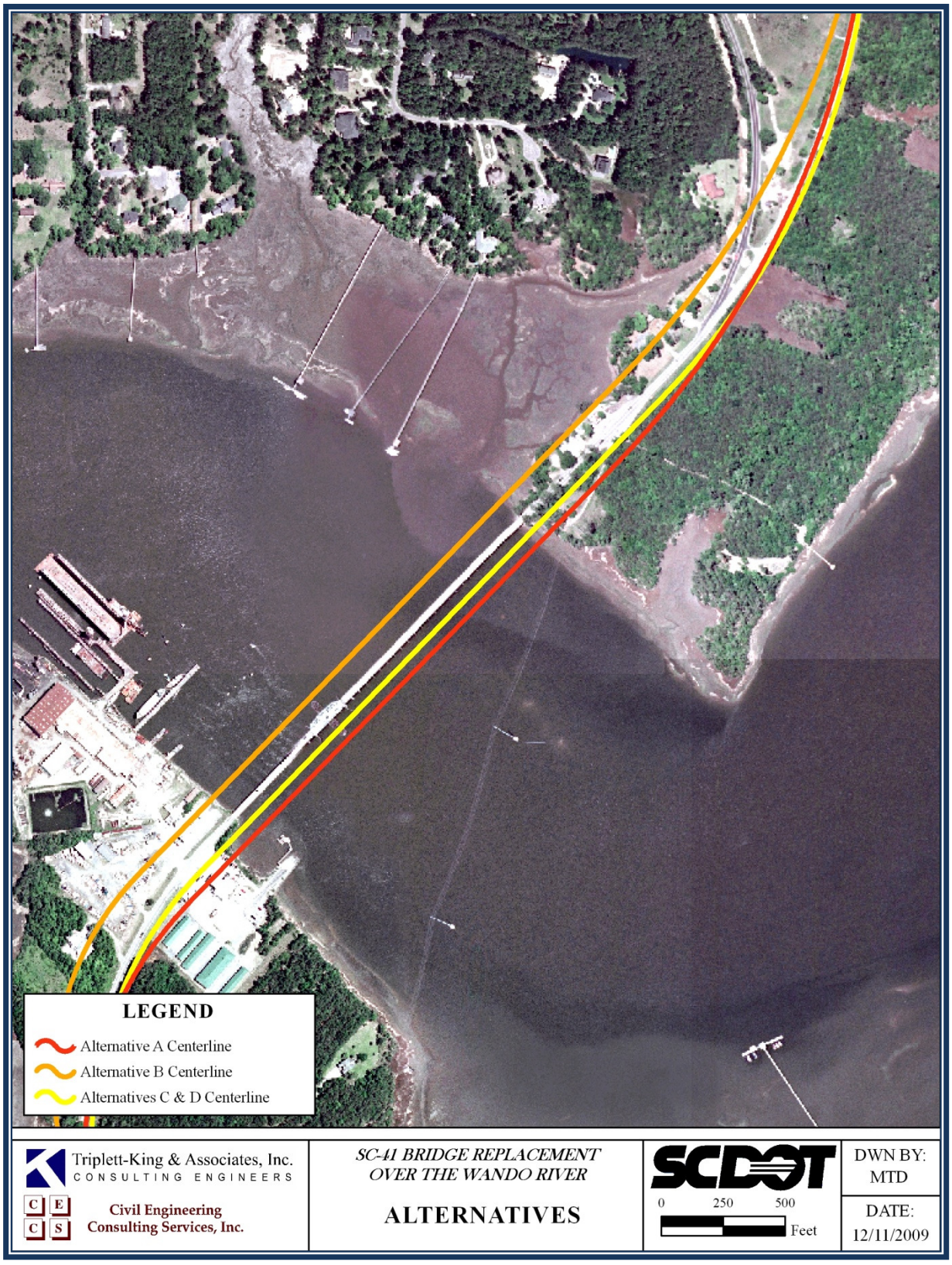
Many aspects of the project are shared by all of the proposed corridors including logical termini, design speed, access, and road and bridge typical sections. The project begins at the southern terminus located at Harpers Ferry Way in Charleston County. It extends northward across the Wando River and into Berkeley County. Existing access would be provided for residences and businesses that are not relocated due to the project. Road and bridge typical sections would remain the same for all the corridors and are included in Appendix E.

3.1 Alternative Corridors Considered and Eliminated

3.1.1 Corridor B

Corridor B would be located approximately 118 feet downstream of the existing centerline and consist of four 12-foot travel lanes with 10-foot outside shoulders. Four feet of the shoulder would be used to accommodate bicycles. The inside shoulders would be four feet separated by a standard concrete median barrier. The bridge would also have six-foot sidewalks on both sides. The dimensions of the new structure would be approximately 93 feet wide and 2,700 feet long. The structure would consist of twenty pre-stressed concrete bulb-tee beam spans of 135 feet each and would be supported by three or four column concrete interior bents.

Figure 3-1: Corridor Alignments



The distance between the existing roadway and new structure would be sufficient enough that staged construction of the bridge would not be required. Because of the presence of an estuarine marsh just north of the river bridge, a secondary crossing would be required for this alternative. This alternative would necessitate a four span cast-in-place flat slab bridge 120 feet in length be constructed. The flat slab bridge would be supported by driven pre-stressed concrete pile bents.

The selection of Alternative Corridor B would require the potential relocation of five (5) residences, the potential relocation or substantial impacts to three (3) commercial properties including a boat storage business (Carolina Boatyard) and a shipyard (Detyen's Shipyard), and a cellular communications tower. This corridor would also impact three hazardous material sites: Detyen's Shipyard, a former SCDOT Wando Section Shed, and the former Wando Grocery. Of the alternatives considered Alternative Corridor B would have the greatest impact to wetlands (1.42 acres) excluding in-water bridge structure common to all the corridors. As a result of this corridor analysis, Corridor B has shown that it has the greatest amount of overall impacts to the surrounding human and natural environment and is not the most feasible corridor.

3.1.2 Corridor C

Corridor C would be a staged construction alternative that would place the new bridge centerline approximately 67 feet upstream from the existing facility. The bridge dimensions for this corridor would be similar to Alternative A. The construction of the first stage of the new bridge, a fully functional two-lane section would be provided and utilized with the potential future widening of SC-41. Although staged construction would be required, there would be some flexibility as to when the structure would need to be completed. The structure could be completed, as soon as the existing bridge could be removed or at a later date when the four-lane section would be required.

The selection of Alternative Corridor C would require the potential relocation or substantial impacts to two (2) commercial properties including a boat storage business (Wando Boat Landing and Self Storage) and a gas station/convenience store (Pantry # 879). This corridor would also impact one (1) hazardous material site: Pantry #879. Of the corridors considered Alternative Corridor C is tied with Corridor D having the least impact to wetlands (0.50 acres) excluding in-water bridge structure common to all the corridors.

As a result of this corridor analysis, Corridor C has shown that it has environmental impacts that are nearly the same as Corridors A and D. Construction staging would be more complicated due to the close proximity of the new bridge to the existing roadway. A more complex traffic control strategy would be required to maintain motor vehicle traffic during staged construction increasing the potential for vehicular crashes in the work zone when compared to a new location construction option. This corridor alignment may not be compatible with a lower profile, movable span bridge due to potential conflicts with the existing swing span bridge. As a result of this corridor analysis, Corridor C has shown that it is not the best and most feasible corridor.

3.1.3 Corridor D

Corridor D would be a twin bridge configuration with the construction of one bridge prior to the demolition of the existing bridge. As with Corridor C, a fully functional two-lane section would be provided with the construction of the first bridge. The second structure could be constructed immediately or with the potential future widening of SC-41. The center of the two bridges would be located approximately 56 feet upstream of the existing facility's centerline. Each new bridge would consist of two 12-foot travel lanes with 10-foot shoulders on each side. A four-foot shoulder would be used to accommodate bicycles. Each bridge would also have six-foot sidewalks. The geometry of each of the two bridges would consist of fifteen pre-stressed concrete bulb-tee beam spans at 135 feet each for a total bridge length of approximately 2,025 feet and width of 53 feet. The supporting substructure for each bridge would require two or three column concrete interior bents.

The selection of Alternative Corridor D would require the potential relocation or substantial impacts to two (2) commercial properties including a boat storage business (Wando Boat Landing and Self Storage) and a gas station/convenience store (Pantry # 879). This corridor would also impact one (1) hazardous material site: Pantry #879. Of the corridors considered Alternative Corridor D is tied with Corridor C having the least impact to wetlands (0.50 acres) excluding in-water bridge structure common to all the corridors.

As a result of this corridor analysis, Corridor D has shown that it has environmental impacts that are nearly the same as Corridors A and C. Construction staging would be more complicated due to the close proximity of the new bridge to the existing roadway. A more complex traffic control strategy would be required to maintain motor vehicle traffic during staged construction increasing the potential for vehicular crashes in the work zone when compared to a new location construction option. This corridor alignment may not be compatible with a lower profile, movable span bridge due to potential conflicts with the existing swing span bridge. As a result of this corridor analysis, Corridor D has shown that it is not the best and most feasible corridor.

3.2 No-build Alternative

The No-build Alternative, also known as the no action alternative, was considered in place of the bridge replacement project. This alternative would neither improve the bridge's sufficiency rating nor address the bridge's structurally deficient and functionally obsolete status. If the No-build Alternative was selected then only maintenance operations would occur on the bridge and it would continue to age and slowly deteriorate. It is likely that SCDOT would eventually be required to post weight restrictions on the bridge, substantially reducing its ability to serve the motoring public. In future years the bridge could be closed to vehicular traffic due to its deteriorated condition, requiring lengthy detours for motorists and area residents. Based on this information the No-build Alternative was deemed an unacceptable alternative.

3.3 Rehabilitation Alternative

The Rehabilitation Alternative was also considered in place of the proposed bridge replacement project. Rehabilitation includes measures that address the structural condition of the bridge in order to maintain the carrying capacity rating. This would require ongoing inspections, maintenance, and repairs to allow the bridge to be structurally sufficient without posting a

vehicle weight limit. The rehabilitation measures, however, would not address the substandard geometry related to the functional obsolescence of the bridge including the width of travel lanes and shoulders. In light of the age of and structural condition of the bridge, the Rehabilitation Alternative is not the most prudent and feasible alternative.

3.4 Build Alternatives

Corridor A, located approximately 110 feet upstream of the existing facility's centerline, would consist of four 12-foot travel lanes with 10-foot outside shoulders. Four feet of the shoulder would be used to accommodate bicycles. The bridge would also have six-foot sidewalks on both sides. The dimensions of the new structure would be approximately 93 feet wide and 2,025 feet long. The distance between the existing roadway and new structure would be sufficient enough that staged construction of the bridge would not be required. The existing swing span would remain in service during construction of this alternative.

As shown in Table 3-1 Corridor A had fewer impacts to the surrounding human and natural environment than Corridor B. Corridor A also reduces the likelihood of conflict with the existing swing bridge during construction, provides for easier constructability and safer traffic operations during construction, and was less expensive than either Alternative C or D. Based on this analysis Corridor A was selected as the best alternative to replace the existing SC-41 Bridge.

Table 3-1: Alternative Corridor Comparison Matrix

CATEGORY	CORR. A	CORR. B	CORR. C	CORR. D
Residence Structures	0	5	0	0
Business Structures	2 One Gas Station and Two Storage Unit Buildings	3 One Shipyard , and Two Commercial One-Story Buildings	2 One Gas Station and Two Storage Unit Buildings	2 One Gas Station and Two Storage Unit Buildings
Boat Ramp	1	0	1	1
Antenna Tower	0	1	0	0
Billboard	1	0	1	1
Wetlands (acres)*	0.60	1.42	0.50	0.50
Hazardous Material Sites	1	3	1	1
Estimated Construction Cost (in millions)	31.1**	41.1**	34.4**	38.3**

* Wetland acreages are based on National Wetland Inventory maps and do not include the Wando River.
**Construction cost estimate based on 2005 costs in the alternative concept report with assumed 3% annual inflation for the years from 2006 to 2010. A fixed span bridge with 45 foot vertical clearance was used for cost comparison of alternative corridors.
NOTE: Information provided by the ***Alternative Concept Report for S.C. Route 41 Bridge Replacement*** for Alts. A,B,C and D. A complete copy of this report is included on the CD accompanying this document.

After reviewing additional aspects of the project's alignment and traffic patterns, engineers and designers proposed several modifications to Corridor A. Like the existing Corridor A, there would be a new structure upstream of the existing bridge. The roadway improvements would extend onto new location approximately 2,000 feet south of the existing bridge and

east/upstream of the existing roadway. The project would continue northerly across the Wando River maintaining a parallel course of approximately 110 feet upstream of the existing bridge. Once the bridge touches down in Berkeley County, the roadway would transition onto the existing SC-41 and continue northerly approximately 2,000 feet before tying into Road S-33 (Clements Ferry Road) approximately 1,200 feet north of the existing Road S-33/SC-41 intersection.

Although no vertical profile was finalized at this point for the modified Corridor A, a preliminary design was presented to the public for comment. The new bridge would be a high level fixed span concrete and steel structure providing the width to accommodate four 12-foot travel lanes (two in each direction) with 10-foot shoulders on the outside and six-foot shoulders inside. The opposing directions of travel would be separated by a standard concrete median barrier. Four feet of the outside shoulder could be utilized by bicyclists. The structure would be approximately 2,160 feet long, approximately 82 feet wide. The proposal to construct a bridge with four travel lanes instead of two is a proactive response the Charleston Area Transportation Study's (CHATs) Long Range Transportation Plan that includes widening improvements to both SC-41 and Clements Ferry Road in the current project area.

Vertical Navigational Clearance and Alternative Refinement: A Response to Public Involvement

In January 2005, SCDOT conducted a public information meeting (PIM) on the proposed bridge replacement project in the Wando community. The modified Corridor A was presented to and input was requested from the public. Although a profile had not been finalized, a bridge with a mean high water vertical clearance of 45 feet was presented. The overwhelming response from the public was that they wanted a new bridge with a lower vertical profile or clearance; however, some attendees requested a bridge with a higher vertical clearance. For a summary of comments from the PIM please see section 5.1 Public Information Meeting.

Based on the public's response SCDOT engineers considered and evaluated how to meet the desire expressed by the public while meeting the horizontal and vertical navigational clearance standards required by the United States Coast Guard (USCG). On June 2, 2005, an interagency meeting was conducted on-site to discuss the vertical clearance requirements.

Increasing the vertical clearance could be accomplished by utilizing a bridge with fixed spans similar to the I-526 Bridge over the Wando River downstream from SC-41. Another option considered would be to replace the existing swing bridge with a new moveable span bridge. The new bridge could be a swing bridge like the existing bridge, a single leaf bascule bridge, or a dual leaf bascule bridge. The new moveable span bridge could also have a lower vertical profile than a fixed span bridge while still meeting the USCG's horizontal and vertical navigational

I-526 Bridge over the Wando River

clearance requirements for navigable coastal waters.

From the earlier alternative evaluation, engineers determined the best location, regardless of which bridge design was implemented, would be to keep the corridor alignment upstream from the existing bridge (modified Corridor A). The corridors closer to the existing bridge had greater utility relocation impacts and would be more difficult to construct while maintaining traffic. The alternative downstream of the bridge would substantially impact a shipyard.

As a result SCDOT engineers considered developing two bridge replacement options within the modified Corridor A footprint to accommodate public input. The result was Alternative A1 and A2.

3.4.1 Alternative A1

Alternative A1 has a similar project footprint to modified Corridor A, with the most notable change being to the vertical navigational clearance of the bridge. The proposed vertical clearance of the bridge for navigation would be 55 feet above MHW via a fixed span bridge.

The roadway improvements would extend onto new location approximately 2,000 feet south of the existing bridge and east/upstream of the existing roadway. The project would continue northerly across the Wando River maintaining a parallel course of approximately 110 feet upstream of the existing bridge. Once the bridge touches down in Berkeley County, the roadway would transition onto the existing SC-41 and continue northerly approximately 2,000 feet before tying into Road S-33 (Clements Ferry Road) approximately 1,200 feet north of the existing Road S-33/SC-41 intersection.

The roadway would be improved to provide for two 12-foot travel lanes (one in each direction) with 10-foot shoulders of which four feet would be paved to accommodate bicyclists. It is expected that 150 feet of right of way (75 feet each side) would be required to construct and maintain the roadway while 200 feet of right of way (100 feet each side) would be required to construct and maintain the new bridge. Slope permission would also be required in certain areas.

The new bridge would be a high level fixed span concrete and steel structure providing the width to accommodate four 12-foot travel lanes (two in each direction) with 10-foot shoulders on the outside and six-foot shoulders inside. The opposing directions of travel would be separated by a standard concrete median barrier. Four feet of the outside shoulder could be utilized by bicyclists. The structure would be approximately 2,300 feet long and 82 feet wide.

Roadway improvements, including relocating the existing Clements Ferry Road/SC-41 intersection, would occur north of the Wando River. Relocating Clements Ferry Road will require approximately 135 feet of new right of way (60/75 feet to either side) for a distance of approximately 600 feet and approximately 100 feet of new right of way (50/50 each side) for a distance of approximately 1,400 feet. Clements Ferry Road, where it ultimately terminates with SC-41, would consist of two 12-foot travel lanes, one left turn lane, and grassed shoulders. SC-41 would also provide for left turn movement at this location. A frontage road would be required along the south west portion of the bridge approach and extend under the bridge to provide access to the four property owners adjacent to the roadway (see Figure 3-3).

The development of this alternative is the result of the public involvement effort in January, 2005. For more information on the public information meeting that was held, please go to section 5.1: Public Information Meeting.

3.4.2 Alternative A2

Alternative A2 has a similar project footprint to Alternative A1, with the most notable changes being to the type of bridge profile and vertical navigational clearance of the bridge. The replacement bridge for Alternative A2 would have a total length of approximately 2,000 feet with a moveable span approximately 135 feet in length over the channel.

SCDOT engineers evaluated three moveable span bridge options to find the most feasible option to study in further detail. This would provide for a lower profile bridge (compared to Alternative A1) as requested by the public while providing for unrestricted (vertical navigational clearance) usage of the river by the mariners.

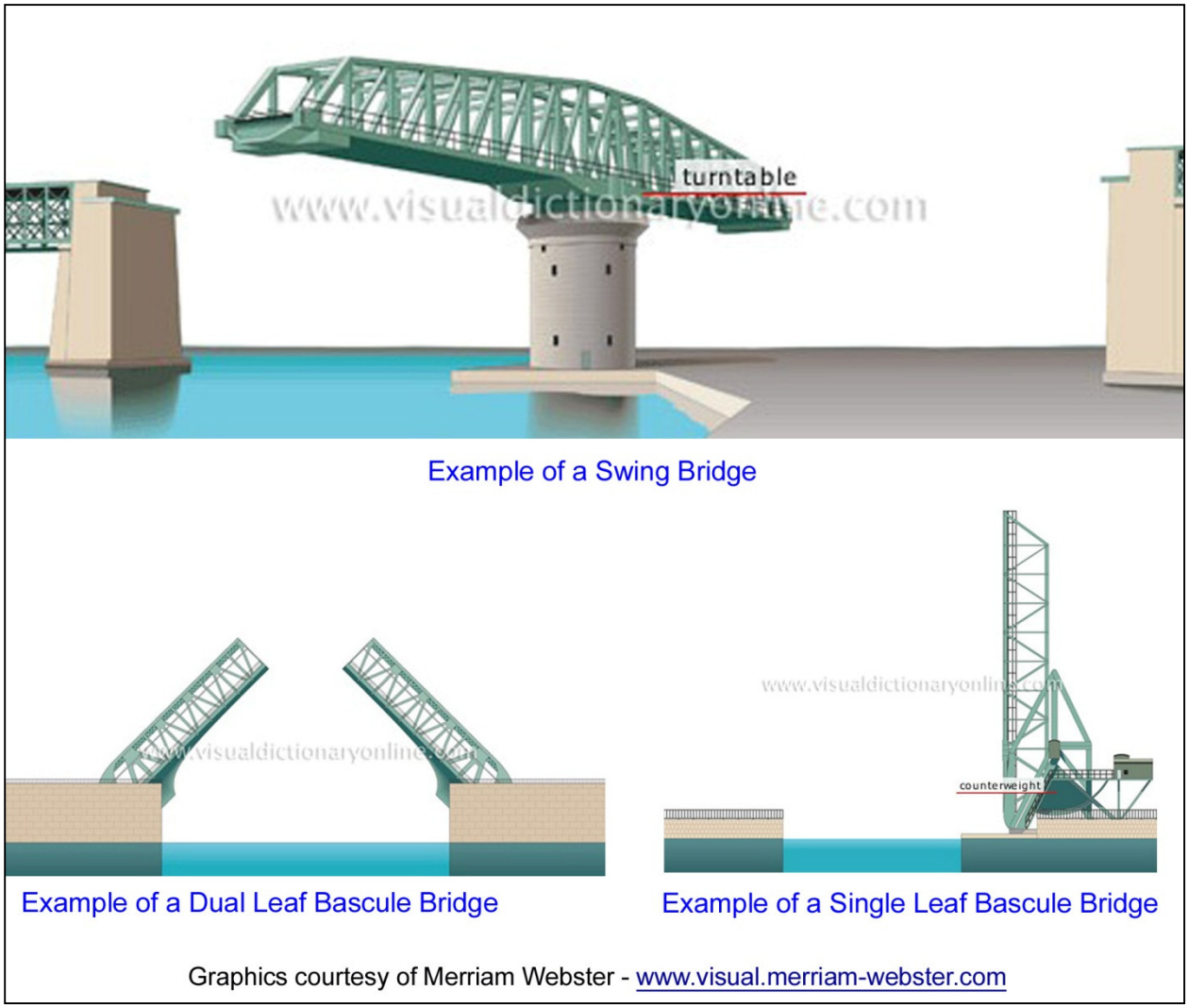
Replacing the existing swing bridge with a similar swing design slightly upstream posed two potential challenges. Because the size of the new bridge would need to be larger to meet the horizontal navigational clearance, constructing a second swing bridge in close proximity could create conflicts if both needed to open simultaneously. Additionally, construction in close proximity of the existing bridge may require closure of river traffic for extended periods. Because of these issues, this bridge alternative is deemed unfeasible.

Single leaf bascule bridges are moveable bridges with a single counterweight that balances the leaf during operation. They offer no vertical clearance limitations, and can be built with a lower profile to the river than a fixed span bridge. A single counterweight, built below the bridge, would be encased in a concrete and steel casing in the river channel, making the bridge more aesthetically pleasing compared to an elevated counterweight.

Dual leaf bascule bridges have two smaller leafs compared to a single leaf bridge. This allows for a quicker opening operation to river traffic; however, this requires separate counterweights and operating mechanisms on either side of the bridge, increasing building cost and anticipated maintenance. Because of the limited use of the existing moveable bridge, the additional costs of a dual leaf bridge do not appear to be warranted.

A single leaf bascule is anticipated to be more economical to build and maintain for long-term operation. Because of the public concern, lower maintenance costs, and greater aesthetic value, this alternative was considered over a dual leaf bascule.

Figure 3-2: Examples of Moveable Span Bridges



For Alternative A2 a single leaf bascule bridge is proposed to replace the existing swing span bridge. The proposed vertical clearance of the bridge for navigation in the closed position would be 14 feet above MHW. The existing bridge's vertical clearance in the closed position is 8 feet above MHW. The vertical clearance when the bridge is opened would be an unlimited vertical clearance.

3.3 Design Alternatives to be Considered in Detail

An alternative comparison matrix for Alternatives A1 and A2 was developed after the public information meeting that was held in January of 2005 to highlight the difference between the two alternatives.

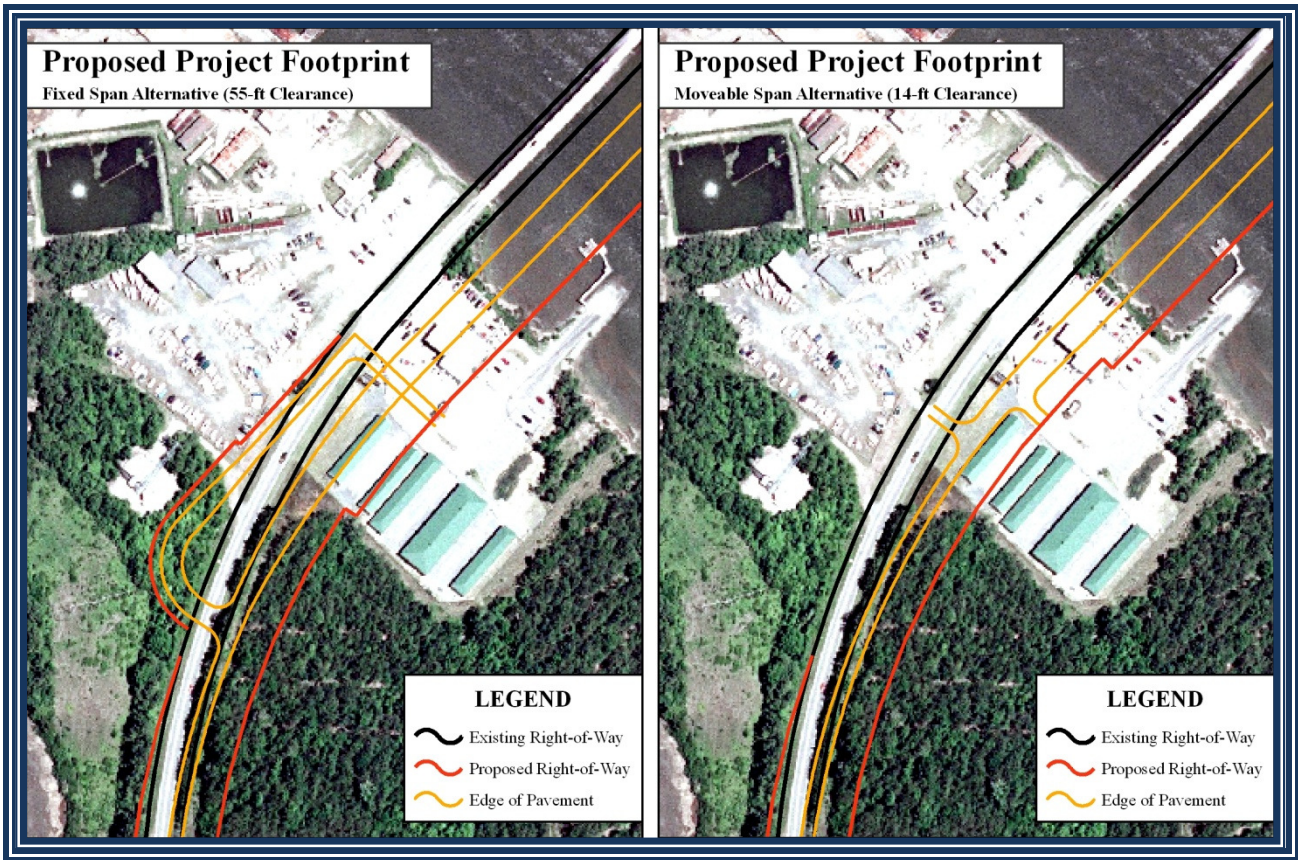
Table 3-2: Alternative A1 and A2 Comparison Matrix

CATEGORY	ALT. A1	ALT. A2
Navigational Clearance in the channel above MHW (feet)	55 fixed	14 (closed), Unlimited (open)
Right of Way Impacts (acres)	24.4	23.4
Residences (each)	0	0
Businesses (each)	Pantry #879 Gas Station/ Convenience Store Two Self Storage Building – Wando Boat Landing and Self Storage (partial relocation)	Pantry #879 Gas Station/ Convenience Store One Self Storage Buildings – Wando Boat Landing and Self Storage (partial relocation)
Boat Ramp (each)	Wando Boat Landing and Self Storage	Wando Boat Landing and Self Storage
Antenna Tower (each)	0	0
Billboard (each)	1	1
Farmland Impacts (acres)	0.00	0.00
100-year Floodplains (acres)	27.00	26.00
Wetlands (acres)*	2.917	2.861
In-water Impacts (acres)	0.0457	0.1614
Stream Impact (linear feet)**	0.00	0.00
Threatened and Endangered Species (each)	5 (may affect, not likely to adversely affect)	5 (may affect, not likely to adversely affect)
Impacted Noise Receptors (each)	0	0
Historic Properties (each)	1	1
Section 4(f) Resources	1 (Wando River Bridge)	1 (Wando River Bridge)
Hazardous Material Sites	1	1
Estimated Project Cost (in millions)	35.6***	46.1***

* Based on Natural Resources Technical Report, 2008, and does not include impacts to the Wando River.
** Impacts do not include bridge piers or in-river structures required to support a bascule bridge or its counterweight.
*** Construction cost estimate based on 2010 costs

As shown in Figure 3-3, the right of way footprints will be nearly identical for both Alternative A1 and A2; however, impacts for each alternative will vary slightly. These include in-channel stream impacts, overall bridge length, relocations, and access to existing facilities.

Figure 3-3: Project Footprint Differences for Alternatives A1 and A2



Based on the public's input and vertical navigational clearance concerns expressed by the public and the United States Coast Guard (USCG) the SCDOT proposes to consider Alternatives A1 and A2 in greater detail in this EA. Subsequent to a public hearing where both alternatives will be presented the SCDOT will select a Preferred Alternative to move forward into engineering design. During the design phase the environmental impacts will be analyzed in detail for the Preferred Alternative. The results of this detailed analysis will be included in the request for a Finding of No Significant Impact (FONSI) made to the FHWA.

4.0 PROBABLE IMPACTS ON THE ENVIRONMENT

This section includes a discussion on the probable beneficial and adverse social, economic, and environmental effects of the fixed span and moveable span alternative on the surrounding human and natural environment and describes the measures proposed to mitigate any potential

adverse impacts. Environmental studies conducted on these alternatives indicate the absence of any significant impacts by the project on the surrounding environment. The following paragraphs provide a brief overview of environmental findings by topic.

4.1 Land Use

The immediate area surrounding the project is rapidly developing with new residential subdivisions, small businesses, and light industry locating along this section of SC-41 and Clements Ferry Road (S-33). Areas not already impacted by this growth consist mainly of forested areas with tidal wetlands located immediately adjacent to the Wando River. A majority of these tidal waters will be bridged; therefore impacts are expected to be minimal within the limits of the Wando River. Because the alignment of both Alternatives A1 and A2 are nearly identical, the remaining land use impacts are not anticipated to vary greatly between alternatives. Future Land Use Maps can be found in Appendix F of this document.

A portion of the project corridor is listed within the Charleston County Future Land Use Plan as being an Incorporated Area. The Berkeley County Land Use Plan has listed the project area as a Rural Village Area. This designation means the County will support development within the area while ensuring the existing character of the village is maintained and enhanced. The Town of Mount Pleasant has developed a detailed land plan that extends west of US-17 and terminates just short of the project area. A proposal to improve and widen this section of SC-41 is currently listed on the Charleston Area Transportation Study's (CHATS) 2005-2030 Long Range Plan. SCDOT will ensure consistency of the project with these governmental entities through circulation of the project's environmental document with local planning officials.

Alternative A1 would require approximately 24.4-acres of surrounding property for additional right of way. Alternative A2 would require slightly less additional right of way, approximately 23.4-acres. Of this additional right of way required, approximately 8.3-acres are contained within the proposed bridge limits of the Wando River.

4.2 Farmlands

The Farmland Protection Policy Act (FPPA) of 1981 requires evaluation of farmland conversions to nonagricultural uses. Farmland can be prime farmland, unique farmland, or farmland of statewide or local importance. Prime farmland soils are those that have characteristics favorable for economic production of sustained high yields of crops. These soils may or may not be presently used as cropland. Conversely, land that is presently used as cropland may or may not be prime farmland. Most of the prime agricultural land in the study area is currently used for residential purposes.

This project involves the acquisition of only a minor amount of new right of way in the vicinity of the bridge and would not involve any farmland being converted to nonagricultural use. Through the use of county farmland listings provided by the Natural Resources Conservation Service (NRCS), it has been determined that the project area would not involve lands protected under the act. Under the FPPA, "Farmlands" do not include land already in or committed to urban development as shown in urbanized area mapping (7 CFR 658.2). The project corridor is included within the Charleston and Berkeley County Land Use Plans with the Charleston portion of the project listed as incorporated and the Berkeley portion shown as rural village.

Neither Alternative A1 nor Alternative A2 would result in impacts to Farmlands protected by FPPA.

4.3 Water Quality

Pursuant to the 1976 South Carolina Code of Laws, the South Carolina Department of Health and Environmental Control (SCDHEC) shall declare regulations to implement the Pollution Control Act. Regulation 61-69, *Classified Waters*, provides a listing of water bodies in the state, their locations and classifications. Regulation 61-68, *Water Classifications and Standards*, establishes water quality uses, general rules, and specific water quality criteria for each classification. These water quality standards also serve as a basis for decision making in other water quality program areas, including the National Pollutant Discharge Elimination System (NPDES). The U.S. Environmental Protection Agency (EPA) has approved these water quality standards in accordance with Section 303(c) of the Clean Water Act (CWA) and 40 CFR 131. Regulation 61-68 and 61-69 can be obtained from the SCDHEC, Bureau of Water.

All stream reaches contained within the project study area have been classified by SCDHEC as Shellfish Harvesting Waters (SFH). Class SFH are tidal saltwaters protected for shellfish harvesting and uses listed in Class SA and Class SB. Class SA and SB waters are suitable for primary and secondary contact recreation, crabbing, fishing, and for the survival and propagation of a balanced indigenous aquatic community of marine fauna and flora. However, SCDHEC may designate prohibited areas where shellfish harvesting for market purposes or human consumption shall not be allowed.

In addition to determining water quality classifications and standards, SCDHEC develops a priority list of water bodies that do not currently meet State water quality standards pursuant to Section 303(d) of the CWA and 40 CFR 130.7. This list is developed by SCDHEC on a biannual basis, and reviewed and approved by the EPA. It is commonly referred to as the 303(d) List of Impaired Waters and can be obtained from SCDHEC, Bureau of Water. The EPA also maintains an interactive geographic information systems (GIS) website which provides detailed information on impaired water bodies. This is known as the “EnviroMapper for Water” and can be found at www.epa.gov.

To monitor the Wando River’s water quality, SCDHEC has established a shellfish monitoring station (09B-03) and an ambient water quality monitoring site (MD-115) located on the Wando River at the SC-41 Bridge. Station MD-115 was listed in the 2006 edition of the 303(d) list for higher than standard levels of copper, but was delisted in 2008. The 2010 edition of the 303(d) list has not yet been approved by the EPA; however, the Draft 2010 303(d) list was published on February 8, 2010 and lists station MD-115 for non-standard levels of dissolved oxygen.

The proposed bridge replacement project is not expected to exacerbate water quality problems in the watershed. The project was presented at the February 11, 2010 SCDOT Agency Coordination Effort meeting. SCDHEC recommended the consideration of a closed drainage and treatment system for stormwater discharge from the proposed bridge. Because the project is in a preliminary construction phase, SCDOT will address this recommendation in more detail in the request for a Finding of No Significant Impact (FONSI), and submit a drainage plan to SCDHEC prior to finalizing construction plans. Coordination with the USACE and OCRM regarding the potential impacts of this project on surrounding water bodies will occur through the

Section 401/404 permitting process. In addition, the contractor would be required to minimize potential impacts through implementation of construction best management practices, reflecting policies contained in 23 CFR 650 B and SCDOT's Supplemental Specifications on Seeding and Erosion Control Measures.

Water Impacts (Rivers & Streams)

SC-41 crosses four streams and one river system running through the project area. A detailed description of each stream is provided in Table 4-1. Rivers and streams within the project study area are considered riverine systems, as defined by the Cowardin classification.[1] None of the streams are located with the project's construction limits.

Streams were delineated during a Jurisdictional Determination conducted in July 2005, and was verified by the USACE as a reasonable approximation (SAC 80-2005-1664) on March 1, 2006. A copy of this verification letter can be found in Appendix A.

Table 4-1: Stream Information

System	Name	Cowardin Classification*	Drainage Area[1] (square miles)	Avg. Width (feet)	Water Depth (inches)[2]	Length Within Proposed Right of Way	Anticipated Impacts - Alternative A1 (feet)	Anticipated Impacts - Alternative A2 (feet)
Stream 1	UT to Wando River	R2UB1	0.1	4	2-6	0	0	0
Stream 2	UT to Stream 3	R4SB4	0.01	2.5	6-12	0	0	0
Stream 3	UT to Wando River	R2UB2	0.07	4.5	12-24	0	0	0
Stream 4	UT to Wando River	R2UB1/2	0.05	3	0-6	55	0	0
Wando River	Wando River	E1UBL	59	1,695	N/A	250	0	0

Source: Natural Resources Technical Report, 2008.

[1] Drainage areas given are bounded by the downstream edge of the project study area.

[2] Measurement at time of field visit

*** Note: Cowardin Wetland Classifications listed in Table 4-1:**

E1UBL	estuarine, sub-tidal system with an unconsolidated bottom that has a sub-tidal water regime
R2UB1	riverine, lower perennial system with an unconsolidated bottom of cobble and gravel
R2UB2	riverine, lower perennial system with an unconsolidated bottom of sand
R2UB1/2	riverine, lower perennial system with an unconsolidated bottom of gravel and sand
R4SB4	riverine, intermittent streambed system with a substrate of sand and mud

[1] Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. USFWS/OBS -79/31. Fish and Wildlife Service, U.S. Department of the Interior, Washington, DC.

Figure 4-1: Stream Locations

Stream 1

This perennial stream flows west out of the project study area at the western terminus of the project study area, draining southward to the Wando River. Stream 1 is located approximately 400 feet outside the project construction limits. Impacts to Stream 1 are not anticipated for either Alternative A1 or Alternative A2 (Table 4-1).

Stream 1

Stream 2

Stream 2

This intermittent stream flows east out of the project study area at its eastern terminus, approximately 100 feet outside the project construction limits. Stream 2 flows into Stream 3 southeast of the project study area. Impacts to Stream 2 are not anticipated for either Alternative A1 or Alternative A2 (Table 4-1).

Stream 3

This perennial stream flows east out of the project study area, originating at the eastern edge of SC-41, approximately 200 feet outside the project construction limits. Both Stream 3 and Stream 2 originate at culverts under SC-41. Impacts to stream 3 are not anticipated (Table 4-1).

Stream 3

Stream 4

Stream 4

This perennial stream flows parallel to SC-41 on the southwest side of the Wando River Bridge for approximately 55 feet before exiting into salt marsh. Stream 4 is located approximately 100 feet outside the project construction limits. Impacts to stream 4 are not anticipated for either Alternative A1 or Alternative A2 (Table 4-1).

Wando River

Impacts to the Wando River would consist of the construction of a new bridge immediately upstream to the existing bridge. The existing bridge is a 1,690-foot by 22-foot structural steel and reinforced concrete bridge.

The project would involve work within the confines of the Wando River corridor. During construction activities, temporary siltation may occur in the creek beds and erosion would be of a greater degree than presently occurring on existing terrain. The contractor would be required to minimize this impact through implementation of construction best management practices, reflecting policies contained in 23 CFR 650 B and SCDOT's Supplemental Specifications on Seeding and Erosion Control Measures (November 11, 2008).

Wando River

Impacts to water resources in the project study area are not likely to result from activities associated with project construction. Direct impacts as a result of project construction would be limited to the area within the construction limits. No direct stream impacts are anticipated as a result of project construction. The following impacts to surface water resources could result from the construction activities mentioned above.

- Increased sedimentation and siltation downstream of road crossings and increased erosion in the project study area.
- Alteration of stream discharge due to silt loading and changes in surface and groundwater drainage patterns.
- Changes in light incidence and water clarity due to increased sedimentation and vegetation removal.
- Changes in and destabilization of water temperature due to vegetation removal.
- Alteration of water levels and flows due to interruptions and/or additions to surface and ground water flow from construction.
- Increased nutrient loading during construction via runoff from exposed areas.
- Increased concentrations of toxic compounds in roadway runoff.
- Increased potential for release of toxic compounds such as fuel and oil from construction equipment and other vehicles.

Impacts to stream reaches adjacent to the facility footprint would be temporary and localized during construction. Temporary construction impacts due to erosion and sedimentation would be minimized through implementation of a stringent erosion-control schedule and the use of Best Management Practices (BMPs). No long-term impacts resulting from construction activities are anticipated to adjacent reaches.

Alternative A1 proposes to span the entire length of the Wando River utilizing a new bridge approximately 2,300 feet long and 82 feet wide. Direct stream impacts would be limited to the installation of bridge piers into the stream channel.

Alternative A2 also proposes to span the entire length of the Wando River, but because of its lower profile to the Wando River, the proposed bridge is approximately 2,000 feet long and 82 feet wide. Alternative A2 would require direct in-channel impacts due to bridge piers, as well as the location of the bascule counterweight. This counterweight, built below the bridge, would be encased in a steel-enforced concreted structure approximately 60-feet by 80-feet within the stream channel.

4.4 Wetlands and Waters of the US

Water bodies such as rivers, lakes, and streams are subject to jurisdictional consideration under Section 404 of the Clean Water Act (CWA), which regulates discharge into "waters of the United States." Although the principal administrative agency of the CWA is the U.S. Environmental Protection Agency, the U.S. Army Corps of Engineers (USACE) has major responsibility for implementation, permitting, and enforcement of provisions of the CWA. Wetlands are considered "waters of the United States" and are described by 33 CFR 328.3(b) [1986] as:

> *Those areas that are inundated or saturated by groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.*

The project study area lies within the Ashley River/Cooper River Basin (USGS Hydrologic Unit 03050201), within sub basin 080. Watershed 03050201-080 extends through Berkeley and Charleston Counties and consists primarily of the Wando River and its tributaries. The project study area includes portions of the Wando River and associated drainages and wetlands.

A combination of vegetation analysis, hydrological observations, and soil sampling was utilized to determine the locations of wetlands within the proposed project area. Project study area wetlands are considered palustrine or estuarine systems, as defined by the Cowardin classification.[2] Palustrine systems occur in low depressions or in floodplains adjacent to streams and vary in plant community composition as a result of hydrology and/or level of disturbance. Estuarine systems comprise saltwater or brackish waters of the Wando River and adjacent marshes and drainages. Wetlands in this landscape function as receptors of upland runoff, intercepting runoff prior to entering stream systems. The wetlands also function as buffers during times of flooding, by reducing runoff rates and allowing for increased absorption and infiltration.

Wetland 37

[2] Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. USFWS/OBS -79/31. Fish and Wildlife Service, U.S. Department of the Interior, Washington, DC.

Jurisdictional areas within the project study area were delineated and located using Global Positioning System (GPS) technology during the period of March 9-11 and 15-17, 2005. The delineation was reviewed by the USACE Charleston District and by SCDHEC's Oceans and Coastal Resource Management (OCRM) Office for concurrence. The USACE verified the delineation (SAC-2005-1664) on March 1, 2006, and SCDHEC-OCRM verified wetlands areas on March 16, 2006. A copy of the USACE verification can be found in the Appendix A.

Fifty one wetlands were identified within the study area during a Jurisdictional Determination verified on March 1, 2006 and finalized in April 2008. Thirty-two of these wetlands are located within the proposed right of way of Alternative A1 (Table 4-2). The proposed right of way of Alternative A2 includes 31 of these identified wetlands. Four streams and one river system (Wando River) are associated with these 51 wetland systems. Please refer to the *Natural Resources Technical Report* for more details. Wetlands depicted below are based on wetlands delineated during the Jurisdictional Determination. These areas were identified to be greater areas identified using National Wetlands Inventory mapping, used in the ***Alternative Concept Report for S.C. Route 41 Bridge Replacement*** (Table 3-1).

Table 4-2: Wetland Information & Classification

Wetland Number	Associated Stream	Acres within Alternative A1 ROW	Acres within Alternative A2 ROW	Wetland Classification*
1	Stream 1	0	0	PFO1A/B
2	non-riverine	0.009	0.009	PEM1J
3	Stream 4	0.023	0.023	PEM1C
4	non-riverine	0.011	0.011	PEM1J
5	non-riverine	0.083	0.083	PEM1C
6	Stream 4	0.184	0.184	PEM1J
7	non-riverine	0.003	0.003	PEM1J
8	non-riverine	0.048	0.048	PEM1J
9	Stream 4	0.040	0.040	PSS1C
10	non-riverine	0.054	0.054	PEM1J
11	non-riverine	0	0	PEM1J
12	Stream 3	0	0	PEM1J
13	non-riverine	0	0	PEM1J
14	non-riverine	0	0	PEM1J
15	Stream 2	0	0	PEM1J
16	Stream 2	0	0	PEM1J
17	Stream 2	0	0	PFO4J
18	Stream 2	0	0	PFO4A
19	Stream 2	0	0	PFO4A
20	Stream 2	0	0	PFO4A
21	Stream 2	0	0	PFO4A
22	Stream 2	0	0	PEM1A
23	Stream 3	0.191	0.191	PEM1F/H
24	Stream 2	0	0	PFO4J, PFO6J
25	Stream 3	0.017	0.017	PEM1J
26	Stream 3	0.007	0.007	PEM1J

Wetland Number	Associated Stream	Acres within Alternative A1 ROW	Acres within Alternative A2 ROW	Wetland Classification*
27	Stream 3	0.015	0.015	PEM1J
28	Stream 3	0	0	PFO6A
29	Stream 3	0	0	E2EM1N
30	Stream 3	0	0	PFO6A
31	Wando River	0	0	PSS6A
32	non-riverine	0.003	0.003	PEM1J
33	non-riverine	0.015	0.015	PEM1J
34	Stream 4	0.102	0.102	PEM1J
35	Stream 4	0.011	0.011	PEM1J
36	Stream 4	0.005	0.005	PEM1J
37	Wando River	0.534	0.534	E2EM1N
38*	Wando River	0	0	E2EM1N
39	Wando River	0.109	0.109	PFO4A
40	Wando River	0.025	0.025	PFO4A
41*	Wando River	0	0	E2EM1N
42	non-riverine	0.011	0	PEM1C
43	non-riverine	0.173	0.128	PEM1C
44	Wando River	0.449	0.449	PEM1J
45	Wando River	0.138	0.138	PEM1J
46	Wando River	0.136	0.136	PEM1C
47	Wando River	0.251	0.251	E2EM1N
48	Wando River	0.038	0.038	PEM1J
49	Wando River	0	0	PFO6A
50	Wando River	0.048	0.048	PFO3Y
51	Wando River	0.184	0.184	E2EM1N
	TOTALS	**2.917**	**2.861**	

Source: Natural Resources Technical Report, 2008.

[#] Open-water associated with the limits of the Wando River. Impacts to these wetlands will be avoided at the maximum extent practicable by bridging. Only minimal impacts caused by bridge supports are anticipated

*** Note: Cowardin Wetland Classifications listed in the table above:**

E2EM1N	estuarine, inter-tidal, persistent emergent, regularly flooded wetland
PEM1A	palustrine, forested, needle-leaved evergreen, temporarily flooded wetland
PEM1C	palustrine, persistent emergent, seasonally flooded or inundated wetland
PEM1F/H	palustrine, persistent emergent, semipermanently to permanently flooded wetland
PEM1J	palustrine, persistent emergent, intermittently flooded wetland
PFO1/3A	palustrine, forested, broad leaved deciduous & evergreen, temporarily flooded wetland
PFO3Y	palustrine, forested, broad-leaved evergreen seasonally saturated wetland
PFO4A	palustrine, forested, needle-leaved evergreen, temporarily flooded wetland
PFO4J	palustrine, forested, needle-leaved evergreen, intermittently flooded wetland
PFO4J, PFO6J	palustrine, forested, needle-leaved evergreen, deciduous, intermittently flooded wetland
PFO6A	palustrine, forested, deciduous, temporarily flooded wetland
PSS1C	palustrine, shrub-scrub, deciduous, seasonally flooded wetland
PSS6A	palustrine, shrub-scrub, deciduous, temporarily flooded wetland

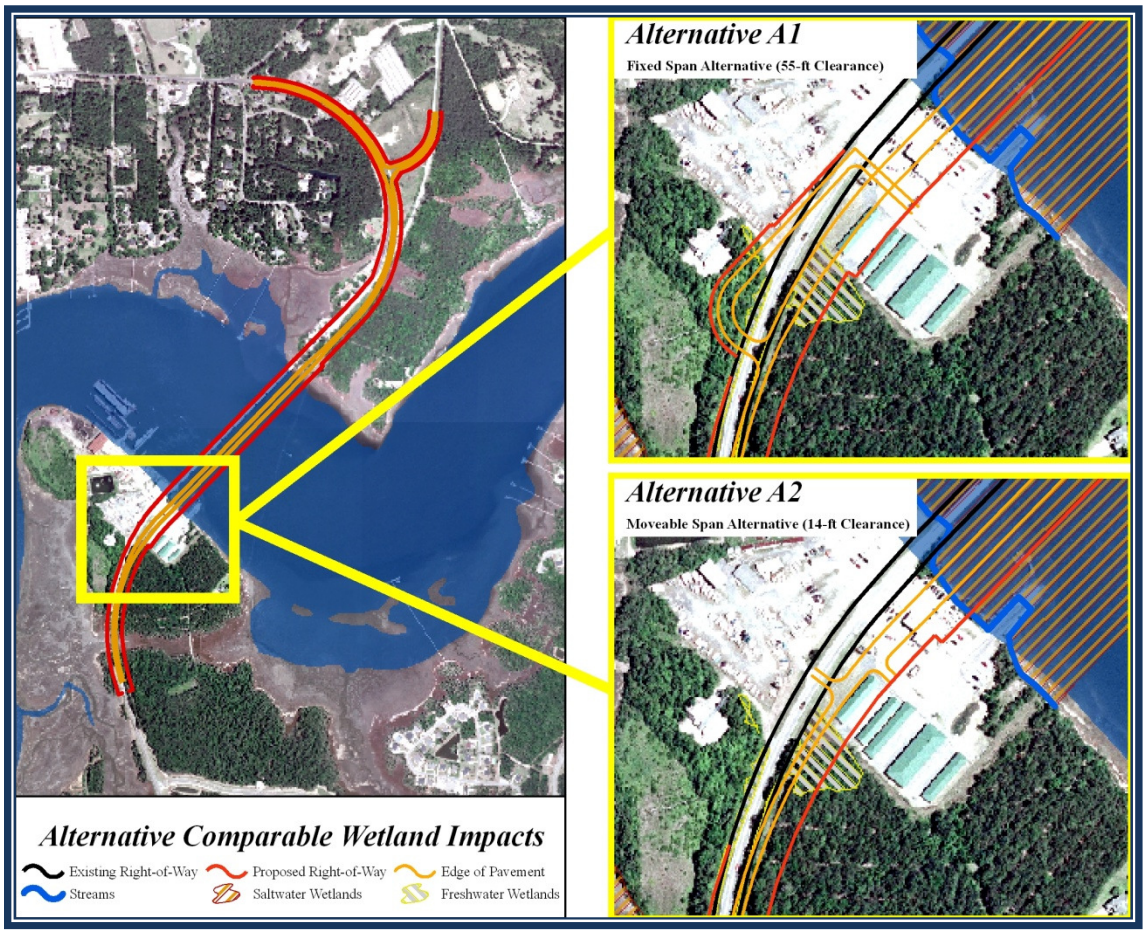
Wetland Impacts

Wetlands were given special consideration during the development and design of the project. Measures were considered and implemented to avoid and minimize impacts to wetlands. The present alternatives considered incorporate all prudent and feasible options that pose the least disruption to wetlands in the project area. It appears that there is no practicable alternative to the construction in wetland areas.

SCDOT will comply with Executive Order 11990 regarding the protection of wetlands and will utilize best management practices during the project's construction. The implementation of appropriate sediment and erosion control measures, which include seeding of slopes, hay bale emplacement, silt fences, and sediment basins as appropriate, will be required of the contractor to ensure compliance with policies reflected in 23 CFR 650B. Reclamation of wetland areas disturbed during construction activities will involve returning the areas to their original elevations to the extent possible and allowing for adjacent vegetation to naturally reclaim the area.

Permanent impacts to vegetated wetlands may be expected due to the extension of cut-fill slopes adjacent to the new alignment portion of the project. Temporary cut-fill impacts may be due to the placement of fill for construction access, or to mechanized clearing in vegetated wetlands. All impacts are expected to be limited to the area within the construction limits.

Figure 4-2: Alternative Comparable Wetland Impacts



In total, 2.917-acres of wetland are located within the proposed right of way for Alternative A1 as seen in Figure 4-2. Alternative A2 includes a total of 2.861-acres of wetlands, for a difference of 0.056 acres. Both acreages were calculated within the proposed right of way for comparison purposes and exclude the limits area of the Wando River within the proposed right of way. The SCDOT will determine the quantity of impacts to Waters of the U.S. in greater detail during the design and permitting process.

4.5 Permits

Permit coordination will be carried out with the US Army Corps of Engineers (USACE) (Charleston District), SCDHEC-OCRM, and the US Coast Guard (USCG) for the design and construction of the bridge and roadway improvements. The following permitting activities are anticipated:

Section 404 of the CWA requires a permit for the discharge of dredged or fill material into Waters of the U.S., including wetlands. Currently, SCDOT anticipates processing this activity through the USACE Individual Permit process unless avoidance and minimization measures can maintain wetland impacts at or below the thresholds of the SCDOT General Permit

SCDHEC's 401 Water Quality Certification, pursuant to Section 401 of the Federal Water Pollution Control Act of 1972 as amended by the CWA of 1977 and the Water Quality Act of 1987, will be required. Certification is required for activities permitted by the USACE for construction occurring in navigable waters or discharge of dredged or fill material into the State's waters.

SCDHEC-OCRM permit will also be required as work will occur within the tidally influenced area of the state.

R. 19-450, et seq., Code of Laws of South Carolina, 1976 as amended, requires that a State Navigable Waters Permit will be necessary for construction of this project.

USCG Bridge Permit will be required for construction within the navigational channel of the Wando River.

4.6 Mitigation

Pursuant to Section 404 of the Clean Water Act, adverse impacts to Jurisdictional Waters of the U.S., including wetlands, must be avoided and minimized to the maximum extent practicable. For all unavoidable impacts, compensatory mitigation is required to replace the loss of impacted wetland and aquatic resources to the surrounding environment. Compensatory mitigation can be achieved through restoration, establishment, enhancement, and/or preservation of wetlands, streams and other aquatic resources. The responsibility for determining the appropriate form and amount of compensatory mitigation necessary is given to the USACE for all Department of the Army permit authorizations under Section 404 of the CWA and Sections 9 and 10 of the Rivers and Harbors Act.

On April 10, 2008, the USACE and EPA published 940 CFR Part 230, the "Compensatory Mitigation for Losses of Aquatic Resources" (Final Rule). The final rule governs compensatory

mitigation activities related to USACE issued permits, and establishes a hierarchy for preferred mitigation options. The most preferred option is mitigation bank credits.

As the primary form of compensatory mitigation, the SCDOT proposes to purchase credits from an approved mitigation bank for all unavoidable impacts to aquatic resources resulting from the project. Multiple mitigation banks are available to provide mitigation services to the project area, including Pigeon Pond Mitigation Bank (Berkeley County), Congaree Carton Mitigation Bank (Charleston County), and the SCDOT Huspa Creek Mitigation Bank (Beaufort County). As a second form of mitigation, SCDOT would seek to place a restrictive covenant on all Jurisdictional Waters of the U.S., including wetlands, within the SCDOT right of way not impacted by the project. Specific details of compensatory mitigation will be coordinated with the USACE during the permitting process.

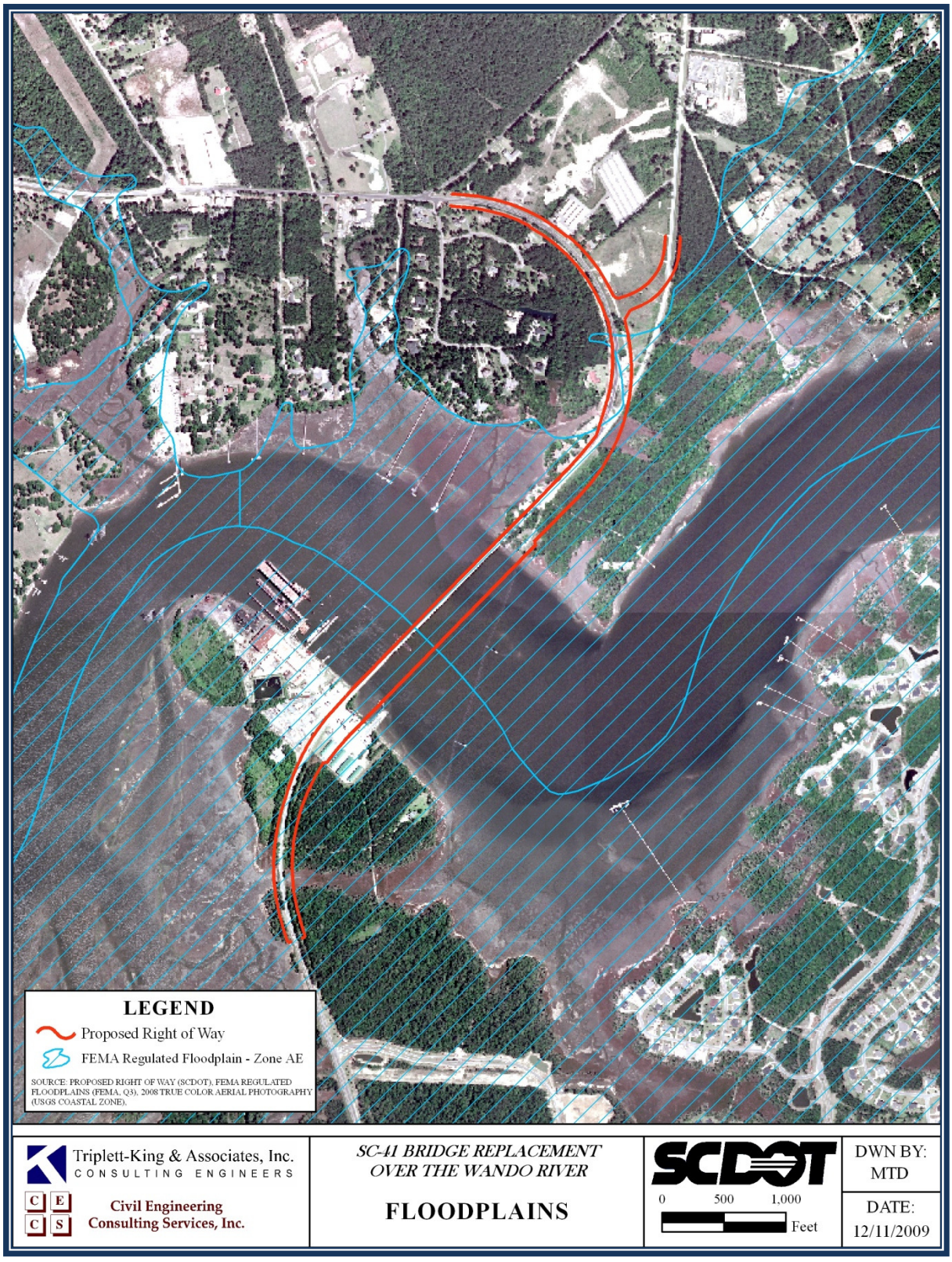
4.7 Floodplains

The 100-year floodplain is defined and regulated by the Federal Emergency Management Agency (FEMA) as the area adjacent to any particular waterway that would be inundated by the base flood, an event that has a one-percent chance of occurring in any given year. Development within the floodplain must meet requirements set forth by FEMA for the National Flood Insurance Program (NFIP).

Based on a study of the Flood Insurance Rate Maps (FIRM), published by FEMA, the proposed project would involve construction within the regulated 100-year floodplain of the Wando River. The impacts would occur from the southern tip of the project limits north to the proposed intersection with Clements Ferry Road (Figure 4-3). The FIRMs reviewed for this project were panels 45015C0737D (dated 10/16/2003) in Berkeley County and 45019C0340J (dated 11/17/2004) in Charleston County. FIRMs depict all areas within the 100-year floodplain with zone distinctions of A and AE. Zone A classification designates areas within the floodplain where base elevations and flood hazards have not been determined, whereas a Zone AE classification identifies areas in which existing detailed studies have already determined base flood elevations. All floodplains within the project limits are designated Zone AE. Because base flow elevations have been established for the floodplains in the project area, FEMA requirements limit encroachment in the 100-year floodplain to activities that do not increase the base flood elevation by more than one-tenth foot, rounded to the nearest one-tenth foot, or “no-rise”.

A preliminary hydraulic design analysis was conducted for the conceptual bridge plan to ensure the project would not increase flood elevations beyond the no-rise threshold. The results of the analysis concluded that the proposed bridge openings or span arrangements are large enough to handle the waters of the 100 year flood, and the proposed project would induce no standing backwater for the studied conditions. Therefore, additional bridging or the installation of floodplain culverts is not a hydraulic requirement to maintain existing flood elevations. A copy of this analysis can be found on the CD accompanying this document. Because a final bridge design has not yet been determined, the preliminary hydraulic design will be modified to address the final proposed bridge design. These findings will be included in the request for a Finding of No Significant Impact (FONSI).

Figure 4-3: FEMA Regulated Floodplains



Based on these preliminary findings, the project is not expected to be a significant longitudinal encroachment as defined under the Code of Federal Regulations for the Location and Hydraulic Design of Encroachments on Floodplains (23 CFR 650A), nor is it expected to have an appreciable environmental impact on this base floodplain. Because the project would be constructed to be above the base floodplain elevation, the level of risk and consequences attributed to this encroachment is not expected to be any greater than that associated with the present roadway and bridge. Also, the project is not expected to have any increased potential for impact on those critical elements that would constitute a significant risk under 23 CFR 650A and will continue to meet the requirements of Executive Order 11988 for Floodplain Management.

Executive Order 11988 states that each agency shall provide leadership and shall take action to minimize the potential impacts of flooding and to restore and preserve the natural and beneficial values served by floodplains in carrying out federally assisted construction and improvements. To accomplish this, minimization and avoidance measures have been conducted and each agency will be provided the opportunity for public review and comment on the proposed project. In addition, a copy of the finalized hydraulic report will be delivered to the floodplain administrators within Charleston and Berkeley Counties for review and comment/concurrence. This coordination will take place during the USACE permitting process.

Alternative A1 includes approximately 27-acres of Zone AE Floodplains, whereas Alternative A2 contains approximately 26-acres of regulated Floodplains. A copy of the FEMA Floodplain Checklist is located in Appendix C of this document.

4.8 Wildlife and Plant Communities

Fragmentation and loss of wildlife habitat is an unavoidable consequence of highway development. However, the proposed project is not expected to result in adverse impacts to terrestrial wildlife due to the existing developed nature of the project study area. Short-term displacement of local wildlife populations will occur during initial construction. Most local species are habituated to human disturbances and are expected to move back into the vicinity of the construction area upon project completion.

Potential impacts to plant communities resulting from bridge construction reflect the relative abundance of communities within the project study area. Much of the project study area is within highway rights of way and, therefore, disturbed land comprises the majority of mapped plant community acreage. Impacts to plant communities are expected to be limited to cut-fill boundaries within the right of way limits. Since this project involves improvements to existing roadways, no fragmentation of plant communities is expected.

4.9 Threatened and Endangered Species

Species with Federal classifications of Endangered (E) or Threatened (T) are protected under the Endangered Species Act of 1973 (ESA), as amended (16 USC 1531 et seq.). Pursuant to Section 7 of the ESA, activities conducted, sponsored, or funded by federal agencies must be reviewed for their effects on these protected species. Endangered status refers to "*any species which is in danger of extinction throughout all or a significant portion of its range*", and

Threatened status refers to "*any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range*" (16 USC 1532).

Table 4-3: Federally Protected Species listed for Berkeley and Charleston Counties

Common & Scientific Name	Status	County*	Habitat	Determination
Shortnose sturgeon *Acipenser brevirostrum*	Endangered	B, C	POSSIBLE	MAY AFFECT, NOT LIKELY TO ADVERSELY AFFECT
Seabeach amaranth *Amaranthus pumilus*	Threatened	C	ABSENT	NO EFFECT
Flatwoods salamander *Ambystoma cingulatum*	Threatened	B, C	ABSENT	NO EFFECT
Loggerhead sea turtle *Caretta caretta*	Threatened	B, C	ABSENT	NO EFFECT
Piping plover *Charadrius melodus*	Threatened	C	ABSENT	NO EFFECT
Green sea turtle *Chelonia mydas*	Threatened	C	ABSENT	NO EFFECT
Kirtland's warbler *Dendroica kirtlandii*	Endangered	C	POSSIBLE	MAY AFFECT, NOT LIKELY TO ADVERSELY AFFECT
Leatherback sea turtle *Dermochelys coriacea*	Endangered	C	ABSENT	NO EFFECT
Bald eagle *Haliaeetus leucocephalus*	BGEPA^	B, C	ABSENT	NO EFFECT
Kemp's ridley sea turtle *Lepidochelys kempii*	Endangered	C	ABSENT	NO EFFECT
Pondberry *Lindera melissifolia*	Endangered	B, C**	POSSIBLE	NO EFFECT
Wood stork *Mycteria americana*	Endangered	B, C	POSSIBLE	MAY AFFECT, NOT LIKELY TO ADVERSELY AFFECT
Canby's dropwort *Oxypolis canbyi*	Endangered	B, C	POSSIBLE	NO EFFECT
Red-cockaded woodpecker *Picoides borealis*	Endangered	B, C	ABSENT	NO EFFECT
American chaffseed *Schwalbea americana*	Endangered	B, C	POSSIBLE	NO EFFECT
West Indian manatee *Trichechus manatus*	Endangered	B**, C	POSSIBLE	MAY AFFECT, NOT LIKELY TO ADVERSELY AFFECT
Bachman's warbler *Vermivora bachmanii*	Endangered	C	POSSIBLE	MAY AFFECT, NOT LIKELY TO ADVERSELY AFFECT

Source: Natural Resources Technical Report, 2008
^ Bald and Golden Eagle Protection Act of 1918
* County: B: Berkeley; C: Charleston
** Occurrence in County listed as "Possible"

A list of federally protected species whose ranges extend into Charleston and Berkeley Counties (as of March 2008) was obtained from the United States Fish and Wildlife Service (USFWS) and are depicted in Table 4-3. In addition, files maintained by the SC Heritage Trust Program (SCHTP) were reviewed for documented sightings of state or federally listed species. SCHTP was established under Section 51-17-90 of the South Carolina Code of Laws as a legal trust responsible "*for the inventorying, preservation, use and management of unique and outstanding natural and cultural areas and features in this State*". The SCHTP, in conjunction with SCDNR, maintains a database of known and documented state and federally protected species, and species of concern, and their approximate locations in the State.

Field surveys for the presence of protected species were conducted during field visits and focused on identification of potential habitat areas and detailed searches of those areas. In a letter dated July 16, 2008, USFWS concurred with the biological determinations for the terrestrial species provided in Table 4-3. A copy of this concurrence letter can be found in the Appendix A. USFWS also recommended contacting the National Oceanic and Atmospheric Administration's Nation Marine Fisheries Service (NOAA-NMFS) for consultation regarding the shortnose sturgeon and sea turtles, pursuant to Section 7 of the ESA. A copy of this letter, along with the Essential Fish Habitat (EFH) has been delivered to NOAA-NMFS for consultation. These findings will be included with a request for the Finding of No Significant Impact (FONSI).

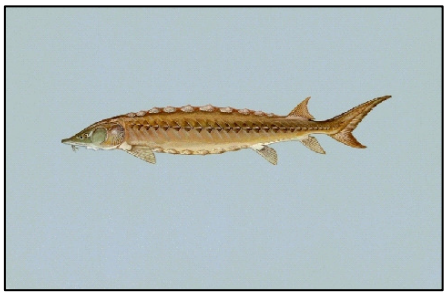
Because the right of way footprint is nearly identical for both alternatives, the Biological Determination is likely to be equal for each alternative.

No suitable habitat was found for the seabeach amaranth, flatwoods salamander, loggerhead sea turtle, piping plover, green sea turtle, leatherback sea turtle, Kemp's ridley sea turtle, or red-cockaded woodpecker. Therefore, a determination of No Effect was concluded for these listed species.

Field surveys identified potential habitat for pondberry, Canby's dropwort, and American chaffseed. A finding of No Effect was determined for these species since no occurrences were recorded during field studies.

A brief description and recommendation for protected species is discussed in the following paragraphs.

***Acipenser brevirostrum* (Shortnose sturgeon)**
Endangered
Family: Acipenseridae
Date Listed: March 11, 1967



Shortnose sturgeon
USFWS Graphic

The shortnose sturgeon is a bottom-feeding fish that rarely exceeds three feet in length. This species has a heterocercal tail, an inferior, protrusible mouth proceeded by barbels, and a body covered with rows of bony scutes. Adults have a short, blunt snout; the body is brown to blackish dorsally, yellowish on the sides, and white ventrally. The usual habitat is estuaries and lower sections of large rivers. The sturgeon is anadromous, spending most of the year in brackish

estuarine environments and moving into fresh water only when spawning. This species occurs in Atlantic seaboard rivers from the St. Johns River in Florida to eastern Canada.

The proposed SC-41 bridge replacement over the Wando River occurs over waters that may provide important foraging habitat for shortnose sturgeon during the winter months. The National Marine Fisheries Service (NMFS) may recommend that construction of the Wando River Bridge should not take place during the winter. Regarding the shortnose sturgeon, the best period for in-water construction would be the spring spawning season (February 1 to June 15), when the fish are more likely to be upstream of the project study area. No surveys for shortnose sturgeon were undertaken during the field studies. SCHTP documents no occurrence of shortnose sturgeon within five miles of the project study area. If in-water bridge construction occurs during the summer months, the project is unlikely to affect shortnose sturgeon. Coordination is ongoing with NOAA-NMFS concerning the shortnose sturgeon. Following this coordination with NOAA-NMFS, these findings will be included with a request for the Finding of No Significant Impact (FONSI).

BIOLOGICAL CONCLUSION: MAY AFFECT, NOT LIKELY TO ADVERSELY AFFECT

***Dendroica kirtlandii* (Kirtland's warbler)**
Endangered
Family: Emberizidae
Date Listed: March 11, 1967

Kirtland's warbler
USFWS Photo

Kirtland's warbler is a 5.5- to 6-inch songbird that is gray above and predominantly yellow below. They have black streaks on the back and sides, two white wing bars, white tail spots, a white belly, and a white eye ring. The warbler is extremely tame and habitually wags its tail. Kirtland's warbler nests in jack pines of central Michigan and winters in the Bahaman islands. They are very rare transients in the Carolinas in spring and fall. Sightings are most often recorded in the spring, when the males are singing. The birds frequent thickets and woodland edges on uplands adjacent to the wet margins of lakes and swamps.

Suitable habitat for Kirtland's warblers may exist within the project study area during migration periods in spring and fall. Forested edges and thickets bordering salt marshes and freshwater wetlands may provide stopover feeding and resting areas for the warblers. If construction minimizes the disturbance of these areas, the project is unlikely to affect the Kirtland's warbler. SCHTP documents no occurrence of Kirtland's warbler within five miles of the project study area.

BIOLOGICAL CONCLUSION: MAY AFFECT, NOT LIKELY TO ADVERSELY AFFECT

Mycteria americana (Wood stork)
Endangered
Family: Ciconiidae
Date Listed: February 28, 1984

Wood stork
USFWS Photo

Wood storks are strong winged birds that fly with their necks stretched straight ahead and their long legs trailing behind. Adult wood storks are predominantly white with black flight feathers, dark legs and bill, and dark unfeathered heads. Immature wood storks are similar in color; however, they may have a yellow bill. Adult birds are tall, measuring approximately 50 inches, with a wingspan of 60 to 65 inches. Typical foraging habitat includes shallow salt or brackish water, shallow water of bays, tidal creeks, ponds, or other bodies of water. Wood storks usually feed in six to ten inches of water, and typically feed on fish, but also prey on amphibians, crustaceans, and reptiles. Nesting habitat consists of flooded cypress or other wooded swamps.

SCHTP documents no occurrence of wood storks within five miles of the project study area, and USFWS has no record of nesting colonies in or near the project study area. No suitable nesting habitat occurs in or near the project study area. However, foraging habitat may occur in the Wando River and its associated tidal saltwater marshes. A detailed survey for foraging wood storks was conducted for a minimum of 300 feet outward from the project study area on August 10, 2005. No sightings of wood storks were recorded. The proposed project will avoid extensive alterations to natural shorelines. Based on observations, habitat requirements, and project parameters, this project is unlikely to affect the wood stork.

BIOLOGICAL CONCLUSION: MAY AFFECT, NOT LIKELY TO ADVERSELY AFFECT

***Trichechus manatus* (West Indian manatee)**
Endangered
Family: Trichechidae
Date Listed: March 11, 1967

West Indian manatee
USFWS Photo

The manatee is a large, gray or brown aquatic mammal that averages 10 to 13 feet in length and weighs up to 1,000 pounds. This species occurs from Brazil to the West Indies to the east coast of the United States. During summer months manatees migrate from their Florida wintering areas as far north as coastal Virginia. These mammals inhabit warm waters, both fresh and salt, where their diet consists mostly of aquatic vegetation.

Outlined in a 2003 memo the USFWS developed recommendations for general construction activities in aquatic areas which may be used by the manatee. The USFWS directs that construction which can be completed in several months be scheduled during the seven month period of November through May. USFWS also makes a series of recommendations pertaining to construction and the manatee, some of which are summarized as follows: 1) construction

managers should advise all construction personnel to be aware of the possibility of manatee appearance and the legal obligation to avoid harassment of the species; 2) construction personnel will watch for manatee sightings and be prepared to shut down equipment if one is made; 3) any sightings or contact with manatees will be reported to the appropriate natural resource agencies (USFWS, South Carolina Department of Natural Resources); 4) a sign will be posted providing instructions to equipment operators in case a manatee is sighted; 5) special steps will be taken on site concerning operations during the no-blast moratorium period, such as guidelines for operating water craft and placement of siltation barriers.

SCHTP documents no occurrence of West Indian manatee within five miles of the project study area. No West Indian manatees were sighted during field studies. However, the project study area may provide habitat for West Indian manatee during the summer months. USFWS has recommended that in-water construction activities, such as pile driving, be conducted during the fall, winter, or early spring. If recommendations to avoid disturbance to the manatee are followed, this project is unlikely to affect the West Indian manatee.

BIOLOGICAL CONCLUSION: MAY AFFECT, NOT LIKELY TO ADVERSELY AFFECT

***Vermivora bachmanii* (Bachman's warbler)**
Endangered
Family: Emberizidae
Date Listed: March 11, 1967

Bachman's warbler is a small (4.25- to 4.50-inch) wood warbler that exhibits a uniquely thin and decurved bill; males show a yellow chin with a black bib, a yellow to yellow-olive forehead, and a black cap. The back is olive to olive gray, and the underparts are yellow. The sexes are strongly dimorphic, with the females mostly lacking the black markings.

Bachman's warbler is thought to be a habitat specialist, frequenting canebrakes and thickets within and near mature hardwood swamp forests. Sightings in South Carolina have occurred from March to July; sightings in North Carolina are presumed to be accidental. The warbler may be extinct; the last certain sightings were in the Charleston, South Carolina region in 1962.

SCHTP documents no occurrence of Bachman's warbler within five miles of the project study area. Marginal habitat for migrating Bachman's warblers may occur within the project study area in thickets and forested areas adjoining wetlands. USFWS recommends that disturbances to these areas be minimized to avoid adversely impacting Bachman's warbler habitat. If such disturbances are minimized, this project is not likely to affect the Bachman's warbler.

BIOLOGICAL CONCLUSION: MAY AFFECT, NOT LIKELY TO ADVERSELY AFFECT

4.10 Essential Fish Habitat

In addition to federally protected species, an assessment was conducted to determine the potential adverse effects on essential fish habitat (EFH) associated with the Wando River. This assessment is in conformance with the Magnuson-Stevens Fishery Conservation and Management Act of 1976, as amended in 1996. EFH is defined as those waters and substrate

necessary to fish for spawning, breeding, feeding, or growth to maturity (16 USC 1802, 50 CFR 600.10). The National Oceanic and Atmospheric Administration National Marine Fisheries Service (NMFS) works closely with the South Atlantic Fishery Management Council (SAFMC) to minimize adverse impacts to EFH in the southeast region of the US. Adverse effects are those impacts that reduce the quality and/or quantity of EFH. In total, the assessment recognized 10 species managed by SAFMC and NOAA with habitat appropriate for the project area; however, the proposed project was determined to have, at most, minimal effects on essential fish habitat or aquatic species managed by SAFMC. A complete copy of this EFH assessment is located in Appendix D of this document.

4.11 Air Quality

The purpose of this project is to replace a structurally deficient and functionally obsolete bridge. This project would not result in any meaningful changes in traffic volumes, vehicle mix, location of the existing facility, or any other factor that would cause an increase in emissions impacts relative to the No-build Alternative. As such, FHWA has determined that this project would generate minimal air quality impacts for Clean Air Act criteria pollutants and has not been linked with any special mobile source air toxics (MSAT) concerns. Consequently, this effort is exempt from analysis MSATs.

Moreover, the US Environmental Protection Agency (EPA) regulations for vehicle engines and fuels will cause overall MSATs to decline significantly over the next 20 years. Even after accounting for a 64 percent increase in vehicle miles traveled (VMT), FHWA predicts MSATs will decline in the range of 57 percent to 87 percent, from 2007 to 2027, based on regulations now in effect. This will both reduce the background level of MSATs as well as the possibility of even minor MSAT emissions from this project.

The project was evaluated with regards to the Clean Air Act Amendments of 1990 (CAAA) with a resultant determination that Charleston and Berkeley Counties remain in attainment of all automotive related air quality standards. The State Bureau of Air Quality Control has determined that transportation control strategies are not necessary to maintain the area's current status. Because of the absence of any transportation control measures, Section 770.9 (conformity) of 23 CFR 770 does not apply.

Because the right of way footprint is nearly identical for both alternatives, air quality impacts are not anticipated to vary regardless of the alternative chosen.

4.12 Noise

As stated in 23 CFR, Part 772; *Procedures for Noise Abatement of Highway Traffic Noise and Construction Noise* and *SCDOT Noise Abatement Policy*, traffic noise analysis is required for proposed federal-aid highway projects on new location or physically alter an existing highway, that will significantly change the horizontal or vertical alignment of the road, or will increase the number of through-traffic lanes. The project consists of constructing a bridge on a new location alignment approximately 110 feet upstream of the existing roadway; therefore, a noise study was conducted to determine potential future traffic noise impacts.

The decibel is the common term used for noise density. Human hearing is less sensitive at low and high frequencies than in the mid-range frequency; therefore, the A-weighted system favoring mid-range frequencies is used to determine how frequencies impact human hearing. The use of this system is denoted as dBA. A noise impact occurs if the projected future noise level at a receptor either approaches (within 1 dBA) or exceeds the Noise Abatement Criteria (NAC) as seen in Table 4-4 or if the predicted future noise levels for a receptor exceed existing levels by more than 15 dBA (defined as a substantial increase).

To determine if highway noise levels are compatible with various land uses, the FHWA Traffic Noise Model (TNM) was used to compare existing and future noise levels (L_{eq}). L_{eq} is the equivalent steady state sound level which in a stated period of time would contain the same acoustic energy as the time-varying sound level during the same time period. L_{eq} (h) is the average energy of sound level (dBA) over a one-hour period. The NAC shown in Table 4-4 identifies the land use categories found in the project corridor in which the criteria or standard has been set in determining impacts.

Table 4-4: NAC for Land Use Categories in the Project Corridor

Activity Category	L(eq) (h)	Description of Activity Category
B	67 dBA (Exterior)	Residences, motels, hotels, schools, churches, public meeting rooms, libraries, hospitals, picnic areas, recreation areas, playgrounds, active sports areas and parks.
C	72 dBA (Exterior)	Developed lands, properties or activities not included in Category B above.

Source: 23 CFR Part 772

Ambient noise readings (L_{eq}) were taken on December 15, 2009 at two locations in the project corridor to determine existing noise levels (Table 4-5). Readings were taken for 15 minutes 50 feet from the edge of pavement or in a vacant lot next to the existing alignment. Traffic counts were also taken at three of the sites. The ambient noise measurements data sheets are located in project noise study located on the disc in the back of the document.

Table 4-5: Ambient Noise Measurements

Site	Location	Date	Time	Equivalent Vehicles Per Hour	Ambient Leq Measurement (dBA)
1	SC-41 adjacent to the boat storage and gas station	12/15/09	11:09am-11:24am	512	66.0
2	Vacant lot on Clements Ferry Road	12/15/09	11:35am-11:50am	388	63.2

Source: CECS, Inc., 2009

TNM was used to predict future traffic noise levels as a result of the proposed project. Traffic was modeled as 90 percent automobiles, five percent medium trucks, and five percent heavy trucks all traveling at the future posted speed limit of 35 miles per hour. Projected traffic volumes in design hourly volume (DHV) for 2018 and 2028 peak hour were used in determining potential impacts to adjacent receptors as this represented the worst case scenario (Table 4-6).

Table 4-6: Traffic Volumes (DHV)

SC-41	Build 2008	Build 2028
Northbound/Southbound Combined	430	790

Source: Pavement Loading Traffic Data, SCDOT.

Distances approaching the NAC for each land use present along the project corridor were determined. The SCDOT defines "approach" as 1 dBA below the specified FHWA NAC for each of the land use types (Table 4-7).

Table 4-7: Approximate Distances (ft) to Approaching NAC

SC-41	Approaching NAC B Residential (66 dBA)	Approaching NAC C Business (71 dBA)
Build 2018	10 feet	< 10 feet*
Build 2028	30 feet	< 10 feet*

*Note: Noise levels at 10 feet for 2018 (approx. 66 dBA), for 2028 (approx. 69 dBA)
Source: CECS, Inc., 2010.

Representative receptors within 150 feet of each side of the centerline were modeled to determine the predicted noise levels at those locations. Ten commercial and seven residential receptors were modeled to determine future noise impacts.

None of the residential or commercial receptors along the project corridor are receiving or would receive future noise impacts approaching or exceeding their NAC thresholds as a result of the proposed bridge replacement project (Table 4-8). Two commercial receptors along the project corridor would have substantial right of way impacts (C3 and C4) and are potential relocations. Construction noise should not interrupt normal community functions since construction usually occurs during daylight, weekday hours. SCDOT will inform local planning officials of future, generalized noise levels expected to occur in the project vicinity.

Noise Sampling Site Along SC-41

Figure 4-4: Receptor Locations

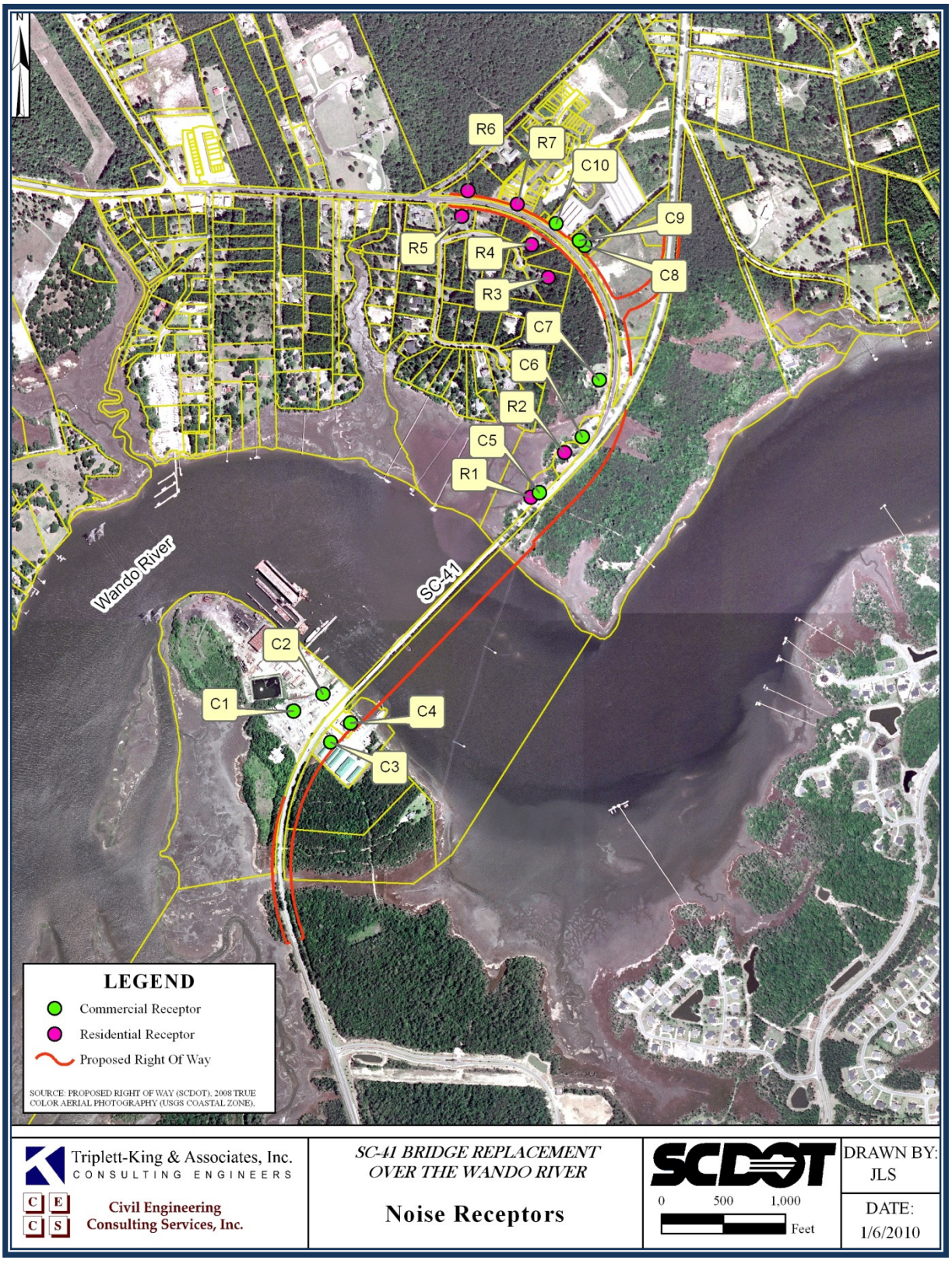


Table 4-8: Receptor Noise Levels (dBA)

Representative Receptor[1]	Dwelling Units	Approximate Distance to Receptor (ft)	No Build 2028 (dBA)	Alt A1 Build 2008 (dBA)	Alt A1 Build 2028 (dBA)	Alt A2 Build 2008 (dBA)	Alt A2 Build 2028 (dBA)	Noise Impact (Y/N)
C1	1	362	53	52	55	51	53	N
C2	1	284	58	55	58	54	56	N
C3[2]	1	30	60	63	65	62	65	N
C4[2]	1	190	59	63	65	61	64	N
R1	1	169	63	56	58	56	59	N
C5	1	238	65	56	59	56	59	N
R2	1	176	59	53	55	53	56	N
C6	1	184	62	54	57	54	57	N
C7	1	288	60	54	56	54	56	N
R3	1	166	52	49	52	49	52	N
R4	1	103	56	54	57	54	57	N
C8	1	101	61	59	61	59	61	N
C9	1	86	62	59	62	59	62	N
C10	1	127	63	60	62	60	62	N
R5	1	88	59	56	59	56	60	N
R6	1	40	62	61	63	61	63	N
R7	1	71	64	60	62	60	62	N

[1]See Figure 4-4 for receptor locations
[2]Receptors could be relocations
Source: CECS, Inc., 2010.

4.13 Hazardous Waste and Underground Storage Tanks (HAZMAT)

Hazardous waste/material sites are regulated by the Resource Conservation and Recovery Act (RCRA) of 1976, as amended, the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended, and the Superfund Amendments and Reauthorization Act of 1986 (SARA). An Initial Site Assessment (ISA) was conducted by ARM Environmental Services, Inc. to identify possible sites involving the presence and/or past use of underground storage tanks (USTs), above ground storage tanks (ASTs), and/or other hazardous materials within the project corridor. Federal and State regulatory databases were reviewed to further identify any known sources of contamination located on or adjacent to the project study area. Federal records searched during this assessment included sites which handle or dispose of hazardous materials, and sites which otherwise have been identified to have air, soil, or groundwater contamination. State records reviewed included hazardous waste sites, landfills, and sites with registered or leaking underground storage tanks.

The following regulatory databases were reviewed during this assessment:

Federal Databases
Comprehensive Environmental Response, Cleanup and Liability Information System (CERCLIS)
National Priorities List Superfund (NPL)
Resource Conservation and Recovery Information System (RCRIS)
EPA Index System for Permitted Facilities (ERNS)

State Databases
State Priority List Site / State Hazardous Waste Sites (SPL/SHWS)
Registered Underground Storage Tanks (RUST)
Leaking Underground Storage Tank Incident Reports (LUST)
Solid Waste Facilities / Landfill Sites (SWF/LS)

Asbestos containing materials may be present in buildings in the project corridor, therefore surveys of any buildings to be demolished will be conducted as required by SCDHEC and materials should be handled in accordance with state and federal regulations.

Based on an initial survey of potential hazardous material sites within the study area, it is highly probably that the current and/or proposed project right of way has been impacted by contaminants from the sites discussed below.

Detyen's Shipyard

The regulatory status of the Detyen's Shipyard is limited to an entry in the ERNS. ERNS is a database that records and stores information on reported releases of oil and hazardous substances. However, the ERNS and ERNS incident reports provided no information pertaining to any releases. An additional query of standard incident reports provided through a National Response Center (NRC) website returned details regarding three fuel releases that occurred at or near the Detyen's Shipyard site. All three of the releases were observed in the Wando River. This site has adversely affected the environmental conditions due to the large magnitude of the repair activities conducted at the site, the presence of potentially hazardous substances at the site, and the existence of documented adverse environmental impacts at the site.

Pantry #879

The Pantry #879 is a retail gasoline sales facility located in the study area. There are three 10,000 gallon USTs and one AST on site. The site is responsible for a fuel release reported to DHEC in November 1991. A No Further Action (NFA) status was issued by DHEC in March 2003. This project would result in the relocation of this property and proposed right of way is required; therefore, the USTs would likely be removed. SCDHEC would require additional assessment of the shallow soil and groundwater present near the UST basins as part of the tank closure activities.

Former SCDOT Wando Section Shed

The former SCDOT Wando Shed formerly utilized two relatively small USTs for the storage of diesel fuel. A fuel release has been reported for the site and the 1,000 gallon and 560 gallon USTs formerly present at the site were abandoned by removal. A NFA status was issued for the site in May 1990. Due to the former utilization of USTs at the site and the resulting fuel release, the potential exists for subsurface petroleum based contamination to remain at the site.

However, based on available information, the potential for impact to the study area from the release is considered to be low.

Former Wando Grocery

The former Wando Grocery is a former UST site responsible for a fuel release reported by DHEC in 1991. Five USTs were present at the location including one 1,000 gallon, two 550 gallon, and two 6,000 gallon USTs. The site has received a relatively high SCDHEC priority ranking of 2BB, primarily due to the presence of drinking water supply wells adjacent to the site. Based on documentation of a previous fuel release on the Wando Grocery property, it appears that additional investigation of the utilization of USTs at the site and an evaluation of the subsurface environmental conditions of the site is warranted.

Cohen Gaskins Jr. Parcel

The Cohen Gaskins Jr. Parcel contains a concrete feature very similar to a former petroleum product dispenser island. However, no prominent features indicative of the former existence of a gasoline station on the property were apparent. Based on the presence of the potential former dispenser island on the property, it appears that the site formerly served as a retail gasoline sales facility. The SCDHEC UST databases were reviewed and they listed UST sites in the Wando area, but not specifically for this site. No regulatory information is available for this site. An environmental assessment was conducted in November 2000 that indicated substantially elevated concentrations of petroleum based contamination in the shallow soil samples on the site.

Based on the environmental conditions documented on the Cohen Gaskins Jr. parcel, the environmental conditions of the project area have been adversely impacted by petroleum based contamination. Additionally, the concentrations of Contaminant of Concern (CoC) detected in the soil and groundwater during the assessment are significantly elevated above the Risk Based screening Levels (RBSLs) established by DHEC as a lower threshold for conditions that represent a significant risk to human health and to the environment.

A Phase II Subsurface Assessment was completed in June of 2005 on five sites in and around the project study area. The two sites believed most critical to the project are the Pantry and Cohen sites where low levels of all contaminants were found. It is likely that the USTs at the Pantry will require removal and that contaminated soils at both sites will require special treatment during the removal and disposal of these soils. No information was revealed that suggested the need for changes to the project's current location or design. The project's current design shifts away from Detyen's Shipyard, the Former DOT Wando Shed, and the Former Wando Grocery.

It is SCDOT's policy to avoid the acquisition of underground storage tanks and other hazardous materials, if possible. If avoidance is not a viable alternative, tanks and other hazardous materials would be tested and removed and/or treated in accordance with the U.S. Environmental Protection Agency (USEPA) and SCDHEC requirements. Cost of necessary remedial actions would be considered during the right of way appraisal and acquisition process.

The additional right of way required for Alternative A1 does not appear to have been susceptible to hazardous material impacts; therefore, the impacts are likely to be equal for each alternative.

Figure 4-5: Locations of Hazardous Materials Sites

4.14 Cultural Resources

Section 106 of the National Historic Preservation Act of 1966, as amended, requires federal agencies to consider the effects of their actions on historic properties. In accordance with 36 CFR 800.4, archival research and coordination with the State Historic Preservation Officer (SHPO) was performed to identify and help predict the locations of significant cultural resources in the vicinity of the proposed study area. The archaeological and architectural surveys performed were designed to provide the necessary management data to allow for the sites and properties to be evaluated for recommendations of eligibility to the National Register of Historic Places (NRHP).

Cultural resources studies in the vicinity of the SC-41 Wando River Bridge have been conducted, including areas of potential new right of way for the replacement project. A summary of the NRHP listed, eligible, or potentially eligible resources identified within the project study area are provided in Table 4-9. Sites that are particularly relevant to the bridge and its approaches are shown in bold. The cultural resources survey was designed to identify and assess all historic architectural resources, archaeological sites, and underwater sites in the Area of Potential Effects (APE).

Intensive Archaeological Survey

The archaeological survey involved the pedestrian traverse of transects parallel to the existing SC-41 roadway, a portion of Cainhoy Road, and an area of new right of way. The project archaeologist revisited two sites in the APE (38BK1810 and 38BK1621). The archaeological survey consisted of the excavation of 30-by-30-cm (1.0-by-1.0-ft) shovel tests every 30 meters (100 feet) along one survey transect on each side of the existing highway adjacent to the existing right of way. The archaeological and archaeological terrestrial surveys identified no new archaeological sites or isolated finds.

Intensive Architectural Survey

Five new historic architectural resources (0809-0813) were identified in the architectural survey and are recommended not eligible for NRHP.

Table 4-9: Historic Architectural Resources in the SC-41 Project Study Area

Site number	Historic Use	Date	NRHP Status	Effect
066 0006	Bridge	1941	Eligible	Adverse
809	House	c. 1955	Not Eligible	None
810	Restaurant	c. 1955	Not Eligible	None
811	Barber Shop	c. 1955	Not Eligible	None
812	Baptist Church	c. 1955	Not Eligible	None
813	Agricultural Buildings	c. 1955	Not Eligible	None

Source: Cultural Resources Survey, May 2008

Site 066 0006, the Wando River Bridge, is recommended eligible for the NRHP under Criterion C, because it embodies distinctive characteristics of a bridge type, bridge construction period, and method of construction; its replacement will be an adverse affect to the resource. A Draft Programmatic Section 4(f) Evaluation is included in Appendix B. In addition, a draft Memorandum of Agreement (MOA) to mitigate the adverse impact to the bridge is being developed between the SCDOT and SHPO. A copy of the signed MOA by both agencies will be included in the request for a FONSI.

If unanticipated cultural materials or human skeletal remains are discovered during construction activities, the SCDOT County Resident Construction Engineer shall be immediately notified and all work in the vicinity of the discovered materials shall cease until an evaluation can be made by an SCDOT archaeologist in consultation with the SHPO.

Cultural Resource impacts are equal for both Alternative A1 and Alternative A2.

4.15 Section 4(f) Resources

The Wando River Bridge at SC-41 was constructed in 1941. The proposed bridge replacement would affect the bridge, which is an architectural site eligible for the National Register of Historic Places (NRHP). This bridge has been determined to no longer meet the State's safety and design requirements for its transportation system, and would be replaced immediately upstream of its existing alignment. Replacement of the existing bridge is deemed the only feasible and prudent alternative to continue providing a safe and efficient transportation network. This resource represents the only Section 4(f) issue associated with the proposed project. No other recreational areas or wildlife refuges were found within the project corridor. A Draft Programmatic Section 4(f) Evaluation has been prepared in accordance to 23 CFR 771.135(i) and is included in Appendix B.

SCDOT agrees to and commits to fulfill the recommendations of the SHPO that the following actions be taken to mitigate the removal of the bridge:

- A narrative report will be produced that includes background research and a short contextual history of metal, swing-span/turn-style bridges in South Carolina.

- A qualified firm (or firms) with experience in both engineering and cultural resources will produce a guidance document that discusses Context Sensitive Solutions (CSS) to historic bridge replacements and new bridge construction within or in view of eligible or listed National Register properties or districts. The document will include an overview of the CSS process and examples of successful CSS designs nationwide. These examples will be case studies focusing on bridge replacements of historic bridges and bridge replacements or new bridge construction within or in view of an eligible or listed National Register property or district.

Neither Alternative A1 nor Alternative A2 would impact any additional Section 4(f) resources.

4.16 Relocations

The proposed project would not result in the displacement of any churches, community centers, or residences. One commercial displacement would occur, a gas station/convenience store. Damages to business property will be assessed during the right of way appraisal process. One outdoor advertising sign would also be displaced. Additional right of way impacts would result in the taking of one self storage building and a portion of parking lot at Wando Boat Landing & Self Storage (Table 4-10).

Boat Landing and Gas Station

Due to the increased length of a fixed span bridge, Alternative A1 would require additional relocation impacts. These include a second self storage building at Wando Boat Landing & Self Storage and a portion of parking lot from Carolina Boatyard for the construction of an access to Carolina Boatyard, Detyens Shipyard, and Wando Boat Landing & Self Storage.

The relocation program will be conducted in accordance with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (Public Law 91-646, as amended by 100-17; 49 CFR Part 24). The program is designed to provide assistance to displaced persons in finding replacement property in which to live or do business. This will include fair market value for the acquired property in addition to equitable compensation normally associated with relocation. Ample lead time would be given to the individuals to allow for any planning contingencies that may arise. All other benefits available under the act would be carefully explained to the individual. As is the policy of SCDOT, in response to the non-discrimination requirements in Title VI of the Civil Rights Act of 1964, the relocation advisory assistance shall be provided to all eligible persons without discrimination.

Table 4-10: Summary of Potential Relocations

Alternative	Potential Relocations
A1	• Pantry #879 Gas Station / Convenience Store • Advertisement Sign / Billboard • Self Storage Building – Wando Boat Landing and Self Storage • Portion of Parking Lot – Wando Boat Landing and Self Storage
A2	• Pantry #879 Gas Station / Convenience Store • Advertisement Sign / Billboard • Two Self Storage Buildings – Wando Boat Landing and Self Storage • Portion of Parking Lot – Wando Boat Landing and Self Storage • Portion of Parking Lot – Carolina Boatyard

4.17 Social and Economic

The project's limits are within census tract 204.02 in Berkeley County and tract 46.01 in Charleston County. In 1990 the populations for these tracts were 3,305 and 2,309 respectively. Those populations grew to 4,630 and 10,375 in 2000. This was a population increase of approximately 40 percent for the Berkeley County census tract and 350 percent for the Charleston County census tract. The Charleston County tract population increased at a much higher rate than the Berkeley County tract between 1990 and 2000.

Few right of way impacts are anticipated, with only minor amounts of new right of way needed. No appreciable change in the existing land use or impacts to the local population in the area should occur as a result of the project.

The project's construction would require minor alterations in the area's traffic flow; however, no adverse effects on traffic or emergency services are anticipated. Traffic in both directions would be maintained during construction.

The project should not result in an adverse effect to communities, schools, local government finances, employment patterns, or local population trends. The acquisition of only minor amounts of new right of way is not anticipated to adversely impact either county's property tax base. The project should not specifically benefit, harm, or disproportionately impact any population group including elderly, handicapped, non-drivers, low-income, or minority groups. Upon completion, the benefits to Berkeley and Charleston Counties should be indirectly realized in the form of a structurally safer and more modern transportation facility, an important transportation link for the residents of the counties in meeting daily transportation, and an improved hurricane evacuation route for coastal Charleston County.

The social and economic impacts are not anticipated to differ between alternatives.

4.18 Indirect and Cumulative Effects

The Council on Environmental Quality (CEQ) regulations (40 CFR §§1508.7-1508.8) define the direct effects, indirect effects, and the cumulative impacts of a project on the surrounding environment:

Direct effects are caused by the action and occur at the same time and place.

Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

A cumulative effect is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

The purpose of the project is to replace an ailing swing span bridge with a modern bridge, either fixed span or moveable. The direct effects of the project on the surrounding environment are discussed in the various sections of this chapter. The proposed bridge would be built to accommodate four travel lanes while being striped for two lanes. This project would complement the proposed widening of SC-41 from US-17 to the Wando River Bridge within the CHATS Long Range Plan (2005-2030). Replacement of the bridge combined with improvements to the roadway could improve traffic flow within the area making it desirable for new businesses and residential neighborhoods to locate to the area. Potential induced development in future years could be considered an indirect effect of the combined reasonably foreseeable actions.

A potential for a cumulative effect to the future water quality of the Wando River exists. Greater population densities and increased travel demand in the area could potentially impact water quality in the Wando River. Residential and commercial development increases untreated stormwater runoff from impervious surfaces. Fertilizers and lawn care products in landscaping runoff could potentially impact future dissolved oxygen levels in the river, and fecal coli form from pet or animal droppings could impact bacteria levels in the river.

While the bridge replacement alone would not cause the cumulative effect, it along with the planned improvements to SC-41 and the current growth rates and increased development in the area may. A lessening of this potential effect could be substantially reduced by local and county planning officials through proactive zoning requirements and stormwater capture/retention ordinances.

Indirect and cumulative impacts for both alternatives are anticipated to be equal.

4.19 Visual Impacts

A viewshed is the natural environment that is visible from one or more viewing points.[3] There are two viewsheds for which visual impacts or visual quality impacts must be considered for a transportation project: the view of the project and the view from the project.

View of the bridge

View from the bridge

[3] Merriam-Webster Online Dictionary, <http://www.merriam-webster.com>, last accessed June 4, 2009.

The Federal Highway Administration's: *Guidance for Preparing and Processing Environmental and Section 4(f) Documents* provides this guidance for when potential visual impacts occur:

> *When this potential exists, the draft EIS should identify the impacts to the exiting visual resource, the relationship of the impacts to the potential viewers of and from the project, as well as measures to avoid, minimize, or reduce the adverse impacts.*[4]

Visual impacts for Alternatives A1 and A2 do vary between the alternatives. Alternative A2 would replace the existing bridge with a new bridge upstream approximately 110 feet and the height of the entire bridge structure could increase up to 10 feet due to the superstructure needed to support the bascule bridge. The greatest visual difference noticed would be of the bridge at its moveable span. The existing swing span would be replaced with a single leaf bascule bridge. These bridges look different in design and when opened for river traffic.

View of the existing swing bridge

View of a typical bascule bridge

Similarly both bridges have a relatively low profile. Neither bridge is silhouetted against the skyline except when the bascule bridge is opened temporarily for river traffic. The existing bridge does and the proposed bascule bridge would tend to block the view of the river on the opposite side of the bridge from the viewer. The bridge is not easily seen through due to its low profile and the numerous piers that reduce the angle of view for mariners.

[4] Federal Highway Administration, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents,* 1987.

The potential visual impacts both to and from the bridge are more noticeable for the fixed span bridge with a 55 foot vertical clearance above MHW.

View of the existing swing bridge

View of a typical fixed span bridge (I-526 over the Wando River downstream)

Motorists on the bascule bridge would not notice much of a change from the existing swing bridge, while these same motorists would notice a substantial increase in the viewshed size for the fixed span bridge due to the difference in elevations. Motorists on the fixed span bridge would have a much greater view both up and down this section of the Wando River compared to the bascule bridge. Likewise, at this elevation the I-526 Bridge over the Wando River and the Cooper River Bridge downstream would likely be seen on a clear day.

The view of the bridge would also be substantially different for a fixed span bridge. With a clearance of 55 feet above MHW the fixed span bridge would be silhouetted against the sky at day, night, dawn, and dusk to a much greater extent than the existing or bascule bridge would be. The fixed span bridge would become a permanent part of the skyline of the area which is mostly dominated by a tree line. The higher fixed span bridge would facilitate a greater view through the bridge and from one side to the other, especially for mariners.

4.20 Summary of Environmental Impacts

As the right of way corridors for Alternatives A1 and A2 are nearly identical, their potential impacts to the surrounding environment are similar in many areas. The differences are highlighted in the table below for comparative purposes.

Table 4-11: Summary of Environmental Impacts

Effected Item	Units	Alternative A1	Alternative A2
Land Use	Additional Acres	1.065	-
Wetlands*	Additional Acres	0.056	-
Floodplain	Additional Acres	1.065	-
Relocations	Each	One additional boat storage building and additional parking area	-

* Based on Natural Resources Technical Report, 2008, and does not include impacts to the Wando River. Impacts do not include bridge piers or in-river structures required to support a bascule bridge or its counterweight.

5.0 COMMENTS AND COORDINATION

SCDOT initiated an extensive public involvement process that included presentations with local citizens, public officials, and agencies. Results of the early coordination effort have been summarized in the following paragraphs. Following acceptance of this revised EA and preferred alternative, the environmental stage of project development would be complete and right of way acquisition could begin.

5.1 Public Information Meeting

SCDOT conducted a public information meeting on January 27, 2005, at the Wando Baptist Church in Wando, SC with approximately 134 individuals in attendance. As a result of the meeting and the two week response period, SCDOT received 151 comment forms and letters including one petition containing 25 signatures. Table 5-1 reflects a tabulation of comments by subject matter. A summary of comments offered during this public review period can be found in later paragraphs.

The majority of comments received from the public information meeting concerned the height of the bridge. The community seems to be divided when it comes to this issue. There were eight comments received in favor of the proposed 45-foot bridge height. Several comments were from property owners concerned with maintaining navigational and recreational use upstream from SC-41. One citizen noted that there is currently no restriction on the height of watercraft in the Wando River because the current bridge can be manually opened. The residents argue that this river access should not be taken away from people who are accustomed to it. Fifteen citizens were in support of a higher bridge clearance to assure their property values will not decrease because of the Upper Wando being made inaccessible to some boat traffic. Another

25 citizens signed a petition against a fixed low vertical clearance span bridge. These citizens were concerned with associated property values and river accessibility.

Table 5-1: Public Information Comment Summary

Bridge Height	**(146 Comments)**
Lower	97
Higher	15
In Favor (45-foot)	8
Against Low Span	26*
Other Comments	**(36 Comments)**
Alignment (Reroute Clements Ferry/SC-41 intersection to Reflectance Drive/SC-41 intersection)	14
Boat Ramp	7
Request for Additional Information	3
Other Alignment	5
Traffic Signal	4
Noise Impact	3

*A petition with 25 signatures reflected opposition to a fixed span bridge having a low vertical clearance due to the current (swing span) bridge being open to all boat traffic.

Ninety-seven comments received were in favor of a lower bridge height. The citizens indicated concern over the cost of building a bridge of this height and length and several feel no demonstrated need exists for a bridge of this width. A lower bridge height would be more economical and efficient. Residents feel that the vast majority of boats will still have access upstream from the bridge. Concern was also raised concerning the potential for the proposed bridge width to prematurely set the stage for a future four-lane widening of SC-41. The people of the Phillips community believed they would ultimately be bisected by a four-lane facility and intend to advocate for an alternative design that would spread the impacts among other communities that contribute to the traffic along SC-41.

Various other concerns were raised relating to the proposed (45-foot) bridge height. The proposed height would accommodate larger boats and promote increased boat traffic, dock construction, or a possible marina along the Wando River. The proposed height is inconsistent with the rural character of the area and would disturb the river's peaceful character and habitat, causing negative feedback to the environment. Several of the citizens were also concerned with the bridge increasing property values and taxes. Residents believe only those looking to sell and leave the area will benefit from the reaches in the upper Wando being accessible, resulting in property taxes being driven up for those citizens left behind. Several citizens were concerned with their property and the project's right of way. Residents proposed that the bridge be built as close as possible to the existing footprint.

Concern was also expressed with the proposed alignment of the project. Seventeen comments were received about the alignment, of which 14 were proposed changes to the Clements Ferry Road/SC-41 intersection. The Clements Ferry curve should be realigned and Reflectance Road utilized as the only intersection to SC-41. This would facilitate traffic leaving the Cainhoy Landing subdivision and would involve less impact to property owners in the residential area.

The remaining five comments regarding alignment varied. Three alignment comments each proposed rerouting Clements Ferry Road to another location. Two comments proposed rerouting Clements Ferry Road to US-17. One comment requested a new four-lane right of way beginning at the entrance to Dunes West subdivision and shifting the proposed alignment to the Deyten's Shipyard side of the river. The remaining two comments recommended no four-lane roadway facility be developed as part of this bridge contract.

Seven comments received from citizens concerned river access via a boat landing. The existing privately owned boat landing (owned by Harvie-Watt Properties, LLC) would be removed as part of the proposed project. Agreements have been in the process to re-open this boat landing as a source of income. The proposed bridge alignment would negate these plans. The remaining comments requested that a boat landing be constructed in the old bridge right of way.

Other general comments concerned signalization, noise impacts, and requests for additional information. Four comments suggested that there should be a traffic signal in the area. One citizen expressed concern over the noise impact to the Dunes West neighborhood and requested a noise analysis be conducted. Two other citizens were concerned with noise impacts associated with an increased bridge height. A request for additional public meetings regarding the light and noise impacts associated with an increased bridge height was requested. Three comments requested additional information about the proposed project and mapping.

5.2 Interagency Coordination

A preliminary meeting was conducted with representatives of the permitting and review agencies on June 2, 2005, to present preliminary information on the project. Results of this early coordination revealed the desire by agencies for SCDOT to identify possible areas for on-site mitigation as well as exploring further avoidance/minimization opportunities for wetland impacts. Principal discussions focused on the varied opinions expressed to date for a satisfactory bridge height.

SCDOT will provide copies of the EA to regulatory and resource agencies who may have an interest in the proposal. Of particular value will be the review by permitting agencies. By soliciting comments from these agencies early in the development process, it is hopeful that issues can be identified and satisfactorily resolved prior to submission of the appropriate wetland and navigational permits.

5.3 Public Hearing

Following approval of this environmental assessment (EA), SCDOT will advertise and conduct a public hearing to afford local governmental officials and citizens of the two counties the

opportunity to review and comment on the project. The EA will be made available to the public for review at the SCDOT's Columbia and Charleston Offices 15 days prior to the public hearing date.

APPENDIX A

Project Coordination

September 26, 2007

The Honorable Harry M. Hallman, Jr.
Mayor, Town of Mount Pleasant
Post Office Box 745
Mount Pleasant, South Carolina 29465-0745

RE: Proposed SC 41 Bridge Replacement over the Wando River
Berkeley and Charleston Counties

Dear Mayor Hallman:

Thank you for your July 30, 2007, letter to Secretary of Transportation H. B. Limehouse, Jr. requesting renewed efforts to resolve the bridge height issue for the SC 41 Bridge Replacement project. Mr. Limehouse has forwarded your letter to me for response.

South Carolina Department of Transportation (SCDOT) shares your eagerness to advance the design of the project. As you may recall, a meeting was held on December 6, 2005, with representatives from the U.S. Coast Guard, the Town of Mount Pleasant, SCDOT, and Berkeley County to discuss this issue. In the meeting, the Coast Guard expressed concerns with the Town Council's recommended vertical clearance of 20 to 25 feet. SCDOT also advised that a vertical clearance of 30 feet or less would cause constructability issues and require the proposed alignment to shift, resulting in additional right-of-way and environmental impacts.

The Coast Guard has advised that it would issue a permit for a bridge with a vertical clearance of 50 feet, but any submittal with a vertical clearance less than 35 feet would be returned to SCDOT without consideration. It is our understanding that a bridge with a vertical clearance between 50 to 35 feet would be considered, but would likely require mitigation to compensate boat owners for limited access upstream of the bridge. In an effort to resolve this issue and to avoid additional delays, SCDOT is advancing the project with a vertical clearance of 35 feet. Please be aware that the proposed clearance is a compromise for all of the parties involved and any design with a vertical clearance less than 35 feet would essentially stop the project.

As far as the availability of funding, there is evidence that the severity of the funding crisis referenced in your letter is beginning to subside, and we are now able to resume many of the projects that were affected by the shortfall. Staff has already advised the consultant hired to assist with developing the project to resume work on the environmental document.

I hope that the Town of Mount Pleasant is agreeable with this compromise on the bridge height issue. Please let me know if the Town feels this compromise is unacceptable. SCDOT appreciates your interest in this project and looks forward to working with you as it is advanced.

Sincerely,

Tony L. Chapman
State Highway Engineer

TLC:svg
cc: Joe Young, SCDOT Commissioner, First Congressional District
Marvin Stevenson, SCDOT Commissioner, Second Congressional District
H.B. Limehouse, Jr., Secretary of Transportation
File: PC/AWH

CTS 28532

bc: Robert Clark, District Six Engineering Administrator
Tony Fallaw, Program Manager

Town of Mount Pleasant

Harry M. Hallman, Jr.
Mayor

January 30, 2008

Mr. H.B. "Buck" Limehouse, Jr.
Secretary
South Carolina Department of Transportation
P.O. Box 191
Columbia, SC 29202-0191

Re: SC 41 Bridge Replacement Over the Wando River

Dear Mr. Limehouse:

Town Council has reconsidered its position on the height of the proposed Highway 41 replacement Bridge over the Wando River and in light of SC DOT's concerns, voted to accept a maximum 35' height. It is always our desire to cooperate with SCDOT, and we share your concerns that this bridge supports a primary evacuation route. Nevertheless we remain concerned about future development along the upper reaches of the Wando River and will endeavor to unite with both Charleston and Berkeley counties to manager future development so that the quality of the water is not diminished.

As always, we appreciate your consideration of our interests in matters pertaining to the State's roadways. Thank you for all that you continue to do for our town and our state.

With every good wish and kind personal regards, I am

Sincerely yours,

Harry M. Hallman, Jr.
Mayor
TOWN OF MOUNT PLEASANT

HMHjr/ba

cc: Mr. Dan Davis, Berkeley County Supervisor
Captain Mike McAllister, Commander, US Coast Guard, Charleston, SC

WETLAND BOUDARIES OCRM - TIDAL INFLUENCE

PROJECT AREA

MEETS & BOUNDS COORDINATES EACH POINT GIVEN

RECEIVED ECOSCIENCE

MAR 0 4 2006

Approved
Project #

DEPARTMENT OF THE ARMY
CHARLESTON DISTRICT, CORPS OF ENGINEERS
69A Hagood Avenue
CHARLESTON, SOUTH CAROLINA 29403-5107

REPLY TO
ATTENTION OF

March 1, 2006

Regulatory Division

Gerald R. McCrain
EcoScience Corporation
1101 Haynes Street, Suite 101
Raleigh, North Carolina 27604

Re: 80-2005-1664
Berkeley/Charleston County

Dear Mr. McCrain:

This is in response to your letter of August 4, 2005, requesting a wetland determination, on behalf of South Carolina Department of Transportation, for a 64.9 acre tract located at the US 41 crossing of the Wando River in Berkeley and Charleston Counties, South Carolina. The project area is depicted on the drawings you submitted which was prepared by EcoScience Corporation, dated July 2005, and entitled "Jurisdictional Areas SC 41 Bridge Replacement over the Wando River (River Mile 10) Berkeley and Charleston Counties, South Carolina".

The drawings depict "Critical Area" boundaries as established by your office and/or the South Carolina Department of Health and Environmental Control, Office of Ocean and Coastal Resource Management (OCRM). They also depict the approximate boundaries of freshwater wetlands and/or other waters of the United States as established by your office. You have requested that this office verify the accuracy of this mapping as an approximate representation of areas within the regulatory authority of this office. The location and configuration of these areas are reflected on the drawings referenced above.

Based on an on-site inspection and a review of aerial photography and soil survey information, it has been determined that the boundaries of saltwater "critical areas" and freshwater wetlands or other waters of the United States shown on the referenced drawings are a reasonable approximation of the location and boundaries of such areas found on this site. However, you are cautioned that this delineation is approximate, subject to change, and should be used for planning purposes only. This office should be contacted prior to performing any work in or around any of these jurisdictional areas. In order for a more accurate determination to be provided, the freshwater wetlands or other waters of the United States should be surveyed and platted. Upon receipt of such a plat, this office can then issue a letter verifying the accuracy of the actual jurisdictional boundaries.

You should be aware that the areas identified as jurisdictional may be subject to restrictions or requirements of other state or local government entities. This office should be contacted prior to performing any work in these areas.

Please be advised that this determination is valid for five (5) years from the date of this letter unless new information warrants revision of the delineation before the expiration date. All actions concerning this determination must be complete within this time frame, or an additional delineation must be conducted. Further, be advised that this **preliminary** jurisdictional

determination is **not** an appealable action under the Corps of Engineers administrative appeal procedures defined at 33 CFR 331.

In future correspondence concerning this matter, please refer to SAC 80-2005-1664. Prior to performing any work, you should contact the South Carolina Department of Health and Environmental Control, Office of Ocean and Coastal Resource Management (OCRM). A copy of this letter is being forwarded to them for their information.

If you have any questions concerning this matter, please contact me at 843-329-8044 or toll-free (outside of the Charleston area) at 1-866-329-8187.

Respectfully,

Richard L. Darden, Ph.D.
Biologist

Enclosures:
Basis for Jurisdiction
Customer Service Survey

Copy Furnished:

Mr. H. Stephen Snyder
S.C. Department of Health
and Environmental Control
Office of Ocean and Coastal
Resource Management
1362 McMillan Avenue, Suite 400
Charleston, South Carolina 29405

JURISDICTIONAL DETERMINATION Revised 8/13/04
U.S. Army Corps of Engineers

DISTRICT OFFICE: SAC
FILE NUMBER: 80-2005-1664

PROJECT LOCATION INFORMATION:
State:South Carolina
County: Berkeley and Charleston
Center coordinates of site (latitude/longitude): 32.92530 N, 79.82373 W
Approximate size of area (parcel) reviewed, including uplands: 64.9 acres.
Name of nearest waterway: Wando River
Name of watershed: Cooper

JURISDICTIONAL DETERMINATION
Completed: Desktop determination ☒ Date: March 1, 2006
Site visit(s) ☒ Date(s): February 28, 2006

Jurisdictional Determination (JD):

☒ Preliminary JD - Based on available information, ☒ *there appear to be* (or) ☐ *there appear to be no* "waters of the United States" and/or "navigable waters of the United States" on the project site. A preliminary JD is not appealable (Reference 33 CFR part 331).

☒ Approved JD – An approved JD is an appealable action (Reference 33 CFR part 331).
Check all that apply:

☒ *There are* "navigable waters of the United States" (as defined by 33 CFR part 329 and associated guidance) within the reviewed area. Approximate size of jurisdictional area:

☒ *There are* "waters of the United States" (as defined by 33 CFR part 328 and associated guidance) within the reviewed area. Approximate size of jurisdictional area:

☒ *There are "isolated, non-navigable, intra-state* waters or wetlands" within the reviewed area.
☒ Decision supported by SWANCC/Migratory Bird Rule Information Sheet for Determination of No Jurisdiction.

BASIS OF JURISDICTIONAL DETERMINATION:
A. Waters defined under 33 CFR part 329 as "navigable waters of the United States":
☒ The presence of waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.

B. Waters defined under 33 CFR part 328.3(a) as "waters of the United States":
☒ (1) The presence of waters, which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide.
☒ (2) The presence of interstate waters including interstate wetlands[1].
☒ (3) The presence of other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate commerce including any such waters (check all that apply):
☒ (i) which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ (ii) from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ (iii) which are or could be used for industrial purposes by industries in interstate commerce.
☒ (4) Impoundments of waters otherwise defined as waters of the US.
☒ (5) The presence of a tributary to a water identified in (1) – (4) above.
☒ (6) The presence of territorial seas.
☒ (7) The presence of wetlands adjacent[2] to other waters of the US, except for those wetlands adjacent to other wetlands.

Rationale for the Basis of Jurisdictional Determination (applies to any boxes checked above). *If the jurisdictional water or wetland is not itself a navigable water of the United States, describe connection(s) to the downstream navigable waters. If B(1) or B(3) is used as the Basis of Jurisdiction, document navigability and/or interstate commerce connection (i.e., discuss site conditions, including why the waterbody is navigable and/or how the destruction of the waterbody could affect interstate or foreign commerce). If B(2, 4, 5 or 6) is used as the Basis of Jurisdiction, document the rationale used to make the determination. If B(7) is used as the Basis of Jurisdiction, document the rationale used to make adjacency determination:* Wetlands and other waters of the United States which occur in the project area include the commercially navigable and tidally influenced Wando River and the numerous adjacent and tributary freshwater waters of the United States. Navigability of the Wando River is based on the federally regulated navigation channel in this portion of the river, including presence of a manned drawbridge on US 41 crossing the river.

Lateral Extent of Jurisdiction: (Reference: 33 CFR parts 328 and 329)

☒ Ordinary High Water Mark indicated by:
- ☒ clear, natural line impressed on the bank
- ☐ the presence of litter and debris
- ☒ changes in the character of soil
- ☐ destruction of terrestrial vegetation
- ☐ shelving
- ☐ other:

☒ High Tide Line indicated by:
- ☐ oil or scum line along shore objects
- ☐ fine shell or debris deposits (foreshore)
- ☒ physical markings/characteristics
- ☐ tidal gages
- ☐ other:

☒ Mean High Water Mark indicated by:
☐ survey to available datum; ☐ physical markings; ☐ vegetation lines/changes in vegetation types.

☒ Wetland boundaries, as shown on the attached wetland delineation map and/or in a delineation report prepared by: EcoScience Corporation

Basis For Not Asserting Jurisdiction:

☒ The reviewed area consists entirely of uplands.
☒ Unable to confirm the presence of waters in 33 CFR part 328(a)(1, 2, or 4-7).
☒ Headquarters declined to approve jurisdiction on the basis of 33 CFR part 328.3(a)(3).
☒ **The Corps has made a case-specific determination that the following waters present on the site are not Waters of the United States:**

☐ **Waste treatment systems, including treatment ponds or lagoons, pursuant to 33 CFR part 328.3.**
☐ **Artificially irrigated areas, which would revert to upland if the irrigation ceased.**
☐ **Artificial lakes and ponds created by excavating and/or diking dry land to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing.**
☐ **Artificial reflecting or swimming pools or other small ornamental bodies of water created by excavating and/or diking dry land to retain water for primarily aesthetic reasons.**
☐ **Water-filled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of waters of the United States found at 33 CFR 328.3(a).**
☐ **Isolated, intrastate wetland with no nexus to interstate commerce.**
☐ **Prior converted cropland, as determined by the Natural Resources Conservation Service.**
Explain rationale:
☐ **Non-tidal drainage or irrigation ditches excavated on dry land. Explain rationale:**
☐ **Other (explain):**

DATA REVIEWED FOR JURSIDICTIONAL DETERMINATION (mark all that apply):

- ☒ Maps, plans, plots or plat submitted by or on behalf of the applicant.
- ☒ Data sheets prepared/submitted by or on behalf of the applicant.
  - ☒ This office concurs with the delineation report, dated August 4, 2005, prepared by (company): EcoScience Corporation
  - ☐ This office does not concur with the delineation report, dated , prepared by (company):
- ☐ Data sheets prepared by the Corps.
- ☐ Corps' navigable waters' studies:
- ☐ U.S. Geological Survey Hydrologic Atlas:
- ☒ U.S. Geological Survey 7.5 Minute Topographic maps: Cainhoy, SC
- ☐ U.S. Geological Survey 7.5 Minute Historic quadrangles:
- ☐ U.S. Geological Survey 15 Minute Historic quadrangles:
- ☒ USDA Natural Resources Conservation Service Soil Survey: Berkeley and Charleston Counties
- ☒ National wetlands inventory maps:
- ☐ State/Local wetland inventory maps:
- ☐ FEMA/FIRM maps (Map Name & Date):
- ☐ 100-year Floodplain Elevation is: (NGVD)
- ☒ Aerial Photographs (Name & Date): 1999 DOQQ, 11227:157
- ☒ Other photographs (Date): Site photos submitted by the applicant
- ☐ Advanced Identification Wetland maps:
- ☒ Site visit/determination conducted on: February 28, 2006
- ☐ Applicable/supporting case law:
- ☐ Other information (please specify):

Signature: Project Manager Richard Darden

[1]Wetlands are identified and delineated using the methods and criteria established in the Corps Wetland Delineation Manual (87 Manual) (i.e., occurrence of hydrophytic vegetation, hydric soils and wetland hydrology).

[2]The term "adjacent" means bordering, contiguous, or neighboring. Wetlands separated from other waters of the U.S. by man-made dikes or barriers, natural river berms, beach dunes, and the like are also adjacent.

South Carolina Archives & History Center
History & Heritage For All Generations

February 27, 2006

Mr. J. Berry Still
Environmental Engineer
South Carolina Department of Transportation
P.O. Box 191
Columbia, SC 29202-0191

Re: Brockington and Associates' ***Cultural Resources Survey of the SC Route 41 Wando Bridge Replacement Project, Berkeley and Charleston Counties, South Carolina,*** SCDOT PIN 32098.

Dear Mr. Still:

Thank you for providing the letter, site forms and draft report for the *Cultural Resources Survey of the SC Route 41 Wando Bridge Replacement Project, Berkeley and Charleston Counties, South Carolina* project, dated January 25, 2006 and received January 27, 2006. We have reviewed these materials and have several comments.

We concur with the report's recommendation of eligibility for the six architectural resources over fifty years old in the project area. Of the six, only one (site # 066 0006, the Wando River Bridge) is eligible for the National Register of Historic Places. The report suggests that modified HAER documentation serve as mitigation for the adverse effect resulting from the bridge's demolition. While modified HAER documentation has worked as mitigation for several bridge replacement projects, we would like to explore other mitigation options as we consider this bridge type to be of increasing significance in the state. State Historic Preservation Office (SHPO) staff will coordinate with South Carolina Department of Transportation (SCDOT) staff to explore other mitigation or avoidance options for this bridge replacement project.

As for the archaeological resources in the project area, 38BK1621 is eligible for the National Register of Historic Places and should be avoided or mitigated. It has undergone Phase II testing through a private development project for the O'Hear Tract. TRC, in *Archaeological and Historical Investigations at 38BK1621, the O'Hare Point Brickyard, Berkeley County, South Carolina* (January 2006, Grunden and Henry), recommended the site eligible, and our office concurred, just prior to our review of SCDOT's report on the SC Route 41 bridge replacement. We do, however, agree that

the proposed right of way does not overlap 38BK1621 -- either that or there are no deposits within the right of way that would contribute to the site's significance. Please note also that the boundaries of 38BK1621, as defined by TRC's testing, represent a smaller area than what is indicated in this SCDOT report.

Additionally, we concur that 38BK1810 is potentially eligible for the National Register. This site is within the proposed new right of way for the bridge widening, thus we have to consider that the project as proposed will have an adverse effect on 38BK1810. Unless project plans change, we recommend the development of a Memorandum of Agreement to manage this site. Additional evaluative testing, and possibly mitigation through data recovery and public information, will be needed if the site cannot be avoided. This site appears to be significant for it's association with the brick maker John O'Hear, his occupation of this property, and his brick making industry that is most clearly manifested at 38BK1621.

SCDOT's letter of January 25, 2006 references avoidance of archaeological sites. This reference indicates that final project plans are not presently available. SHPO looks forward to receiving final plans so that we may issue conclusive affect findings for the project.

We are providing these comments to assist you with your responsibilities as agency official designee, as defined under 36 CFR 800.2, to ensure compliance with Section 106 of the National Historic Preservation Act. If you have any questions, please call me at (803) 896-6184.

Sincerely,

David P. Kelly
DOT Project Coordinator

cc: Keith Derting, SCIAA
Dan Hinton, FHWA
Tony Fallaw, SCDOT
Ed Salo, Brockington and Associates
Bonnie Frick, SCDOT

Catawba Indian Nation
Tribal Historic Preservation Office
1536 Tom Steven Road
Rock Hill, South Carolina 29730
803-328-2427 Fax 803-328-5791

12 August 2008

Mr. Chad C. Long
Archaeologist
SCDOT
Post Office Box 191
Columbia, South Carolina 29202-0191

THPO #		Project description and location
2008-66-11	PIN 32098 File 8.158	SC Rt. 41 Wando Bridge Replacement Project Revised Draft Report: *Cultural Resources Survey of the SC Route 41 Wando Bridge Replacement , Berkeley and Charleston Counties, South Carolina.*

Dear Mr. Long,

Based on the *Cultural Resources Survey of the SC Route 41 Wando Bridge Replacement* Revised Draft Report as listed above, the Catawba Indian Nation Tribal Historic Preservation Office has no immediate concerns with regard to traditional cultural properties, sacred sites or Native American archaeological sites within the boundaries of the proposed project areas. However, the Catawba are to be notified if Native American artifacts and / or human remains are located during the ground disturbance phase of this project.

If you have questions, please contact Sandra Reinhardt at 803-328-2427 ext. 233, or e-mail sandrar@ccppcraftrs.com.

Sincerely,

Sandra Reinhardt for

Wenonah G. Haire
Tribal Historic Preservation Officer

South Carolina
Department of Transportation

MULT
#10386
08-DK0010
AE

June 5, 2008

Ms. Elizabeth Johnson
Deputy State Historic Preservation Officer
South Carolina Department of Archives and History
8301 Parklane Road
Columbia, SC 29223-4905

RE: SC Route 41 Wando Bridge Replacement Project
Revised Draft Report: *Cultural Resources Survey of the SC Route 41 Wando Bridge Replacement, Berkeley and Charleston Counties, South Carolina.*
PIN: 32098 File No. 8.158

Dear Ms. Johnson:

The Department's cultural resources subconsultant has prepared a revised draft report for the proposed SC Route 41 Wando River Bridge Replacement in Berkeley and Charleston Counties. The revised report includes additional information on archaeological sites 38BK1810 and 38BK1621. Archaeological site 38BK1810, a nineteenth-century brick kiln, was tested by TRC (Grunden and Henry) in 2006 during an investigation of an adjacent development tract. Through consultation with your agency, the site was subsequently determined not eligible for listing in the National Register of Historic Places. With respect to archaeological site 38BK1621, field investigations undertaken during the current survey failed to identify any archaeological deposits associated with the site. The proposed project will therefore have no effect on this site.

The architectural survey identified six historic architectural resources in the Area of Potential Effects. The Wando River Bridge (Site # 066 0006) was the only architectural resource determined eligible for listing in the National Register of Historic Places. The proposed removal of the bridge will result in an adverse effect to this historic property. Pursuant to 36 CFR Part 800.6, the Department recommends that a Memorandum of Agreement be developed in order to resolve adverse effects.

In accordance with the memorandum of agreement approved by the Federal Highway Administration, March 16, 1993, the Department is providing this information as agency official

Post Office Box 191
Columbia, South Carolina 29202-0191

Phone: (803) 737-2314
TTY: (803) 737-3870

designee, as defined under 36 CFR 800.2, to ensure compliance with Section 106 of the National Historic Preservation Act.

It is requested that you review the enclosed material and, if appropriate, indicate your concurrence in the Department's findings, thus completing the Section 106 consultation process. Please respond within 30 days if you have any objections or if you have need of additional information.

Sincerely,

Chad C. Long
Archaeologist

Enclosures: 2 reports

I (~~do not~~) concur in the above determination.

Signed: SCDAH DOT Project Coordinator Date: 6/9/08

cc: Chetna Dixon, FHWA
Brian Taylor, CECS
Keith Derting, SCIAA

United States Department of the Interior

FISH AND WILDLIFE SERVICE
176 Croghan Spur Road, Suite 200
Charleston, South Carolina 29407

July 16, 2008

Mr. Chad C. Long
S.C. Department of Transportation
P.O. Box 191
Columbia, SC 29202-0191

Re: SC 41 Bridge Replacement, Wando River, Charleston and Berkeley Counties, SC
FWS Log No. 42410-2008-I-0547

Dear Mr. Long:

The U.S. Fish and Wildlife Service (Service) has received the Natural Systems Technical Report regarding the proposed replacement of the SC 41 Bridge over the Wando River connecting Charleston and Berkeley Counties, SC. The South Carolina Department of Transportation (SCDOT) seeks to replace the existing bridge as well as improve the approach roadways in order to alleviate safety concerns and increase traffic capacity on SC 41. This report provides a description of the natural features within the corridor and evaluates potential impacts of the proposed work. In addition, this report offers a determination of effect upon federally protected species that may occur in the project area.

S.C. Department of Transportation plans to replace the existing SC 41 bridge over the Wando River with a new wider structure on the upstream, or eastern, side. With the bridge relocation, SCDOT must realign the approach roadways on both sides of the bridge as well as the intersection at SC 41 and Clements Ferry Road located northeast of the bridge. The project will begin approximately 2000 feet south of the existing bridge in Charleston County and terminate approximately 3000 feet north along SC 41 in Berkeley County. The project's study corridor extends 150 feet beyond both sides of the existing right of way for a length of 1.5 miles.

This Technical Report includes a review of each of the threatened and endangered (T&E) species that are known to occur, or may occur, within the two counties. A survey for these species was performed in order to facilitate consultation with the Service as required by the Endangered Species Act of 1973 (Act), as amended. The results are detailed and tabulated with a final determination of effect.

Upon review of the information provided, the Service concurs with the determination that the SC 41 project may affect, but is not likely to adversely affect the Kirkland's warbler, wood stork,

Bachman's warbler or the West Indian manatee. The determination for the manatee is based upon the implementation of provisions designed to protect the manatee during construction. Further, the Service concurs that the SC 41 project will have no effect upon the seabeach amaranth, flatwoods salamander, piping plover, pondberry, Canby's dropwort, red-cockaded woodpecker and American chaffseed. Existing and potential habitat for the shortnose sturgeon is found within the Wando River. The Service recommends you contact NOAA Fisheries for consultation regarding this species as well as sea turtles.

Obligations under section 7 of the Act must be reconsidered if (1) new information reveals impacts of this identified action may affect any listed species or critical habitat in a manner not previously considered, (2) this action is subsequently modified in a manner which was not considered in this assessment, or (3) a new species is listed or critical habitat is designated that may be affected by the identified action.

If you have any questions regarding the Service's comments, please do not hesitate to contact Mark Caldwell at (843) 727-4707 ext. 215.

Sincerely,

Timothy N. Hall
Field Supervisor

TNH/MAC

cc: Mr. Dan Hinton, Federal Highway Administration, Columbia, SC

APPENDIX B

Draft Programmatic Section 4(f) Evaluation

FHWA SOUTH CAROLINA DIVISION

DETERMINATION OF A PROGRAMMATIC SECTION 4(f) FOR: MINOR TAKES OF HISTORIC SITES

COUNTY	ROUTE	PIN	FILE NUMBER
BERK AND CHAR	SC-41	32098	

PROJECT NAME:

SC-41 Bridge Replacement over the Wando River in Berkeley and Charleston Counties, South Carolina

1. The scope of the project is one of the following: ☒Yes ☐No

   a. 4R (resurfacing, restoration, rehabilitation, reconstruction)
   b. Safety improvements (shoulder widening, intersections)
   c. Improved traffic operation (signalization, turning/climbing lanes)
   d. Bicycle and pedestrian facilities
   e. Bridge replacements on essentially the same alignment
   f. Addition of lanes (no new location)

2. Is the historic site adjacent to the existing highway? ☒Yes ☐No

3. Does the project require the removal or alteration of historic structures, buildings or objects on the historic site? ☒Yes ☐No

4. Does the project disturb or remove archaeological resources which are important to preserve in place rather than recover? ☐Yes ☒No

5. Is the impact on the 4(f) site considered minor (no effect or no adverse effect)? ☐Yes ☒No

6. Has the SHPO agreed, in writing, with the assessment of impacts and the proposed mitigation? ☐Yes ☒No

7. Does the project require the preparation of an EIS? ☐Yes ☒No

8. Is the project on new location? ☒Yes ☐No

ALTERNATIVES CONSIDERED (all inclusive):

1. The do nothing alternative has been evaluated and is considered not to be feasible and prudent? ☒Yes ☐No

2. An alternative has been evaluated which improves the highway without any 4(f) taking and it is considered not to be feasible and prudent? ☒Yes ☐No

3. An alternative on new location avoiding 4(f) taking has been evaluated and is considered not to be feasible and prudent? ☒Yes ☐No

MINIMIZATION OF HARM:

1. The project includes all possible planning to minimize harm? ☒Yes ☐No

2. Measures to minimize harm include the following:

Narrative report will be produced that includes background research and short contextual history of metal, swing-span/turn-style bridges in SC created at SCDAH.

Context Sensitive Solutions examples will be case studies focusing on bridge replacements of historic bridges

COORDINATION:

1. The proposed project has been coordinated with the following:

   a. SHPO ☒Yes ☐No

   b. Property owner ☐Yes ☒No

   c. Other interested parties (local governments, local historical society, Native American Tribes, ACHP) ☒Yes ☐No

   d. US Coast Guard (for projects that require an individual bridge permit) ☒Yes ☐No

SUMMARY AND APPROVAL:

The project meets all criteria included in the programmatic 4(f) evaluation approved on December 23, 1986.

All required alternatives have been evaluated and the findings made are clearly applicable to this project.

The project includes all possible planning to minimize harm and that there are assurances that the measures to minimize harm will be incorporated in the project.

Environmental Manager (SCDOT): _____ Date: _____

FHWA: _____ Date: _____

SC 41 BRIDGE REPLACEMENT
OVER THE WANDO RIVER

BERKELEY & CHARLESTON COUNTIES
SOUTH CAROLINA

PROGRAMMATIC SECTION 4(f) EVALUATION

Submitted by
U.S. Department of Transportation
Federal Highway Administration
and
S.C. Department of Transportation

Cooperating Agency
U.S. Coast Guard

Date of Approval	S.C. Department of Transportation
Date of Approval	Federal Highway Administration

The following individuals may be contacted for additional information concerning the project:

Mr. Patrick Tyndall
Environmental Program Manager
Federal Highway Administration
1835 Assembly Street, Suite 1270
Columbia, S.C. 29202
(803) 765-5460

Mr. Anthony W. Fallaw, P.E.
Project Manager
S.C. Department of Transportation
P.O. Box 191
Columbia, S.C. 29202
(803) 737-9932

Project No. BR-BR08 (017)
Construction PIN 32098

A. Introduction

The South Carolina Department of Transportation (SCDOT) proposes to replace the existing S.C. Route (SC) 41 moveable-span bridge over the Wando River in Berkeley and Charleston Counties, South Carolina. The proposed project would also include roadway improvements extending onto new location. The proposed bridge replacement would affect one eligible architectural site on the National Register of Historic Places (NRHP), the bridge over the Wando River. This bridge is a 69 year old metal truss swing span determined to no longer meet the State's safety and design requirements for its transportation system. This resource represents the only Section 4(f) issue associated with the proposed project.

B. Description of the Proposed Project

SCDOT is proposing the replacement of the existing SC-41 Bridge over the Wando River and additional roadway improvements in the project study area. SC-41 provides an important transportation link for the residents of Berkeley and Charleston Counties in meeting daily transportation needs as well as serving as an east west hurricane evacuation route for coastal Charleston County. Currently, SC-41 is a two-lane roadway with earthen shoulders and roadside ditches oriented in a north-south direction. The project corridor terrain is flat with the surface runoff drainage flowing to the Wando River via roadside ditches. The existing land use along the project boundaries is a mixture of residential, commercial, industrial, and woodlands.

The existing SC-41 bridge over the Wando River would be replaced immediately upstream of its existing alignment. The bridge over the Wando River was constructed in 1941 with a 168-foot through truss swing span over the channel and 40-foot concrete spans supported on steel beams for the approaches. The existing channel width, when open, is approximately 63 feet. The bridge is 1,690 feet long with a 22-foot wide roadway and 10-inch curb provided on both sides. The roadway right of way to either side of the bridge is currently 37.5 feet. The existing right of way for the bridge is 75 feet each side.

Existing SC-41 Bridge

The existing Wando River bridge at SC-41 was determined to no longer meet the State's safety and design requirements for its transportation system. The existing bridge was evaluated in terms of its structural and functional efficiency and found to be structurally deficient and functionally obsolete, receiving a sufficiency rating of 24.4. Structures given a sufficiency rating of 50 or less are placed in the state bridge replacement program. The replacement of this bridge currently ranks number 12th on SCDOT's 2010 Federal Aid Bridge Program located within the 2010-2015 Statewide Transportation Improvement Program (STIP). SCDOT continues to incur higher maintenance costs to keep the structure protected from natural elements and its mechanical parts fully functional. The swing span is no longer mechanically operated and must be manually opened and closed. It is opened by prescheduled appointment through the Berkeley County Maintenance Office. SCDOT records show that in 2005, the bridge was opened

eight times, 14 times in 2006, 13 times in 2007, seven times in 2008, and eight times in 2009.

The new bridge is proposed to be one of two options. Alternative A1 consists of a high level fixed span concrete and steel structure. Alternative A2 includes a single bascule moveable span bridge. Both alternatives are proposed to provide four twelve-foot travel lanes, two in each direction, with ten-foot shoulders on the outside and six-foot shoulders inside. The bridge would be initially striped for two lanes, one in each direction, and later re-striped when future traffic volumes require the full four travel lanes. The opposing directions of travel would be separated by a standard concrete median barrier. Four feet of the outside shoulder would be utilized for bicycles. The fixed span structure would be approximately 2,300 feet long, whereas the single bascule alternative would be approximately 2,000 feet long. Both alternatives are proposed at approximately 82 feet wide. Alternative A1 would provide a main channel vertical clearance of 55 feet and a horizontal clearance of 100 feet. Alternatives A2 would have no vertical clearance limitations and a minimum horizontal clearance of 90 feet.

The proposed project also involves roadway improvements extending onto new location approximately 2000 feet south of the existing bridge and east of the existing roadway. The new roadway would consist of two twelve-foot travel lanes, one in each direction, with 10-foot shoulders of which four feet would be paved to accommodate bicycles. The new roadway would continue northerly across the Wando River maintaining a parallel course of approximately 110 feet east of the existing bridge before again traversing high ground. From this point, the new roadway would continue northerly approximately 2500 feet before tying into Road S-33 (Clements Ferry Road) approximately 1200 feet north of the existing Road S-33/SC-41 intersection.

C. Historical Properties

In accordance with 36 CFR 800.4, archival research and coordination with the State Historic Preservation Officer (SHPO) was performed to identify and help predict the locations of significant cultural resources in the vicinity of the proposed study area. The archaeological and architectural surveys performed were designed to provide the necessary management data to allow for the sites and properties to be evaluated for recommendations of eligibility to the National Register of Historic Places (NRHP).

Cultural resources studies in the vicinity of the SC-41 bridge over the Wando River have been conducted, including areas of potential new right of way for the bridge replacement project. The cultural resources survey was designed to identify and assess all historic architectural resources, archaeological sites, and underwater sites in the Area of Potential Effects (APE).

The archaeological and archaeological terrestrial surveys identified no new archaeological sites or isolated finds. Five new historic architectural resources were identified in the architectural survey universe, but recommended not eligible for NRHP. Site 066 0006, the Wando River Bridge, was constructed in 1941 and is recommended eligible for the NRHP under Criterion C because it embodies distinctive characteristics of a bridge type, bridge construction period, and method of construction; its replacement will be an adverse affect to the resource.

D. Alternatives and Findings

Various alternatives were developed and considered for the roadway and bridge as it traverses the Wando River. During early project coordination it was decided that the new bridge would be designed for four future lanes of traffic to support the Charleston Area Transportation Study's (CHATS) Long Range Transportation Plan (2005-2030) to widen and improve SC-41 from US-17 to the current project. The roadway approaches to the new bridge would be designed for two lanes of traffic. Based upon this concept, alternatives were developed for consideration and evaluation. All of the alternatives were transitioned to match the existing horizontal and vertical roadway alignments as quickly as possible to minimize the length of the project while still maintaining the desired design criteria. The vertical clearance of the new bridge over the river's channel would remain sufficient to maintain river navigation by vessels. The location of each alternative was selected so that the existing swing span could remain in service during the construction of each alternative considered.

D.1 No-build Alternative

The No-build Alternative, also known as the no action alternative, was considered in place of the bridge replacement project. This alternative would neither improve the bridge's sufficiency rating nor address the bridge's structurally deficient and functionally obsolete status. If the No-build Alternative was selected then only maintenance operations would occur on the bridge and it would continue to age and slowly deteriorate. It is likely that SCDOT would eventually be required to post weight restrictions on the bridge, substantially reducing its ability to serve the motoring public. In future years the bridge could be closed to vehicular traffic due to its deteriorated condition, requiring lengthy detours for motorists and area residents. Based on this information the No-build Alternative was deemed an unacceptable alternative.

D.2 Rehabilitation Alternative

The Rehabilitation Alternative was also considered in place of the proposed bridge replacement project. Rehabilitation includes measures that address the structural condition of the bridge in order to maintain the carrying capacity rating. This would require ongoing inspections, maintenance, and repairs to allow the bridge to be structurally sufficient without posting a vehicle weight limit. The rehabilitation measures, however, would not address the substandard geometry related to the functional obsolescence of the bridge including the width of travel lanes and shoulders. In light of the age of and structural condition of the bridge, the rehabilitation alternative is not the most prudent and feasible alternative.

D.3 Alternative Corridors Considered and Eliminated

Corridor B

Corridor B would be located approximately 118 feet downstream of the existing centerline and consist of four 12-foot travel lanes with 10-foot outside shoulders. Four feet of the shoulder would be used to accommodate bicycles. The inside shoulders would be four feet separated by a standard concrete median barrier. The bridge would also have six-foot sidewalks on both sides. The dimensions of the new structure would be approximately 93 feet wide and 2,700 feet long. The structure would consist of twenty pre-stressed concrete bulb-tee beam spans of 135 feet each and would be supported by three or four column concrete interior bents.

Figure 1: Corridor Alignments

The distance between the existing roadway and new structure would be sufficient enough that staged construction of the bridge would not be required. Because of the presence of an estuarine marsh just north of the river bridge, a secondary crossing would be required for this alternative. This alternative would necessitate a four span cast-in-place flat slab bridge 120 feet in length be constructed. The flat slab bridge would be supported by driven pre-stressed concrete pile bents.

The selection of Alternative Corridor B would require the potential relocation of five (5) residences, the potential relocation or substantial impacts to three (3) commercial properties including a boat storage business (Carolina Boatyard) and a shipyard (Detyen's Shipyard), and a cellular communications tower. This corridor would also impact three hazardous material sites: Detyen's Shipyard, a former SCDOT Wando Section Shed, and the former Wando Grocery. Of the alternatives considered Alternative Corridor B would have the greatest impact to wetlands (1.42 acres) excluding in-water bridge structure common to all the corridors. As a result of this corridor analysis, Corridor B has shown that it has the greatest amount of overall impacts to the surrounding human and natural environment and is not the most feasible corridor.

Corridor C

Corridor C would be a staged construction alternative that would place the new bridge centerline approximately 67 feet upstream from the existing facility. The bridge dimensions for this corridor would be similar to Alternative A. The construction of the first stage of the new bridge, a fully functional two-lane section would be provided and utilized with the potential future widening of SC-41. Although staged construction would be required, there would be some flexibility as to when the structure would need to be completed. The structure could be completed, as soon as the existing bridge could be removed or at a later date when the four-lane section would be required.

The selection of Alternative Corridor C would require the potential relocation or substantial impacts to two (2) commercial properties including a boat storage business (Wando Boat Landing and Self Storage) and a gas station/convenience store (Pantry # 879). This corridor would also impact one (1) hazardous material site: Pantry #879. Of the corridors considered Alternative Corridor C is tied with Corridor D having the least impact to wetlands (0.50 acres) excluding in-water bridge structure common to all the corridors.

As a result of this corridor analysis, Corridor C has shown that it has environmental impacts that are nearly the same as Corridors A and D. Construction staging would be more complicated due to the close proximity of the new bridge to the existing roadway. A more complex traffic control strategy would be required to maintain motor vehicle traffic during staged construction increasing the potential for vehicular crashes in the work zone when compared to a new location construction option. This corridor alignment may not be compatible with a lower profile, movable span bridge due to potential conflicts with the existing swing span bridge. As a result of this corridor analysis, Corridor C has shown that it is not the best and most feasible corridor.

Corridor D

Corridor D would be a twin bridge configuration with the construction of one bridge prior to the demolition of the existing bridge. As with Corridor C, a fully functional two-lane section would be provided with the construction of the first bridge. The second structure could be constructed immediately or with the potential future widening of SC-41. The center of the two bridges would be located approximately 56 feet upstream of the existing facility's centerline. Each new bridge would consist of two 12-foot travel lanes with 10-foot shoulders on each side. A four-foot shoulder would be used to accommodate bicycles. Each bridge would also have six-foot sidewalks. The geometry of each of the two bridges would consist of fifteen pre-stressed concrete bulb-tee beam spans at 135 feet each for a total bridge length of approximately 2,025 feet and width of 53 feet. The supporting substructure for each bridge would require two or three column concrete interior bents.

The selection of Alternative Corridor D would require the potential relocation or substantial impacts to two (2) commercial properties including a boat storage business (Wando Boat Landing and Self Storage) and a gas station/convenience store (Pantry # 879). This corridor would also impact one (1) hazardous material site: Pantry #879. Of the corridors considered Alternative Corridor D is tied with Corridor C having the least impact to wetlands (0.50 acres) excluding in-water bridge structure common to all the corridors.

As a result of this corridor analysis, Corridor D has shown that it has environmental impacts that are nearly the same as Corridors A and C. Construction staging would be more complicated due to the close proximity of the new bridge to the existing roadway. A more complex traffic control strategy would be required to maintain motor vehicle traffic during staged construction increasing the potential for vehicular crashes in the work zone when compared to a new location construction option. This corridor alignment may not be compatible with a lower profile, movable span bridge due to potential conflicts with the existing swing span bridge. As a result of this corridor analysis, Corridor D has shown that it is not the best and most feasible corridor.

D.4 Build Alternatives

Corridor A, located approximately 110 feet upstream of the existing facility's centerline, would consist of four 12-foot travel lanes with 10-foot outside shoulders. Four feet of the shoulder would be used to accommodate bicycles. The bridge would also have six-foot sidewalks on both sides. The dimensions of the new structure would be approximately 93 feet wide and 2,025 feet long. The distance between the existing roadway and new structure would be sufficient enough that staged construction of the bridge would not be required. The existing swing span would remain in service during construction of this alternative.

As shown in Table 3-1 Corridor A had fewer impacts to the surrounding human and natural environment than Corridor B. Corridor A also reduces the likelihood of conflict with the existing swing bridge during construction, provides for easier constructability and safer traffic operations during construction, and was less expensive than either Alternative C or D. Based on this analysis Corridor A was selected as the best alternative to replace the existing SC-41 Bridge.

Table 1: Alternative Corridor Comparison Matrix

CATEGORY	CORR. A	CORR. B	CORR. C	CORR. D
Residence Structures	0	5	0	0
Business Structures	2 One Gas Station and Two Storage Unit Buildings	3 One Shipyard , and Two Commercial One-Story Buildings	2 One Gas Station and Two Storage Unit Buildings	2 One Gas Station and Two Storage Unit Buildings
Boat Ramp	1	0	1	1
Antenna Tower	0	1	0	0
Billboard	1	0	1	1
Wetlands (acres)*	0.60	1.42	0.50	0.50
Hazardous Material Sites	1	3	1	1
Estimated Construction Cost (in millions)	31.1**	41.1**	34.4**	38.3**

* Wetland acreages are based on National Wetland Inventory maps and do not include the Wando River.
**Construction cost estimate based on 2005 costs in the alternative concept report with assumed 3% annual inflation for the years from 2006 to 2010. A fixed span bridge with 45 foot vertical clearance was used for cost comparison of alternative corridors.
NOTE: Information provided by the ***Alternative Concept Report for S.C. Route 41 Bridge Replacement*** for Alts. A,B,C and D. A complete copy of this report is included on the CD accompanying this document.

After reviewing additional aspects of the project's alignment and traffic patterns, engineers and designers proposed several modifications to Corridor A. Like the existing Corridor A, there would be a new structure upstream of the existing bridge. The roadway improvements would extend onto new location approximately 2,000 feet south of the existing bridge and east/upstream of the existing roadway. The project would continue northerly across the Wando River maintaining a parallel course of approximately 110 feet upstream of the existing bridge. Once the bridge touches down in Berkeley County, the roadway would transition onto the existing SC-41 and continue northerly approximately 2,000 feet before tying into Road S-33 (Clements Ferry Road) approximately 1,200 feet north of the existing Road S-33/SC-41 intersection.

Although no vertical profile was finalized at this point for the modified Corridor A, a preliminary design was presented to the public for comment. The new bridge would be a high level fixed span concrete and steel structure providing the width to accommodate four 12-foot travel lanes (two in each direction) with 10-foot shoulders on the outside and six-foot shoulders inside. The opposing directions of travel would be separated by a standard concrete median barrier. Four feet of the outside shoulder could be utilized by bicyclists. The structure would be approximately 2,160 feet long, approximately 82 feet wide. The proposal to construct a bridge with four travel lanes instead of two is a proactive response the Charleston Area Transportation Study's (CHATs) Long Range Transportation Plan that includes widening improvements to both SC-41 and Clements Ferry Road in the current project area.

Vertical Navigational Clearance and Alternative Refinement: A Response to Public Involvement

In January 2005, SCDOT conducted a public information meeting (PIM) on the proposed bridge replacement project in the Wando community. The modified Corridor A was presented to and input was requested from the public. Although a profile had not been finalized, a bridge with a mean high water vertical clearance of 45 feet was presented. The overwhelming response from the public was that they wanted a new bridge with a lower vertical profile or clearance; however, some attendees requested a bridge with a higher vertical clearance. For a summary of comments from the PIM please see section 5.1 Public Information Meeting.

Based on the public's response SCDOT engineers considered and evaluated how to meet the desire expressed by the public while meeting the horizontal and vertical navigational clearance standards required by the United States Coast Guard (USCG). On June 2, 2005, an interagency meeting was conducted on-site to discuss the vertical clearance requirements.

Increasing the vertical clearance could be accomplished by utilizing a bridge with fixed spans similar to the I-526 Bridge over the Wando River downstream from SC-41. **Another option considered would be to replace the existing swing bridge with a new moveable span bridge. The new bridge could be a swing bridge like the existing bridge, a single leaf bascule bridge, or a dual leaf bascule bridge. The new moveable span bridge could also have a lower vertical profile than a fixed span bridge while still meeting the USCG's horizontal and vertical navigational clearance requirements for navigable coastal waters**.

I-526 Bridge over the Wando River

From the earlier alternative evaluation, engineers determined the best location, regardless of which bridge design was implemented, would be to keep the corridor alignment upstream from the existing bridge (modified Corridor A). The corridors closer to the existing bridge had greater utility relocation impacts and would be more difficult to construct while maintaining traffic. The alternative downstream of the bridge would substantially impact a shipyard.

As a result SCDOT engineers considered developing two bridge replacement options within the modified Corridor A footprint to accommodate public input. The result was Alternative A1 and A2.

Alternative A1

Alternative A1 has a similar project footprint to modified Corridor A, with the most notable change being to the vertical navigational clearance of the bridge. The proposed vertical clearance of the bridge for navigation would be 55 feet above MHW via a fixed span bridge.

The roadway improvements would extend onto new location approximately 2,000 feet south of the existing bridge and east/upstream of the existing roadway. The project would continue northerly across the Wando River maintaining a parallel course of approximately 110 feet upstream of the existing bridge. Once the bridge touches down in Berkeley County, the roadway would transition onto the existing SC-41 and continue northerly approximately 2,000 feet before tying into Road S-33 (Clements Ferry Road) approximately 1,200 feet north of the existing Road S-33/SC-41 intersection.

The roadway would be improved to provide for two 12-foot travel lanes (one in each direction) with 10-foot shoulders of which four feet would be paved to accommodate bicyclists. It is expected that 150 feet of right of way (75 feet each side) would be required to construct and maintain the roadway while 200 feet of right of way (100 feet each side) would be required to construct and maintain the new bridge. Slope permission would also be required in certain areas.

The new bridge would be a high level fixed span concrete and steel structure providing the width to accommodate four 12-foot travel lanes (two in each direction) with 10-foot shoulders on the outside and six-foot shoulders inside. The opposing directions of travel would be separated by a standard concrete median barrier. Four feet of the outside shoulder could be utilized by bicyclists. The structure would be approximately 2,300 feet long and 82 feet wide.

Roadway improvements, including relocating the existing Clements Ferry Road/SC-41 intersection, would occur north of the Wando River. Relocating Clements Ferry Road will require approximately 135 feet of new right of way (60/75 feet to either side) for a distance of approximately 600 feet and approximately 100 feet of new right of way (50/50 each side) for a distance of approximately 1,400 feet. Clements Ferry Road, where it ultimately terminates with SC-41, would consist of two 12-foot travel lanes, one left turn lane, and grassed shoulders. SC-41 would also provide for left turn movement at this location. A frontage road would be required along the south west portion of the bridge approach and extend under the bridge to provide access to the four property owners adjacent to the roadway (see Figure 3-3).

The development of this alternative is the result of the public involvement effort in January, 2005. For more information on the public information meeting that was held, please go to section 5.1: Public Information Meeting.

Alternative A2

Alternative A2 has a similar project footprint to Alternative A1, with the most notable changes being to the type of bridge profile and vertical navigational clearance of the bridge. The replacement bridge for Alternative A2 would have a total length of approximately 2,000 feet with a moveable span approximately 135 feet in length over the channel.

SCDOT engineers evaluated three moveable span bridge options to find the most feasible option to study in further detail. This would provide for a lower profile bridge (compared to Alternative A1) as requested by the public while providing for unrestricted (vertical navigational clearance) usage of the river by the mariners.

Replacing the existing swing bridge with a similar swing design slightly upstream posed two potential challenges. Because the size of the new bridge would need to be larger to meet the horizontal navigational clearance, constructing a second swing bridge in close proximity could create conflicts if both needed to open simultaneously. Additionally, construction in close proximity of the existing bridge may require closure of river traffic for extended periods. Because of these issues, this bridge alternative is deemed unfeasible.

Figure 3-2: Examples of Moveable Span Bridges

Single leaf bascule bridges are moveable bridges with a single counterweight that balances the leaf during operation. They offer no vertical clearance limitations, and can be built with a lower profile to the river than a fixed span bridge. A single counterweight, built below the bridge, would be encased in a concrete and steel casing in the river channel, making the bridge more aesthetically pleasing compared to an elevated counterweight.

Dual leaf bascule bridges have two smaller leafs compared to a single leaf bridge. This allows for a quicker opening operation to river traffic; however, this requires separate counterweights and operating mechanisms on either side of the bridge, increasing building cost and anticipated maintenance. Because of the limited use of the existing moveable bridge, the additional costs of a dual leaf bridge do not appear to be warranted.

A single leaf bascule is anticipated to be more economical to build and maintain for long-term operation. Because of the public concern, lower maintenance costs, and greater aesthetic value, this alternative was considered over a dual leaf bascule.

For Alternative A2 a single leaf bascule bridge is proposed to replace the existing swing span bridge. The proposed vertical clearance of the bridge for navigation in the closed position would be 10 feet above MHW. The existing bridge's vertical clearance in the closed position is 8 feet above MHW. The vertical clearance when the bridge is opened would be an unlimited vertical clearance.

As shown in Figure 3-3, the right of way footprints will be nearly identical for both Alternative A1 and A2; however, impacts for each alternative will vary slightly. These include in-channel stream impacts, overall bridge length, relocations, and access to existing facilities.

Figure 3: Project Footprint Differences for Alternatives A1 and A2

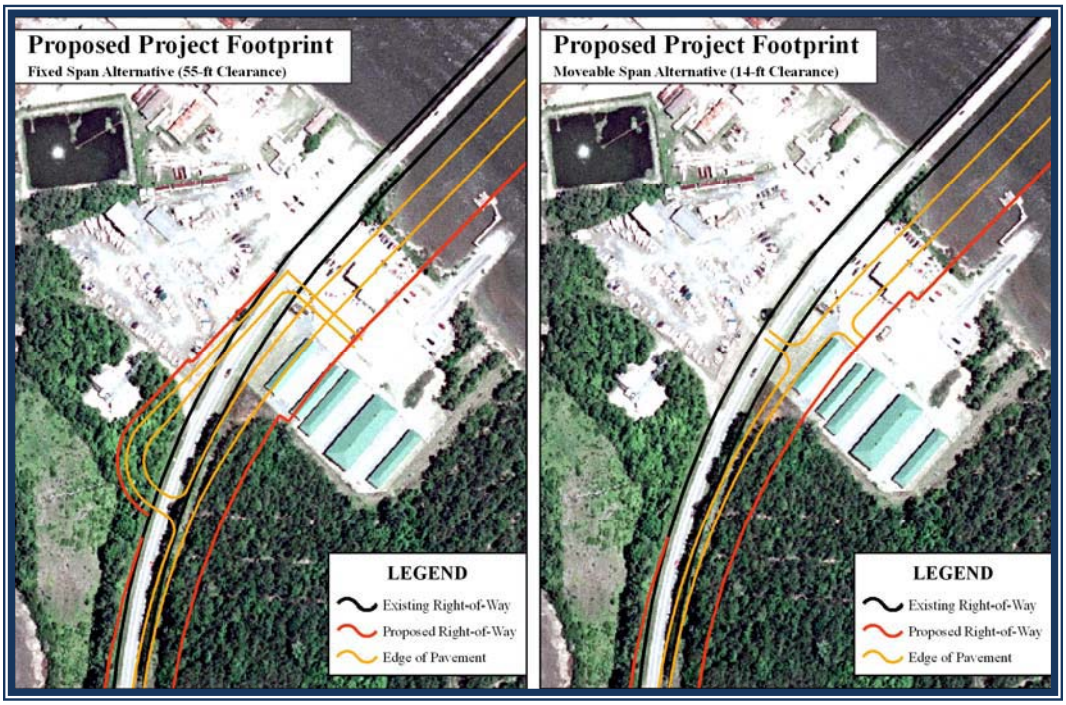


Table 2: Alternative A1 and A2 Comparison Matrix

CATEGORY	ALT. A1	ALT. A2
Navigational Clearance in the channel above MHW (feet)	55 fixed	14 (closed), Unlimited (open)
Right of Way Impacts (acres)	24.4	23.4
Residences (each)	0	0
Businesses (each)	Pantry #879 Gas Station/ Convenience Store Two Self Storage Building – Wando Boat Landing and Self Storage (partial relocation)	Pantry #879 Gas Station/ Convenience Store One Self Storage Buildings – Wando Boat Landing and Self Storage (partial relocation)
Boat Ramp (each)	Wando Boat Landing and Self Storage	Wando Boat Landing and Self Storage
Antenna Tower (each)	0	0
Billboard (each)	1	1
Farmland Impacts (acres)	0.00	0.00
100-year Floodplains (acres)	27.00	26.00
Wetlands (acres)*	2.917	2.861
In-water Impacts (acres)	0.0457	0.1614
Stream Impact (linear feet)**	0.00	0.00
Threatened and Endangered Species (each)	5 (may affect, not likely to adversely affect)	5 (may affect, not likely to adversely affect)
Impacted Noise Receptors (each)	0	0
Historic Properties (each)	1	1
Section 4(f) Resources	1 (Wando River Bridge)	1 (Wando River Bridge)
Hazardous Material Sites	1	1
Estimated Project Cost (in millions)	35.6***	46.1***

* Based on Natural Resources Technical Report, 2008, and does not include impacts to the Wando River.
** Impacts do not include bridge piers or in-river structures required to support a bascule bridge or its counterweight.
*** Construction cost estimate based on 2010 costs

Based on the public's input and vertical navigational clearance concerns expressed by the public and the United States Coast Guard (USCG) the SCDOT proposes to consider Alternatives A1 and A2 in greater detail in this EA. Subsequent to a public hearing where both alternatives will be presented the SCDOT will select a Preferred Alternative to move forward into engineering design. During the design phase the environmental impacts will be analyzed in detail for the Preferred Alternative. The results of this detailed analysis will be included in the request for a Finding of No Significant Impact (FONSI) made to the FHWA.

E. Mitigation

It is the recommendation of the SHPO that the following actions be taken to mitigate the removal of the bridge:

- A narrative report will be produced that includes background research and a short contextual history of metal, swing-span/turn-style bridges in South Carolina.

- A qualified firm (or firms) with experience in both engineering and cultural resources will produce a guidance document that discusses Context Sensitive Solutions (CSS) to historic bridge replacements and new bridge construction within or in view of eligible or listed National Register properties or districts. The document will include an overview of the CSS process and examples of successful CSS designs nationwide. These examples will be case studies focusing on bridge replacements of historic bridges and bridge replacements or new bridge construction within or in view of an eligible or listed National Register property or district.

F. Coordination

Section 106 consultation with the State Historic Preservation Office and SCDOT is ongoing with regard to the projected impact and plan to mitigate for the removal of the bridge as included in this document. SCDOT has initiated an extensive public involvement process that includes presentations with local citizens, public officials, and agencies and coordination with the Town of Mount Pleasant.

SCDOT conducted a public information meeting on January 27, 2005 where concerns about the height of the new bridge were discussed. A preliminary meeting was conducted with representatives of the permitting and review agencies on June 2, 2005, to present preliminary information on the project. Results of this early coordination revealed the desire by agencies for SCDOT to identify possible areas for on-site mitigation as well as exploring further avoidance/minimization opportunities for wetland impacts. Principal discussions focused on the varied opinions expressed to date for a satisfactory bridge height. A meeting was held on February 4, 2008 at SCDOT headquarters to discuss the project in its entirety, impacts to the Wando River bridge, and Section 4(f) mitigation.

Following approval of the project's EA, SCDOT will advertise and conduct a public hearing to again afford local governmental and planning public officials and citizens of the two counties the opportunity to review the proposal. The EA will be made available to the public for review at the SCDOT's Columbia and Charleston Offices 15 days prior to the public hearing date.

APPENDIX C

FEMA Floodplain Checklist

South Carolina Department of Transportation
Location and Hydraulic Design of Encroachments on Floodplains Checklist

23 CFR 650, this regulation shall apply to all encroachments and to all actions which affect base floodplains, except for repairs made with emergency funds. Note: These studies shall be summarized in the environmental review documents prepared pursuant to 23 CFR 771.

I. PROJECT DESCRIPTION

The South Carolina Department of Transportation (SCDOT) proposes to replace the existing S.C. Route (SC) 41 moveable-span bridge over the Wando River in Berkeley and Charleston Counties, South Carolina.

A. Narrative Describing Purpose and Need for Project
   a. Relevant Project History:
   b. General Project Description and Nature of Work (attach Location and Project Map):
   c. Major Issues and Concerns:

SC-41 provides an important transportation link for the residents of Berkeley and Charleston Counties in meeting daily transportation needs as well as serving as an east west hurricane evacuation route for coastal Charleston County. The existing SC-41 Bridge over the Wando River is a 69 year old metal truss swing span determined to no longer meet the SCDOT's safety and design requirements for its transportation system. The existing bridge was evaluated in terms of its structural and functional efficiency and found to be structurally deficient and functionally obsolete, receiving a sufficiency rating of 24.4. Structures given a sufficiency rating of 50 or less are placed in the state bridge replacement program. The replacement of this bridge currently ranks 12th on SCDOT's 2008/2009 Federal Aid Bridge Program.

B. Are there any floodplain(s) regulated by FEMA located in the project area?
   Yes☒ No☐

C. Will the placing of fill occur within a 100-year floodplain?
   Yes☒ No☐

D. Will the existing profile grade be raised within the floodplain?

Yes, the roadway will be raised at the approaches to the new bridge.

E. If applicable, please discuss the practicability of alternatives to any longitudinal encroachments.

An alternative matrix was developed and the best overall alternative was selected. A longitudinal encroachment will not occur from the project's construction.

F. Please include a discussion of the following: commensurate with the significance of the risk or environmental impact for all alternatives containing encroachments and those actions which would support base floodplain development:

a. What are the risks associated with implementation of the action?

The project is not expected to be a significant longitudinal encroachment as defined under 23 CFR 650A, nor is it expected to have an appreciable environmental impact on this base floodplain. The level of risk and consequences attributed to this encroachment is not expected to be any greater than that associated with the present bridge. Also, the project is not expected to have any increased potential for impact on those critical elements that would constitute a significant risk under 23 CFR 650A.

b. What are the impacts on the natural and beneficial floodplain values?

Approximately 14 acres within the floodplain could be impacted. Most impacts occur along the existing roadway in Berkeley County. This is the worst case scenario and assume impacts within the existing SCDOT right of way.

c. The support of probable incompatible floodplain development.

The surrounding area is wooded and marsh wetlands which is not conducive to commercial or residential development.

d. What measures were used to minimize floodplain impacts associated with the action?

All BMP's will be followed to minimize impacts.

e. Were any measures used to restore and preserve the natural and beneficial floodplain values impacted by the action?

Bridge spans and the total bridge length over the river and floodplain has been increased.

G. Please discuss the practicability of alternatives to any significant encroachments or any support of incompatible floodplain development.

Since the Preferred Alternative would not have a longitudinal encroachment no other alternative was considered.

H. Were local, state, and federal water resources and floodplain management agencies consulted to determine if the proposed highway action is consistent with existing watershed and floodplain management programs and to obtain current information on development and proposed actions in the affected? Please include agency documentation.

Appropriate agencies will be notified upon the approval of the FONSI and once the right of way plans have been completed providing more accurate assessment of impacts.

APPENDIX D

Essential Fish Habitat Assessment

Essential Fish Habitat Assessment

SC 41 Bridge Replacement over the Wando River
Berkeley and Charleston Counties, South Carolina

Construction PIN: 32099
Project Number: 8.158B

September 2008

Prepared for:

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1. Introduction

In conformance with the Magnuson-Stevens Fishery Conservation and Management Act of 1976, as amended 1996 (Public Law 94-265) this assessment is being provided to describe potential adverse effects on essential fish habitat (EFH). EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (16 USC 1802, 50 CFR 600.10). The National Oceanic and Atmospheric Administration National Marine Fisheries Service (NMFS) works closely with the South Atlantic Fishery Management Council (SAFMC) to minimize adverse impacts to EFH in the southeast, including South Carolina. Adverse effects are those that reduce the quality and/or quantity of EFH, including direct, indirect, site specific, or habitat wide impacts, including individual, cumulative or synergistic consequences of actions. This assessment describes the proposed project including potential effects to EFH, measures to minimize harm to EFH, and conclusions regarding impacts.

2. Proposed Action

The South Carolina Department of Transportation (SCDOT) proposes to replace the existing Bridge on South Carolina State Road 41 over the Wando River between Berkeley and Charleston Counties, SC (Figure 1, Appendix A). The existing bridge is a 1,690-foot by 22- foot structural steel and reinforced concrete bridge. The new bridge will be approximately 2,700 feet long and approximately 82 feet wide, which can accommodate future roadway widening if later required. The new structure will be initially striped to provide for two 12-foot travel lanes, one in each direction with 10-foot shoulders. Bike lanes are also being considered. The purpose of the SC 41 Bridge Project is to replace the existing functionally obsolete swing bridge and to enhance safety and increase traffic capacity along SC 41.

The project consists of relocating the bridge to the east along the existing alignment with detour bridging during construction (staged construction will also be considered). The project will begin approximately 2,300 feet south of the existing bridge and continue through the SC 41/Clements Ferry Road (SSR 33) intersection for approximately 3,000 feet along SC 41; relocation of the current intersection is anticipated. The study corridor includes 150 feet outside of the existing right-of-way (ROW) along both sides of the existing alignment and widens beyond the SC 41/Clements Ferry intersection. A 150 foot wide ROW extends for 1,650 feet along Clements Ferry Road. The project study area extends for approximately 1.5 miles along SC 41 and encompasses approximately 73 acres (Figures 1 and 2, Appendix A). The project study area includes portions of the Wando River and associated drainages and wetlands.

Work for the proposed improvements is anticipated to begin in 2013 and should be complete in 2017.

3. Essential Fish Habitat Elements

The South Atlantic Fishery Management Council (SAFMC) is tasked with conserving and managing fish stocks for a portion of the Atlantic coast. Four habitat types that are designated as EFH by the SAFMC are present within the project study area (Figure 2, Appendix A).

Estuarine Water Column

In general, estuarine water salinities can range from less than 8 to over 30 parts per thousand. The higher salinities approach those of seawater. The saltwater component of estuarine waters stabilizes the temperature and chemistry of the water column. Freshwater inflow provides nutrients and aids circulation and flushing of turbidity, toxins, and oxygen-depleting substances. In general, salinity increases and nutrients decrease with greater proximity to the ocean. Salinity, nutrients, and pollutants generally increase with depth, while available oxygen decreases. Nutrients are associated with increased primary productivity (phytoplankton, algae, submerged and emergent vegetation), and in turn with grazers and predators (SAFMC 1998).

The mix of conditions in the estuarine water column creates stressful conditions for many organisms. However, the mix of factors also creates a number of niches for a corresponding diversity of marine and estuarine biota. It is an important environment for planktonic organisms as well as for many species that feed directly or indirectly on the primary productivity generated by these environments, or that take advantage of the relative lack of predators. For these reasons, the estuarine water column is extensively colonized by the larvae of marine species and by other transient and resident species (SAFMC 1998).

Estuarine water column habitat within the project study area consists of waters of the Wando River below the SC 41 bridge (Figure 3, Appendix A).

Intertidal flats at the project study area

Intertidal Flats

Tidal flats are generally dynamic and can be influenced by a variety of factors including seasonal weather patterns, tidal range, geology, and a host of human activities. In areas of small tidal amplitude, wind and waves are important in shoal formation. Near ocean inlets or river mouths, tidal currents or sediment input are factors. All of the component forces determine sediment size, but sediments tend to become finer as distance from tidal currents and wave energy increases (SAFMC 1998).

Intertidal flats are generally high in primary productivity, resulting from a rich benthic microalgae community and inflow of detritus. The productivity and dynamic tidal environment provide habitat for a variety of estuarine-dependent species, including benthic invertebrates, small fishes, and predators. Flatfish, such as flounder and rays, are especially suited for the shallow-water environment. Oysters, mussels, and clams are important filter feeders. Habitat advantages also include refuge from large predators and a low-energy environment in which to graze, hide, or loaf (SAFMC 1998).

Intertidal flats at the project study area occur at shores of the Wando River and in Estuarine Emergent Wetlands (Figure 3, Appendix A). They line the shoreward edges of brackish marshes and occur along sloughs and mud banks.

Estuarine Emergent Wetlands at the project study area

Estuarine Emergent Wetlands

Estuarine emergent wetlands include salt and brackish marsh. A limited growth of shrubs may occur in central high marsh areas where salinity is low. These are communities of low species diversity but high primary productivity, with a food chain based on marsh plants and detritus. The productivity of marshes provides the basis for extensive use as nursery areas by many fishes and other aquatic organisms. The complex habitat structure, including the stems of vegetation, woody debris, shell banks, dendritic creeks, hummocks, and swales, also provides cover from predators. The intertidal nature of marsh waters, along with their shallow depth, provides additional refuge areas for smaller species that are out of the reach of large predators. Marshes also protect water quality in estuaries by trapping pollutants and sediment and attenuating floodwaters. The anaerobic soils of marshes are important in denitrifying runoff (Street et al. 2005). The productivity of marshes is exported into estuaries and the ocean in the form of dissolved organic matter, detritus, microalgae, invertebrates, forage fish, and juvenile and adult predatory species.

Marshes are normally dominated in each zonal area by one grass species, such as *Spartina* spp. or *Cladium jamaicense*. These dominant species are constrained by salinity, flooding, elevation, and level of wave energy in each marsh zone. In addition to the dominant species, marshes also often support many species of macroalgae, microalgae, cyanobacteria, and

diatoms (SAFMC 1998). All of these species add to the food and/or cover resources of the marsh. Besides providing vital habitat for a number of economically and ecologically important fish and invertebrate species, marshes also provide food, cover, and breeding habitat for birds, furbearers and other mammals, and reptiles and amphibians. Marsh provides critical habitat for two managed fishery elements, red drum and penaeid shrimp. Fish species that inhabit marshes year-round tend to be smaller forage species, with larger or migratory species utilizing the marsh in larval and juvenile life stages (Street et al. 2005). Low-salinity marshes and intertidal creeks have been found to host a mixture of saltwater and freshwater species. Among the most abundant species are spot, grass shrimp, bay anchovy, and Atlantic menhaden (Street et al. 2005).

Estuarine emergent wetlands occur in large swaths through the project study area (Figure 3, Appendix A). Much of the intertidal area along the Wando River and its tributaries and drainages is covered in marsh vegetation including black needlerush (*Juncus roemerianus*), marsh hay (*Spartina patens*) and smooth cordgrass (*Spartina alterniflora*). Shrubs such as wax myrtle (*Morella cerifera*), groundsel (*Baccharis halimifolia*) and marsh elder (*Iva frutescens*) occur at higher elevations.

Palustrine Emergent Wetlands at the project study area

Forested Wetlands at the project study area

Palustrine Emergent and Forested Wetlands

Palustrine wetlands are defined as freshwater wetlands, including tidal freshwater wetlands, where salinities are less than 0.5 parts per thousand. Tidal freshwater marsh provides nursery habitat for managed species including penaeid shrimp. Except for tidal marsh, the direct use of freshwater wetlands by managed species is not well documented. According to the SAFMC (1998), the chief functions of non-tidal freshwater wetlands as EFH are indirect; they serve to improve the quality of downstream habitat, and they provide important habitat for the prey of managed species. For example, freshwater wetlands fulfill important roles in flood control and the absorption of sediments and pollutants before releasing freshwater to estuaries. Anadromous fish such as river herring and sturgeon, blue crabs, and other forage species utilize freshwaters as habitat at various life stages. The combination of shallow water and abundant vegetation in wetlands provides ideal cover and abundant food supplies for aquatic fauna of all kinds (NCDMF 2006).

This EFH classification may include marsh, swamp, or bottomland forest, either adjacent to a river channel (riparian wetlands) or elsewhere in the floodplain. All of these habitat types are flooded for extended periods and may support standing water year-round. However, riparian wetlands are emphasized as important habitat, since they are connected to coastal water bodies by surface waters deep enough for fish to traverse (Street et al. 2005).

Floral and faunal diversity greatly increases at the transition from brackish to fresh water. Primary productivity in freshwater marshes is thought to meet or exceed that of salt marshes (SAFMC 1998). This primary productivity is exported to estuarine and marine habitats in the form of algae, detritus, and primary consumers from plankton to small fishes. Marshes are generally herb-dominated, with an occasional component of shrubs. Swamps and bottomland forests are characterized by a tree canopy, which is often broken by gaps of open water in swamps, and nearly closed in the case of bottomland forests.

Where drainage from upland areas introduces a large amount of fresh water into the project study area, Palustrine Emergent and Forested Wetlands occur (Figure 3, Appendix A). They are widespread in this vicinity, although most are small in acreage. They occur in roadside ditches and in low spots in fields and forested areas. Plant communities include bottomland hardwood forests of oaks and beech, shrub thickets, and disturbed maintained areas with grasses and weedy herb species.

Habitat Areas of Particular Concern

Habitat Areas of Particular Concern (HAPC) are areas designated by the NMFS and the Fishery Management Councils as subsets of EFH which are rare, particularly susceptible to human-induced degradation, especially ecologically important, or located in an environmentally stressed area. HAPC include high value intertidal and estuarine habitats and habitats used for migration, spawning, and rearing of fish or shellfish (NMFS 1999).

Estuarine shorelines, which occur at the project study area, are HAPC for penaeid shrimp. Tidal inlets, including the Wando River, are HAPC for shrimp, red drum, and gray snapper (SAFMC 2008).

4. Managed Fishery Species

Managed Species

The following table lists species managed by the National Marine Fisheries Service or its affiliated regional Fishery Management Councils. Species with estuarine habitat appropriate for the Site are listed. EFH and HAPC described for these species are also listed.

Species Managed by the South Atlantic Fishery Management Council or the National Marine Fisheries Service (NMFS 1999)					
Common Name	**Scientific Name**	**Life Stage**	**Ecosystem**	**EFH**	**Designated HAPC**
Brown shrimp	*Farfantepenaeus aztecus*	postlarval/ juvenile	Estuarine	marsh edge, SAV, tidal creeks, inner marsh	tidal inlets and state nursery and overwintering habitats
		subadults	Estuarine	mud bottoms, marsh edge	
White shrimp	*Litopenaeus setiferus*	postlarval/ juvenile	Estuarine	mud/peat marsh edge, SAV, marsh ponds, inner marsh	
		subadults	Estuarine	mud/peat marsh edge, SAV, marsh ponds, inner marsh	
		subadults	Estuarine	SAV, sand/shell substrate	
Red drum	*Sciaenops ocellatus*	postlarval/ juvenile	Estuarine	mud bottoms, SAV, marsh/water interface	tidal inlets & state nursery habitats, spawning sites and SAV
		subadults	Estuarine	mud bottoms, oyster reef, mangrove	
		adults	Marine/ Estuarine	inlets & surf zone – 50 meters; mud bottoms, oyster reefs	
Gray snapper	*Lutjanus griseus*	postlarval/ juvenile	Estuarine	SAV, mangrove, mud	hardbottom, mangrove, SAV, oyster/shell, inlets, state nursery areas, *Sargassum*, coral, The Point, Ten Fathom Ledge, & Big Rock (NC)
		adults	Marine/ Estuarine	reefs/hardbottom <77meters; SAV, mangrove, riverine	
Spanish mackerel	*Scomberomorus maculatus*	juvenile	Marine/ Estuarine	offshore, beach, estuarine	Capes Lookout, Fear & Hatteras sandy shoals; The Point, Ten Fathom Ledge, Big Rock (NC); worm reefs, hardbottom, *Sargassum*, Bogue Sound, New River
Cobia	*Rachycentron canadum*	larvae	Marine/ Estuarine	estuarine & shelf	
		postlarval/ juvenile	Marine/ Estuarine	estuarine & shelf	
		adults	Marine/ Estuarine	coastal & shelf	
Bluefish	*Pomatomus saltatrix*	juveniles	Estuarine/ Marine	>15 meters to Gulf Stream and estuaries from Albemarle Sound, NC through St. Johns River, FL	none
		adult	Estuarine/ Marine	shore to Gulf Stream through Key West and estuaries from Albemarle Sound, NC through Indian River, FL	

Species Managed by the South Atlantic Fishery Management Council or the National Marine Fisheries Service (NMFS 1999)					
Common Name	**Scientific Name**	**Life Stage**	**Ecosystem**	**EFH**	**Designated HAPC**
Summer flounder	*Paralichthys dentatus*	larvae/ juvenile	Estuarine/ Marine	shelf waters and estuaries from Albemarle Sound, NC through St. Andrew/Simon Sounds	submerged aquatic vegetation
		adult	Estuarine/ Marine	as above	
dusky shark	*Carcharhinus obscurus*	juvenile	S to 33º N and S of 30º N, inlets, estuaries, waters <200 meters		none
Atlantic sharpnose shark	*Rhizoprionodon terraenovae*	juvenile	Daytona Beach - Cape Hatteras, bays and waters to 25 meters		none

Penaeid Shrimp

Description

Two commercially important penaeid shrimp species managed by the SAFMC are brown (*Farfantepenaeus aztecus*) and white (*Litopenaeus setiferus*) shrimp. These are relatively large shrimp that can reach eight to ten inches in length. Both species have long antennae and three pairs of small pincers. The two species are similar in appearance, but can usually be distinguished by color characteristics or distinct grooves in the exoskeleton (Ruppert and Fox 1988). White shrimp have more widely spaced chromatophores, and are therefore paler in color than brown shrimp.

Brown shrimp account for one-third of the commercial shrimp harvest in the South Atlantic region. The brown shrimp harvest peaks in July and August and continues into late fall (Larson et al. 1989). White shrimp were the first commercially marketed shrimp in North America, beginning in the early 1700s. They have continued to be the predominant species harvested commercially in the South Atlantic, contributing 58 percent of the total shrimp catch in the Carolinas, Georgia and Florida from 1957 to 1980 (Muncy 1984).

Both species are important components of estuarine ecosystems, converting detritus, algae, zooplankton, and small invertebrates into a food source available to larger crustaceans and fishes.

Range and Habitat

Both species of penaeid shrimp are found in shallow inshore waters at early life stages. Brown and white shrimp are thought to occur mainly on soft mud bottoms consisting of decaying vegetation, such as marsh substrates and pluff mud. Brown shrimp can also occur on harder sand and shell substrates as adults (SAFMC 1998). Both species are dependent on intertidal estuarine vegetation for food and cover.

Brown shrimp occur from Massachusetts to the Yucatan Peninsula. They are most abundant in waters less than 180 feet deep (SAFMC 1988). In the South Atlantic, brown shrimp are most abundant along the North Carolina coast, and are moderately abundant from South Carolina to

Florida. Substrate preferences of adults and juveniles are for peaty or muddy areas, although they have been recorded over a range of substrates, including sand, silt, and clay (Larson et al. 1989). Optimal temperatures for adult shrimp are from 58 to 88 degrees Fahrenheit, and salinities are most favorable from 24 to 39 parts per thousand (Lassuy 1983). Turbidity of the water, influenced by wind- or tide-generated currents, is an indication of suspended organic matter and planktonic organisms in the water. Turbidity may reflect the nutritive potential of the water, and serve to protect shrimp from predation. A positive correlation between brown shrimp abundance and turbidity has been suggested in the Gulf of Mexico (Larson et al. 1989).

White shrimp are distributed along the Atlantic and Gulf coasts from New York to Mexico. They are generally found in waters less than 89 feet deep. Commercial catches are generally made in waters less than 35 feet deep within 6 miles of the coast (Muncy 1984, SAFMC 1988).

The diets of penaeid shrimp consist of zooplankton and small invertebrates, with small amounts of algae and detritus (Ruppert and Fox 1988). Temporal and spatial segregation by brown and white shrimp help reduce direct competition for food and especially for substrate. For example, white shrimp burrow less deeply into muddy substrates and are more active in daylight than are brown shrimp (Muncy 1984).

According to the National Marine Fisheries Service (NOAA 2008), brown shrimp are highly abundant to abundant from May through September and white shrimp are highly abundant to abundant all year in the Charleston Harbor area.

Spawning

The initiation and termination of spawning is apparently dependent on water temperatures. Brown shrimp spawn on deeper Continental Shelf waters, while white shrimp tend to spawn nearer to shore (SAFMC 1988). Brown shrimp spawn offshore at depths greater than 60 feet. Spawning occurs through most of the year, but the major spawning period is from September to May. Eggs are semi-buoyant, and hatch within 24 hours at salinities between 27 and 35 parts per thousand. The planktonic larvae develop offshore for two to three weeks, until they reach the postlarval stage. Postlarvae may overwinter offshore, and are transported by surface currents to coastal areas during late winter and spring. The postlarvae migrate to nursery areas from March through June, when water temperatures exceed 36 degrees Fahrenheit, and are transported into estuaries by incoming tides. Postlarvae inhabit shallow, low-salinity areas in marsh-grass communities, where growth to the juvenile state occurs within four to six weeks if food is abundant (Larson et al. 1989).

White shrimp apparently spawn only once, between May and October, in Carolina waters. The initiation and termination of spawning appears to be governed by water temperature. They generally spawn in waters more than 30 feet deep, and within 5.5 miles from shore. Preferred salinities are greater than 27 parts per thousand. The exact locations of spawning areas off the Carolinas are unknown. Eggs sink to the bottom and hatch within 12 hours of fertilization (Muncy 1984).

Nursery Areas

Nursery areas in estuaries are generally characterized by *Spartina* or *Juncus* marshes, which offer food and shelter. Most of the rapid growth of shrimp occurs in these productive areas. While all three species are thought to tolerate a wide range of salinity, temperature, and substrate conditions, optimal surroundings apparently result in the greatest survival and growth rates. Highest densities have been found in intermediate salinities over a mud-silt substrate along the edges of marsh grass (SAFMC 1998). Apparently, the abundance and type of commercially important penaeids is directly related to the amount of intertidal vegetation available for nursery habitats (Larson et al. 1989). All species are sensitive to low changes and particularly sudden drops in temperature (McKenzie 1981).

Juvenile brown shrimp sometimes displace white shrimp from sandy-muddy habitat or from grass cover (Muncy 1984). Juvenile brown shrimp grow faster on vegetated substrates, since small benthic animal prey, which appears to be necessary for normal growth, is more abundant. Vegetated bottoms also afford more protection from predators than unvegetated bottoms. Brown shrimp sometimes burrow into sandy sediments, but this strategy does not afford protection from all predators, especially in turbid water (Larson et al. 1989). Postlarval and juvenile brown shrimp exhibit fastest growth at temperatures between 65 and 88 degrees Fahrenheit, and favorable salinities appear to range from 8.5 to 19 parts per thousand. Factors including temperature and salinity are interrelated – for example, survival and growth may be optimal at a wider range of salinities, given a favorable temperature (Lassuy 1983). Adverse temperature and salinity conditions may not cause direct mortality, but can lead to decreased vigor, less resistance to stress, and increased predation. Predation by fishes is the greatest cause of mortality of brown shrimp in estuaries (Larson et al. 1989).

White shrimp larvae enter estuarine nursery areas on flood tides. White shrimp, like brown shrimp, prefer muddy substrates with loose peat and sandy mud, apparently because of the availability of food in the substrate. Vegetated cover, an abundant food supply, and water temperatures above 68 degrees Fahrenheit are apparently the key factors governing optimal juvenile shrimp growth. White shrimp are less tolerant of low temperatures than brown shrimp. Shallow water and low to moderate salinity (7 to 15 parts per thousand) are also favorable factors. Fresh water inflow patterns into estuaries may shorten or lengthen residency intervals and influence migration times out of estuarine habitats (Muncy 1984).

Migration

Planktonic larvae of penaeid shrimp are transported into the upper reaches of estuaries by shoreward currents, or may play an active role in their shoreward migration; the mechanisms by which larvae reach the estuaries are not well known (SAFMC 1988).

Brown shrimp move from shallow nursery areas to larger, deeper bays and more saline water. Migration is initiated by a decrease in salinity, and may also be influenced by crowding or water temperature (Larson et al. 1989). Distribution of brown shrimp during winter is poorly known.

White shrimp eggs and larvae are planktonic for 15 to 21 days, and enter estuaries during this period. Water depths, times of day, tidal phases, and water temperatures seem to have little effect on the migration process, although water turbidity may affect distributions. While in

estuaries, juvenile white shrimp tend to move farther upstream and into lower salinities than do juvenile brown shrimp. As the season progresses, juvenile white shrimp move into deeper creeks, bays, and rivers (Muncy 1984). Large white shrimp begin emigrating out of the estuary to commercial fishing areas in August and continue through December. Smaller white shrimp may remain in the estuary during winter (SAFMC 1988). White shrimp emigrate from estuaries in response to environmental conditions including low water temperatures and salinities. White shrimp along the southeast Atlantic coast migrate southward during autumn and early winter and then northward in late winter and early spring. Adult white shrimp are powerful swimmers capable of migrating great distances (with currents) and living in littoral zones at relatively high light intensities (Muncy 1984).

EFH

EFH for brown and white shrimp in the project study area consists of Estuarine Emergent Wetlands, marsh edges, inner marsh, tidal creeks, and mud bottoms (NMFS 1999, SAFMC 2008). HAPC includes tidal inlets, which includes the Wando River (NMFS 1999).

Red Drum

Description

Red drum (*Sciaenops ocellatus*) are in the family Sciaenidae, the drums. Fishes in this commercially-important family live in a variety of habitats, but most occur close to the bottom. Many have chin barbels or pores and jaw teeth. Red drum are elongated, streamlined fish to five feet in length, silvery gray to bronze or reddish in color, with one or more ringed black spots on the tail above the lateral line. Red drum have a rounded snout and an underslung mouth (Boschung et al. 1983). Mature red drum are 30 to 36 inches in length, ranging to approximately 45 inches. They can live to 50 to 60 years of age (Burdick 2005, NCDMF 2001).

Range and Habitat

The current range of red drum along the Atlantic coast appears to occur mainly from Florida to the Chesapeake Bay, although they occurred historically as far north as New York (SAFMC 1998). Red drum inhabit a variety of habitats from offshore waters to the surf zone, and occasionally enter fresh water. Their occurrence is influenced by seasonal migrations and the ages of individual fish (Boschung et al. 1983). Young red drum are found in quiet, shallow, protected waters with grassy or slightly muddy bottoms. Juveniles use shallow marsh and backwater habitats, then move on to deeper river mouths, oyster and shell banks, and beaches during their third or fourth year. Shallow bay bottoms or oyster reef substrates are preferred by subadult and adult red drum. Juvenile and subadult red drum (in their first two years of life) may occur in estuaries all year (SAFMC 1998). Red drum are major predators. Their diets consist mainly of fish and crustaceans, including menhaden, penaeid shrimp, blue crabs, and others (Reagan 1985).

Migration

Red drum migrations are keyed to water temperature, salinity, and food availability (Boschung et al. 1983). Adults gather in schools to migrate seasonally along the coast, inshore and/or

north in spring and offshore and/or south in the fall. They remain along the beaches and inlets for one to two months, and move inshore in summer. They school near the inlets again in August to spawn, remaining there through November, when they move offshore. Juveniles tend to move into the deeper areas of estuaries or into the ocean during the fall and winter. (SAFMC 1998).

Spawning and Nursery Areas

Red drum reach maturity at three to four years of age and between 12 to 30 inches in length. Spawning occurs as adult fish migrate out of estuaries and lagoons and move into deeper water (Reagan 1985). They spawn in late summer and fall along ocean beaches and inlets, and also in high-salinity estuaries. Optimal temperature and salinity for egg survival is 77 degrees Fahrenheit and 30 parts per thousand. Under these conditions the eggs float and are carried into estuaries by flood tides in September and October. The larvae then become demersal and utilize tidal and other currents to move to low-salinity areas. Postlarval and juvenile red drum inhabit wetlands and seagrasses, and utilize intertidal marshes for cover. Juveniles have frequently been found along the edges of seagrass, which may indicate that patchy marsh areas afford important habitat (Reagan 1985). However, any shallow-water, mud or sand bottom habitat in inshore waters may support populations of juvenile red drum (ASMFC 2002).

EFH

EFH at the project study area for red drum consists of tidal inlets, mud bottoms, the marsh/water interface, and scrub-shrub wetlands. Any shellfish beds near the project study area would also provide valuable EFH (NMFS 1999, SAFMC 2008). HAPC includes tidal inlets such as the Wando River (NMFS 1999).

Gray Snapper

Description

Gray snapper (*Lutjanus griseus*), in the family Lutjanidae, are slender fish to three feet in length, although most are less than 1.5 feet. This species is gray to olive above with a reddish tinge or blotches, and gray to yellowish-pink below, and can change color instantly to match their surroundings. They have a pointed snout with a projecting lower jaw, and a large pair of canine teeth in the upper jaw. Most snappers are carnivorous reef-dwellers (Boschung et al. 1983). Adults in restricted habitats often occur in schools (SAFMC 1983).

Range and Habitat

Gray snapper are a tropical and subtropical species that occur in marine and estuarine waters along the U.S. Atlantic Coast from Massachusetts through Florida (Boschung et al. 1983). The northern limit of the snapper-grouper complex fishery is the North Carolina-Virginia border (SAFMC 1983). Gray snapper occur under variable conditions and have been collected in waters from 56 to 90 degrees Fahrenheit, at salinities from 1 to 35 parts per thousand (Bortone and Williams 1986).

Juvenile gray snapper occur inshore, even in fresh water. They can occur in estuaries, especially over seagrass, structures, or marl. Marl mud and mud banks adjacent to seagrass

are also utilized (SAFMC 1998). Young adult snapper congregate over hard bottoms. Adults occupy a wide variety of habitats, but generally occur offshore of juveniles. They are primarily marine reef-dwellers, but can also occur in estuaries at grass beds, ledges of channels, structures, artificial reefs, and rock outcrops. Gray snapper are associated with coral or hardbottom structure during at least part of their life cycle, but can also occur in soft bottom habitats.

Gray snapper are predators that consume fish, crustaceans, mollusks, and other invertebrates (SAFMC 1998). As adults, they forage at night, moving short distances away from their typical reef habitats. Juveniles feed diurnally, mainly in grass beds (Bortone and Williams 1986).

Migration

Adults may show seasonal spawning migrations (SAFMC 1998). Movement from estuaries toward deepwater spawning areas is typical. For the most part, gray snapper do not move far from their established habitat (Bortone and Williams 1986).

Spawning and Nursery Areas

Gray snapper spawn in groups or schools. Spawning occurs offshore, mainly during the summer and early fall, during an extended spawning period. Adult fish either move offshore to spawn or are already located in these areas as their normal habitat. Eggs and larvae are planktonic and semi-buoyant and remain offshore during a short incubation period. Larvae under 0.5 inch in length are planktonic. At three to five weeks, juvenile fish subsequently settle in shallow inshore waters. Habitat types used include seagrass, mangrove, jetties and pilings (Bortone and Williams 1986, SAFMC 1998).

EFH

Estuarine Emergent Wetlands at the project study area provide EFH for gray snapper. Mud bottoms and riverine habitats also provide EFH. Any shellfish beds in the area would also be considered EFH for gray snapper (NMFS 1999, SAFMC 2008). HAPC includes inlets such as the Cooper River and Wando River (NMFS 1999).

Coastal Migratory Pelagics (Spanish Mackerel and Cobia)

Description

Spanish mackerel (*Scomberomorus maculatus*) are members of the family Scombridae, which includes mackerel, wahoo, and tuna. These are torpedo-shaped fish with pectoral fins attached high on the body, two dorsal fins that fold into grooves when depressed, and a series of finlets extending from the second dorsal and anal fins to the tail. They are fast-swimming, schooling predators of the open oceans. Spanish mackerel are elongate, laterally compressed, iridescent bluish-green or iron gray above and silvery below. Yellowish-brown or golden spots are present on all individuals. The anterior portion of the dorsal fin is black, and the lateral line does not abruptly decurve at the second dorsal fin, as in king mackerel. Small scales cover the body. Spanish mackerel attain a maximum length of three feet. Teeth are small and triangular (Boschung et al. 1983, GAFMC and SAFMC 1983). The commercial importance of Spanish

mackerel is based mainly on recreational catches from private boats, charter boats, and piers, although a minor gillnet fishery also exists (Mercer et al. 1990).

Cobia (*Rachycentron canadum*) is the sole member of the family Rachycentridae. They are elongate, cylindrical fish to over six feet in length. Cobias are dark brown above with two narrow, silvery bands, and gray or yellowish below. The head is broad and flat, and the small teeth occur in bands on the tongue and roof of the mouth. The scales are small (Boschung et al. 1983). The first dorsal fin is composed of 7-9 short, strong, isolated spines, not connected by a membrane.

Range and Habitat

Spanish mackerel concentrate off the coast of the Carolinas in the spring, summer, and fall (Godcharles and Murphy 1986). Spanish mackerel occur on the surface of open seas and near the shore in bays and estuaries from Maine to Florida and south to the Yucatan peninsula in Mexico (Boschung et al. 1983). The commercial fishery is concentrated along the south Florida coast. Spanish mackerel in the Atlantic Ocean occur shoreward from the edge of the continental shelf, generally in waters from 70 to 80 degrees Fahrenheit and with salinities of 32 to 36 parts per thousand. They spend most of their lives in the ocean where environmental conditions are more stable than in estuaries (Mercer et al. 1990). They are surface feeders that pass close to shore on their seasonal migrations, and frequently enter inlets and estuaries. Larvae are found in nearshore shallow water environments. The diet of Spanish mackerel consists of fish, squid, crustaceans, and other invertebrates. They are major predators of sardines, herrings, menhaden, and other small schooling fish. Sharks and bottlenose dolphins are predators of mackerel in the South Atlantic (GMFMC and SAFMC 1983).

Cobia are world-wide in distribution, occurring from the mid-Atlantic states to Argentina in the western Atlantic. They frequent open seas and near shore around barrier islands and reefs (Boschung et al. 1983). Cobia are mainly known as a shore species, sometimes occurring in waters 20 feet deep or less. They often associate with floating objects such as buoys or boats, even large sharks or turtles, and also occur near reefs and structures. Cobia feed on demersal crustaceans, squid, and fish (GMFMC and SAFMC 1983). Cobia occur inshore in southern South Carolina from April through July (Hammond 2001).

The habitat for adults of these species is generally the coastal waters out to the edge of the continental shelf in the Atlantic Ocean. Their occurrence is governed by warm temperatures (approximately 68 degrees Fahrenheit or warmer) and high salinities, although the salinity preference of cobia is not well defined. Larval habitat of all species is the water column. Within spawning areas, eggs and larvae are concentrated in surface waters (SAFMC 1998).

Mackerel and cobia are carnivorous at all life stages. Diets consist of small schooling fishes, shrimp, and squid, except for the cobia, which preys mainly on crabs, mantis shrimp, eels, and squid on or near the substrate. Copepods are consumed by all species during larval stages (GMFMC and SAFMC 1983). Spanish mackerel are largely piscivorous, feeding on species such as herring, anchovies, sardines, and menhaden. Diets of Spanish mackerel were found to consist largely of anchovies (Godcharles and Murphy 1986).

Migration

Spanish mackerel are more abundant in the northern part of their range during summer and in south Florida during winter. Movements are in response to changes in water temperature. Smaller individuals tend to occur in large schools, while older, larger specimens are often solitary. They reach the coast of the Carolinas by April and remain until September, when they return to the southern part of their range (GMFMC and SAFMC 1983). Spanish mackerel pass very close to the coastline during migrations, often entering bays, estuaries, and tidal inlets, and seldom move far offshore. Migrating fish congregate in large schools of like-sized individuals (Mercer et al. 1990).

Cobia occur in the northern parts of their range in summer, and winter from Florida southward (GMFMC and SAFMC 1983). They generally appear to migrate between the Gulf of Mexico and the Carolinas, and also up and down the east coast. A subset of the stock, both on the east coast and in the Gulf of Mexico, appears to move shoreward in spring and back offshore to deeper live-bottom areas in fall, rather than north and south. Tagging studies in South Carolina have showed a high degree of such site fidelity to waters in the southern part of the state over periods of months to years. Even so, a few fish have been recaptured hundreds of miles away from their release sites (Hammond 2001).

Spawning and Nursery Areas

Spanish mackerel become reproductively mature at two to three years of age and 10-14 inches in length (Mercer et al. 1990). Spawning begins in April off the Carolinas, and sampling studies suggest that spawning occurs mainly in waters 40 to 110 feet deep. Larvae rise to the surface at night and travel to lower depths during the day (Mercer et al. 1990). Spanish mackerel typically use waters for spawning that are minimally affected by water quality degradation and habitat alteration. Larval Spanish mackerel can apparently tolerate lower salinities than adult fish. Part of the population spends its larval stage in low-salinity estuaries, but the majority remains in nearshore ocean waters (Mercer et al. 1990).

Cobia are known to spawn near the Chesapeake Bay and along the Eastern Shore of Virginia from late June to mid-August (GMFMC and SAFMC 1983). Cobia spawn in the Gulf of Mexico from April to September, with spawning occurring in batches as frequently as every four days (Hammond 2001). Spawning apparently occurs well offshore, and larvae move inshore to lower salinity waters as soon as they are mobile (GMFMC and SAFMC 1983). Early-stage larvae collected in the Gulf Stream off North Carolina support the assumption of ocean spawning, although spawning is also known to occur at the mouths of bays and sounds (Hammond 2001).

EFH

EFH for coastal migratory pelagics at the project study area includes estuarine habitat (NMFS 1999). No HAPC for cobia or mackerel occurs in or near the project study area.

Many estuarine-dependent species are important prey for coastal pelagics, and estuaries furnish feeding grounds for pelagic species during migration, spawning periods, and larval stages. Therefore, coastal migratory pelagics are indirectly dependent on the health and productivity of estuaries.

Bluefish

Description

The bluefish (*Pomatomus saltatrix*) is the only North American representative of the family Pomatomidae. Bluefish are elongate, laterally compressed fish to over three feet in length. They are greenish or grayish-blue above and silvery below, with small scales, large heads, pointed snouts, and prominent sharp teeth (Boschung et al. 1983). Individuals can attain lengths of over three feet and weights up to 31 pounds (Moore 1989). Bluefish school by size and swim continuously. Same-size cohorts often combine into larger aggregations (GMFMC and SAFMC 1983). Bluefish are an economically valuable species chiefly due to recreational harvests (Oliver 1989).

Range and Habitat

Bluefish occur at the surface in most warm-temperate and tropical continental shelf waters (GMFMC and SAFMC 1983). Within the Middle Atlantic Bight they occur in large bays and estuaries as well as across the entire continental shelf. Juvenile stages have been recorded from all estuaries surveyed within the Middle Atlantic Bight, but eggs and larvae occur in oceanic waters. Bluefish feed voraciously on squid or schools of small fishes, and throughout the water column on pelagic and demersal organisms. Oceanic larvae consume copepods, with a greater component of other invertebrates (shrimp and squid) as they grow, and shifting to a diet composed mainly of fish as juveniles migrate to nursery areas (Fahay et al. 1999). Adults are sight predators that consume fish, with schooling coastal species being the most important prey (Oliver 1989). In turn, sharks, tunas, billfish, and other fast-swimming large predators feed on bluefish. Seabirds such as puffins and terns prey on young fish (Fahay et al. 1999).

In South Atlantic estuaries, juvenile bluefish may be present from March through December, while adults may be present from May through January (MAFMC 1998). Juvenile bluefish from six to fifteen inches in size utilize high-salinity estuaries on the southern North Carolina coast during summer and fall. Nearshore areas are used by juveniles and adults from spring through winter. Large adults are typically found at least three miles from shore in winter (Moore 1989).

Migration

Bluefish aggregations migrate seasonally along the Atlantic coast, moving northward in spring and southward in fall. Larger fish travel to the more northerly parts of the range. They often enter shallow water during migration periods (GMFMC and SAFMC 1983). During the southward migration in fall, bluefish apparently stay closer to shore than during the northward, spring migration (Oliver 1989), although there is some movement between inshore and offshore areas during both migration seasons (Moore 1989). All size classes remain offshore in winter (GMFMC and SAFMC 1983). Bluefish migrate in response to temperature, as they do not inhabit waters colder than 57 to 61 degrees Fahrenheit. This species tends to migrate as far as southeastern Florida in winter, although some fish may winter near the continental shelf off Cape Hatteras. They migrate to waters of New York and New England in summer (Fahay et al. 1999).

Spawning and Nursery Areas

Bluefish reach sexual maturity at three years of age and about 18 inches in length. Bluefish spawn in two waves in the South Atlantic, one in spring and one in summer. Spring spawning occurs from March to May on the outer continental shelf (at the inner edge of the Gulf Stream) from Cape Hatteras southward to northern Florida. Summer spawning, from June through August, is more inshore, on the continental shelf, and north of Cape Hatteras (GMFMC and SAFMC 1983). A minor spawning wave apparently occurs in fall and winter in the South Atlantic Bight (Oliver 1989). Eggs and larvae are pelagic, with larvae concentrated at 14-foot depths during the day and nearer the surface at night. Eggs do not occur in estuaries, and larvae rarely do. Larvae develop at temperatures from 64 to 75 degrees Fahrenheit, and salinities of 30 to 32 parts per thousand. Growth and development proceed as the larvae mature into pelagic-larval and juvenile stages, and the swimming ability of larval and juvenile bluefish improves as they cross the continental shelf and enter estuarine nurseries (Fahay et al. 1999). Many juveniles from both spawning groups move into estuaries between Cape Hatteras and Cape Cod to mature (GMFMC and SAFMC 1983), perhaps aided by Gulf Stream currents or prevailing winds.

Most of the juveniles from the spring spawning travel north to continental shelf waters north of Cape Hatteras during late May to mid-June. As waters warm, they travel into estuaries between Cape May and Long Island. These juveniles grow to seven or eight inches in length by fall. Juveniles from the summer spawning remain at sea until they enter nursery areas on the continental shelf and in estuaries in both the South Atlantic and Mid-Atlantic Bight in mid to late August. They grow to three inches in length by the fall, move southward, spend the winter offshore, and arrive in the sounds of Carolina the following spring (Fahay et al. 1999, Oliver 1989).

EFH

All estuaries between North Carolina and Florida, including the Wando River, are EFH for juvenile and adult bluefish. HAPC are not designated for bluefish (NMFS 1999).

Summer Flounder

Description

The summer flounder (*Paralichthys dentatus*) is a member of the family Bothidae, or lefteye flounders. Flounders can change their coloration and pattern to match the substrate to some extent. The dorsal and anal fins extend the length of the body (Boschung et al. 1983). On smaller specimens, ringed spots form two triangles on the ocular surface. The summer flounder is an important commercial and recreational species, especially north of Cape Hatteras (Gilbert 1986).

Range and Habitat

The summer flounder's range is the shallow estuarine waters and outer continental shelf from Nova Scotia to Florida, with a center of abundance from Cape Cod to Cape Hatteras (Packer et al. 1999). Larvae are most abundant 12 to 50 miles from shore, at depths from 30 to 230 feet.

Adults generally inhabit estuaries and shallow coastal waters during warmer months, and move offshore to the outer continental shelf during the winter (MAFMC 1998). Offshore fish inhabit waters from 120 to 600 feet in depth. South of Oregon Inlet, North Carolina, the closely related southern flounder (*Paralichthys lethostigma*) and gulf flounder (*P. albigutta*) co-occur with summer flounder. Ecological competition is apparently minimized by salinity preferences of the three species, with southern flounder inhabiting low-salinity areas (less than 11 parts per thousand) and gulf flounder preferring high-salinity areas of 22 to 35 parts per thousand. Summer flounder grow fastest at salinities of 12 to 35 parts per thousand, and are most often found in these conditions. Summer flounder also prefer sandy substrates, while southern flounder are dominant over muddy substrates (Scarlett 1982).

Both adults and juvenile flounder occur in South Atlantic estuaries, although juveniles are usually more abundant, confirming the significant role of these estuaries as nursery areas for summer flounder. They occur in areas of intermediate or high salinities, often close to inlets, and prefer a sandy or sand/shell substrate to a muddy one. Submerged aquatic vegetation is also extensively used during the day, and shallow vegetated areas are believed to be important habitat for summer flounder (Packer et al. 1999). Summer flounder are visual predators that can capture prey at the substrate and in the water column. Larval flounder consume zooplankton and small crustaceans, moving on to larger prey as they grow. Prey for adult and juvenile flounder includes crustaceans, other invertebrates, and schooling and non-schooling fish (Gilbert 1986, Scarlett 1982).

Migration

Movement of larvae into estuaries peaks in February and March. Movement into estuarine areas appears to be assisted by flood tide currents, and enhanced by larval movements between the water column and substrate (Packer et al. 1999). Sampling studies have indicated that the greatest number of larvae have been captured in or near inlets during the full moon (Grimes et al. 1989).

Adult and juvenile summer flounder exhibit strong seasonal movement, inhabiting shallow onshore waters during warmer months and moving offshore with cooler weather. This migration behavior is less pronounced in southern populations. Juvenile fish often remain in their nursery habitat over their first winter, and tagging studies indicate fidelity to summer habitat from year to year (Packer et al. 1999). The timing of offshore movement in fall varies with latitude, with more northerly populations migrating (and spawning) sooner in the year (Scarlett 1982). Fidelity to summer and winter habitats and spawning areas may provide a mechanism for genetic isolation between populations in the South and Middle Atlantic Bights (Gilbert 1986). Tagging studies indicate that a distinct stock of “inshore” summer flounder may occur from southern Virginia southward. These fish appear to migrate offshore only to depths of 120 feet, overwinter, and spend the summer inshore between North Carolina and Delaware (Scarlett 1982).

Spawning and Nursery Areas

Summer flounder appear to spawn beginning in their third year and at a size of 10-12 inches in length. The fish spawn repeatedly over open areas of the continental shelf as the fish move seaward during fall migrations, or on their wintering grounds. Spawning may begin in October and continue through May. Eggs have been collected between 30-foot and 360-foot depths

(Packer et al. 1999). Data suggest that summer flounder adjust their seaward migrations and spawning activity according to yearly and seasonal fluctuations in water temperatures (Gilbert 1986).

South of Cape Hatteras, larvae have been found from November to May, 12 to 52 miles from shore, in depths of 30 to 230 feet. After a brief planktonic stage, they begin to migrate inshore to nursery areas in estuaries and along coasts (Packer et al. 1999). Migrating larvae, up to about one-half inch in length, move vertically in the water column and are conveyed by tides in their shoreward migrations (Gilbert 1986). Juveniles concentrate in intertidal areas, on sandy or sand-shell substrates and in transition areas between fine sand and silt or clay. Other important nursery habitats include marsh creeks, seagrass beds, mud flats, and open bays. Prey abundance (zooplankton, small crustaceans, and other invertebrates) is important to the growth and condition of juveniles at this stage (Packer et al. 1999).

EFH

Estuaries from Albemarle Sound, North Carolina, through St. Andrew and St. Simon Sounds, Georgia are identified as EFH for summer flounder (NMFS 1999). This includes the Wando River estuary and the project study area. HAPC for summer flounder consists of submerged aquatic vegetation, which does not exist at or near the project study area (NMFS 1999).

Dusky Shark

Description

The dusky shark (*Carcharhinus obscurus*) is a member of the Carcharhinidae, or requiem shark family, the largest family of sharks. These sharks have two dorsal fins, and the upper lobe of the tail is elongate and pointed upward. The dusky shark is a slender shark to 12 feet in length, with a short snout and triangular, serrate teeth (Boschung et al. 1983). This is one of the larger species found from inshore waters to the outer reaches of continental shelves. It is important as a commercial species as well as a game fish (OSF 1999).

Range and Habitat

The dusky shark is common in warm and temperate seas, from inshore waters to the outer reaches of continental shelves, throughout the world (Boschung et al. 1983). It occurs in estuaries and can tolerate salinities as low as 10 parts per thousand (Schwartz 1984), although they tend to avoid low salinities (NOAA 2006). On the Atlantic coast they occur from Massachusetts to Florida, and south to the Gulf of Mexico and the Caribbean Sea (Grace 2001). Dusky sharks inhabit continental shelf waters off the Carolinas at least from April through December, and are one of the most abundant sharks south of Cape Hatteras during those months (Schwartz 1984). Prey includes bottom-dwelling fish and smaller sharks (Boschung et al. 1983). Sampling of the longline fisheries in the western North Atlantic indicates that *Carcharhinus* species collectively, including dusky and sandbar sharks, have declined by an estimated 61 percent since 1992 (Baum et al. 2003).

Migration

The dusky shark is a migratory species which moves north-south with the seasons (OSF 1999). They undergo long migrations and prefer warm temperate to tropical waters (NOAA 2006).

Spawning and Nursery Areas

Dusky sharks mature at 19 to 21 years of age and 7 to 8 feet in length. They bear 6 to 14 live young every 3 years (NOAA 2006, Simpfendorfer et al. 2002).

EFH

EFH for juvenile dusky sharks in South Carolina consists of inlets and estuaries, including the Wando River at the project study area. No HAPC is designated for the dusky shark (NMFS 1999).

1.1.1 Atlantic Sharpnose Shark

Description

The Atlantic sharpnose shark (*Rhizoprionodon terraenovae*) is a small, streamlined coastal requiem shark inhabiting the waters of the east coast of North America. These sharks are frequently found in schools of uniform size and sex (OSF 1999). They average three feet and length, although they can reach four feet. Average weight is eight pounds. Adults often have scattered white spots on the dorsal surface. They can form a locally important component of the shallow-water sport fishing industry because of their abundance (Castro 1993).

Range and Habitat

The Atlantic sharpnose shark occurs from the Bay of Fundy to the Yucatan peninsula, although they are most common from North Carolina to the Gulf of Mexico. This species is very abundant in coastal waters in the summer (Castro 1993). The Atlantic sharpnose shark is common year-round south of the North Carolina coast, and is often found in migration off the Virginia coast (OSF 2005). Atlantic sharpnose sharks are often caught in shrimp trawls off South Carolina and Georgia, and can be easily caught over live bottoms in shallow water (Castro 1993). This species occur in waters from the shore to depths of 1000 feet (Grace 2001). These sharks feed on fish, crustaceans, and other invertebrates.

Migration

Atlantic sharpnose sharks migrate north and south along the coast as well as onshore and offshore (Schwartz 1984).

Spawning and Nursery Areas

Atlantic sharpnose sharks reach maturity at about 24 inches in length and from 3 to 4 years in age. Females give birth to 1 to 8 pups (Loefer and Sedberry 2003). Off the South Carolina coast, Atlantic sharpnose sharks are born in late May and early June in shallow coastal waters. Litters consist of four to seven pups (OSF 1999). Shark pups are found in inshore waters of the Carolinas from April through August. Young Atlantic sharpnose sharks dominate the inshore shark fisheries in North and South Carolina (Schwartz 1984).

EFH

EFH for juvenile Atlantic sharpnose sharks has been designated for bays and waters to 25 meters, including the Wando River at the project study area. No HAPC is designated for the Atlantic sharpnose shark (NMFS 1999).

5. Analysis of Effects on Essential Fish Habitat

Impacts to EFH at the Site may result from construction and maintenance of the replacement bridge. During construction, some activities that occur in upland areas have the potential to disturb adjacent water quality, including release of oil, fuel, paint or other chemicals, sewage, debris, and airborne contaminants. The increase in impervious surfaces from the new bridge would likely channel pollutants into open waters unless appropriate stormwater management systems are constructed and maintained. Unless overland flow is attenuated, increases in impervious surfaces can also be a factor in hydrologic modifications that alter currents near the point of runoff, the structure of the water column, and the character of the substrate. Finally, increased noise disturbances may affect marine species. If the new bridge configuration causes an indirect increase in development in the area, the overall effect may be a trend toward estuarine and marine species that are less sensitive to disturbance, less sensitive to water quality, and/or are more highly mobile. Most species managed by the NMFS and the regional Fishery Management Councils would be adversely affected by development. Adverse effects can be minimized by careful planning, construction, and operation of the proposed facility and any associated development.

Estuarine Water Column

Impacts to the estuarine water column could result if currents through the Wando River channel are altered, therefore changing the structure of the water column. Changes in current flow may alter plankton and larval movements, and salinity changes would likely alter the aquatic species composition. However, substantial changes in current and salinity patterns are not anticipated as a result of the project. Water quality issues include short-term turbidity and re-suspension of sediments, and possibly toxic substances, that would occur during initial and maintenance dredging (SAFMC 1998). An increase in automotive traffic is often followed by increase in hydrocarbon emissions and runoff from fuel, oil, tire wear, brake linings, and other substances.

Intertidal flats

Construction of the proposed bridge may cause fill to be placed into an undetermined amount of intertidal and shallow-water habitat, or convert it to a deepwater area. Impacts of this action would include a direct loss of benthic organisms and a change in species composition in the dredged and filled area (SAFMC 1998). Loss of the original surface layer and of the shoreline supply/deposition area at the project study area could contribute to changes in sediment composition. These changes may cause a reduction in the number of specialized benthic species present and an increase in species that are more flexible in their substrate preferences.

Species that are shallow-water specialists would be replaced by deepwater species, or those that can adapt to varying water depths, within the project footprint.

Impacts to intertidal areas adjacent to the Site may also result from erosion from boat wakes and other wave energy, shoaling and jetting behind pilings, changes in sediment supply, and current eddies and other current alterations (SAFMC 1998). However, as the project study area is located on an existing maintained channel, disturbances from boat wakes, waves, eddies, and sediment alterations already exist in the area. Minimal increases in these types of disturbances are expected.

Estuarine Emergent Wetlands

Along the coast of the Carolinas, wetlands losses are due to direct impacts from development, agriculture, dredge, or fill, and also to indirect impacts from sea level rise and erosion. Sedimentation and erosion can change distributions of marsh vegetation (Street et al. 2005). Hardened estuarine shorelines cause gradual, long-term, and cumulative wetland loss by limiting sediment inputs needed for maintenance and expansion of wetlands, and by blocking landward migration as sea level rises (NCDMF 2006). Increased turbulence and scour due to increased boat traffic can result in vegetation mortality, loss of intertidal habitat, and loss of organic detritus and benthic invertebrates. However, as the bridge replacement closely follows the footprint of the existing bridge, impacts to Estuarine Emergent Wetlands are expected to be minor.

Palustrine Emergent and Forested Wetlands

Population growth along the coast results is the primary cause of impacts to both freshwater and estuarine wetlands (Street et al. 2005). Agriculture, forestry, residential development, industry, and road construction all result in impacts. Ditch excavation and road construction is one way in which road construction impacts wetlands. These ditches not only change the hydrologic regime of receiving waters, but also channel pollutants directly into those waters. Increased velocities of runoff cause erosion and incision of downstream channels, contributing to increased turbidity of wetlands and estuarine waters downstream. Careful planning of stormwater management is needed to minimize erosive impacts of runoff on wetlands.

Impacts to Species

Although fluctuations in abundance are natural and are expected even when environmental factors are favorable, alteration of habitats by pollution or by physical causes is becoming a serious factor influencing shrimp production in numerous estuaries (Muncy 1984). Increased turbulence and scour at shorelines results in vegetation mortality, loss of intertidal habitat, and loss of organic detritus and benthic invertebrates (NCDMF 2006).

Release of pesticides and pollutants into estuarine waters impacts shrimp directly, reduces the populations of forage species, and contributes to a decrease in dissolved oxygen that is detrimental to shrimp populations (Larson et al. 1989). Brown shrimp have been shown to avoid and migrate out of areas of low oxygen concentration, possibly leading to overcrowding and

increased predation in the refuge areas (NCDMF 2006). However, with appropriate stormwater control implementation, these impacts can be reduced or eliminated.

Water quality issues that affect shrimp are also important for red drum and other managed fish species. A number of studies suggest that many southeastern estuaries may not fully support food chains of productive fisheries. The loss of productivity of estuaries is combined with the buildup of toxins in the tissues of predatory fish such as red drum, gray snapper, coastal migratory pelagics, bluefish, flounder, and sharks. Contaminants also directly cause lesions and other afflictions in fish (NCDMF 2001).

Threats to EFH for red drum are more intensified for juvenile fish that spend the first two years of their lives in estuaries. Adult fish and newly-hatched larvae inhabit the open seas where pollutants and disturbances are not as concentrated as in estuaries. Adult fish also have the ability to migrate away from adverse habitat conditions. Of the common migratory pelagic species, Spanish mackerel and cobia are most dependent on estuaries for larval development. Adult fish enter estuaries at particular seasons or during migrations. However, adult fish are more mobile and able to avoid poor habitat. Spanish mackerel have also been shown to spawn in areas least affected by habitat degradation (Mercer 1990).

Almost all estuarine and nearshore waters are important habitat for juvenile and adult bluefish (Moore 1989). The accumulation of impacts over time has the capacity to impact water quality not only in estuaries and nearshore areas but also in the open ocean. Habitat degradation has caused fish kills and diseases and has led to closure or restriction of fisheries in some areas (Moore 1989).

Overfishing is the greatest threat to most shark stocks. The low reproductive rate of these fishes allows very little margin for exploitation by commercial and recreational fisheries (Castro 1993). However, the managed shark species mentioned in this document depend on estuarine and nearshore habitats for at least part of their life cycles. Therefore, degradation of habitat for other fish and shrimp species will also have negative impacts to coastal sharks.

These statistics underline the importance of strict provisions for water quality protection, and the adherence to Best Management Practices. With careful management of port industrial activities, impacts to fisheries and EFH at the Site can be minimized.

6. Avoidance and Minimization Measures

Given the potential for temporary siltation and erosion, the contractor would be required to minimize these actions through implementation of construction Best Management Practices (BMP), reflecting policies contained in 23 CFR 650B and SCDOT's Supplemental Specifications on Seeding and Erosion Control Measures of August 15, 2001.

It is anticipated that any tidal marsh or emergent wetland areas impacted during construction will revegetate quickly and naturally after project completion. However, if vegetated areas

impacted by the project have not naturally regenerated within a two year post-construction monitoring period, the area will be restored with emergent or marsh grass plantings.

No contaminants will be released into the water. SCDOT has emergency spill recommendations to the contractor in the event of an accident. If a leak is evident or a spill occurs, the contractor should be notified and should verify that it is mitigated as soon as practical by authorized personnel. Any unused or contaminated materials should be disposed of in accordance with Federal, State, and local laws.

7. Conclusions

It is the determination of SCDOT that the proposed project will have, at most, minimal effects on essential fish habitat or aquatic species managed by the SAFMC.

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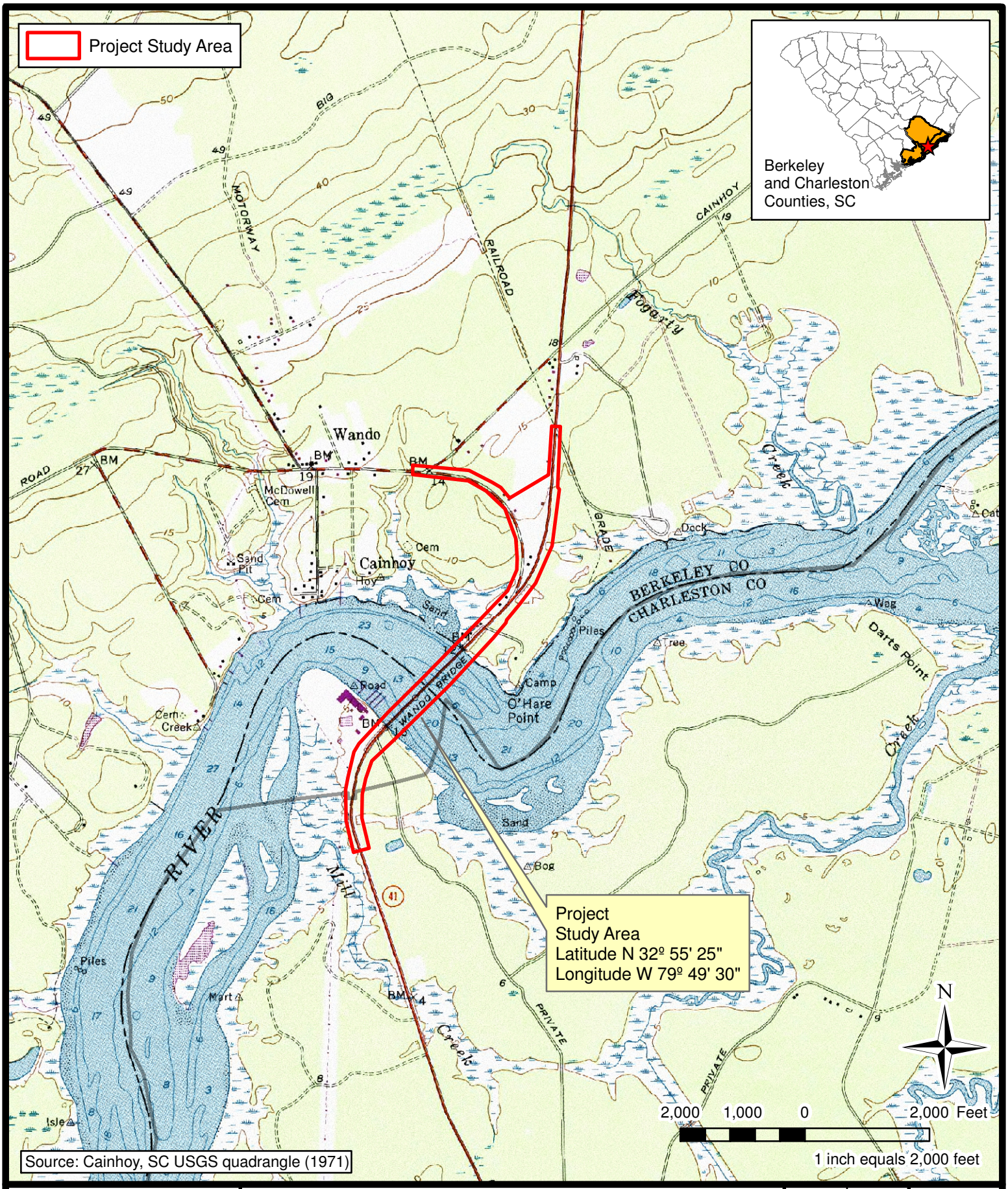
Street, M.W., A.S. Deaton, W.S. Chappell, and P.D. Mooreside. 2005. North Carolina Coastal Habitat Protection Plan. North Carolina Department of Environment and Natural Resources, Division of Marine Fisheries, Morehead City, NC. 656 pp.

APPENDIX A

FIGURES

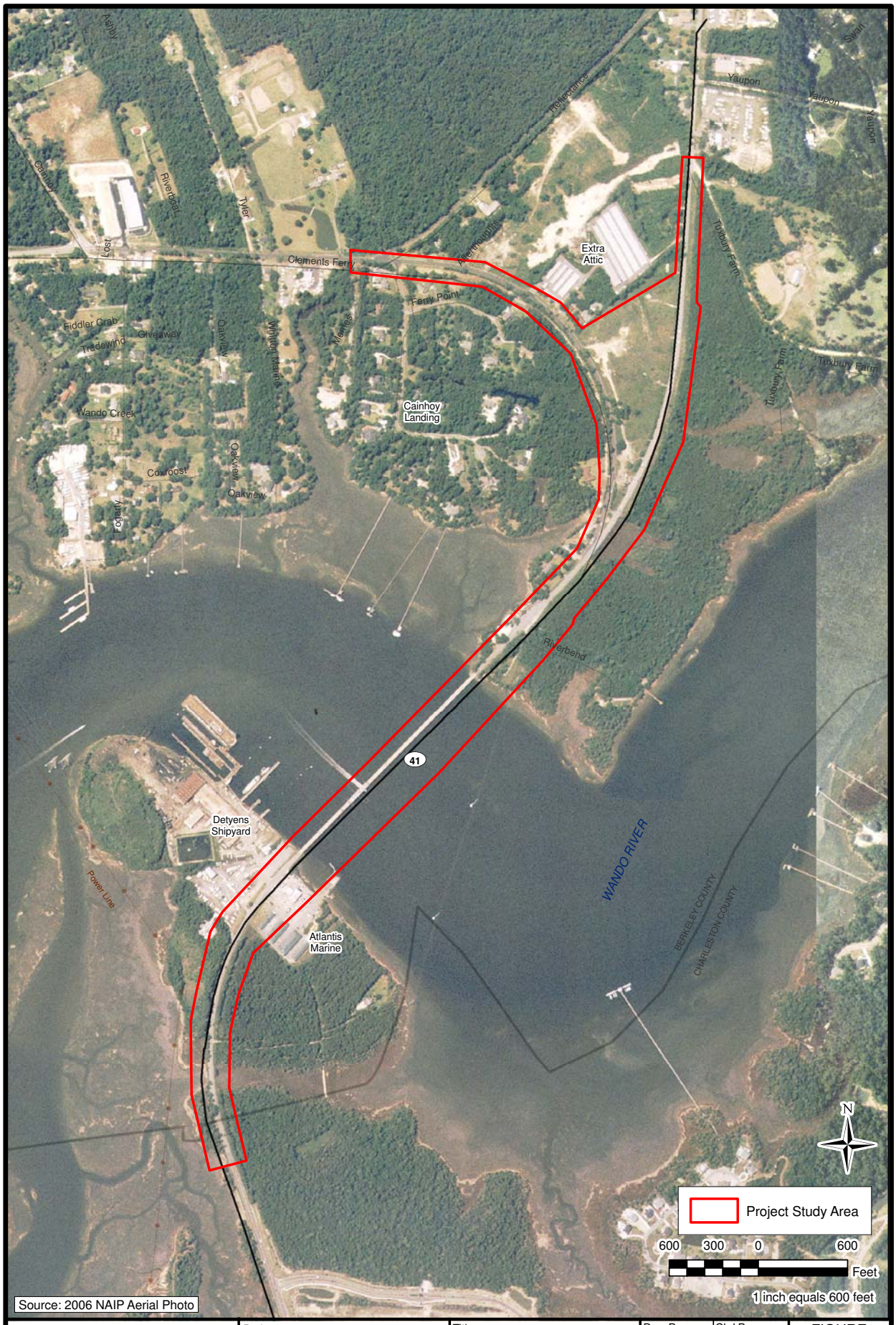


PROJECT LOCATION

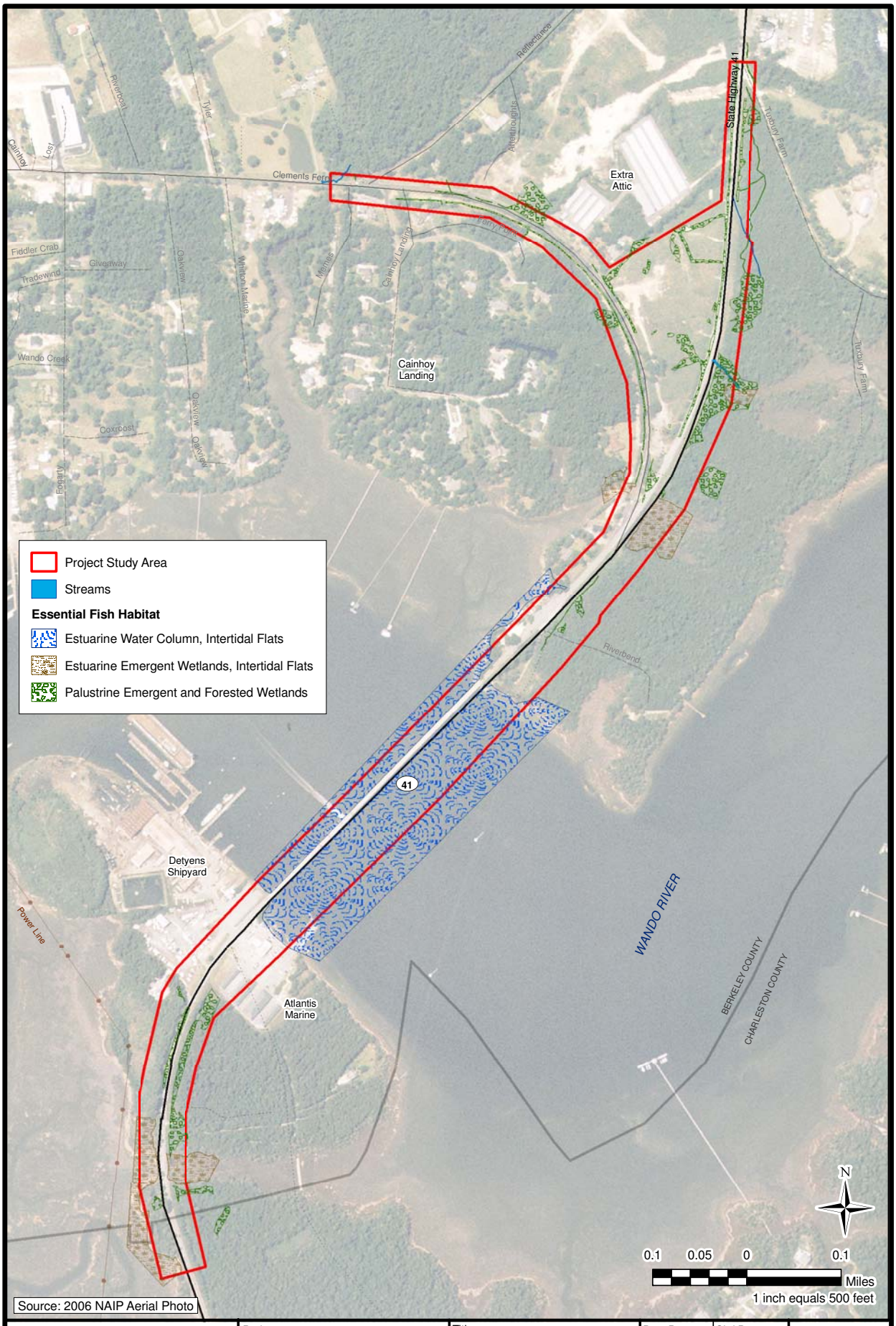
SC 41 Bridge Replacement
over the Wando River

Berkeley and Charleston Counties, South Carolina

Dwn By: ES	Ckd By: ES	FIGURE
Date: APR 2008		1
Scale: As Shown		
ESC Project No.: 05-224		



SCDOT	Project: **SC 41 Bridge Replacement over the Wando River** Berkeley and Charleston Counties, South Carolina	Title: **EXISTING CONDITIONS**	Dwn By: ES / Ckd By: ES Date: APR 2008 / Scale: As Shown ESC Project No.: 05-224	FIGURE **2**



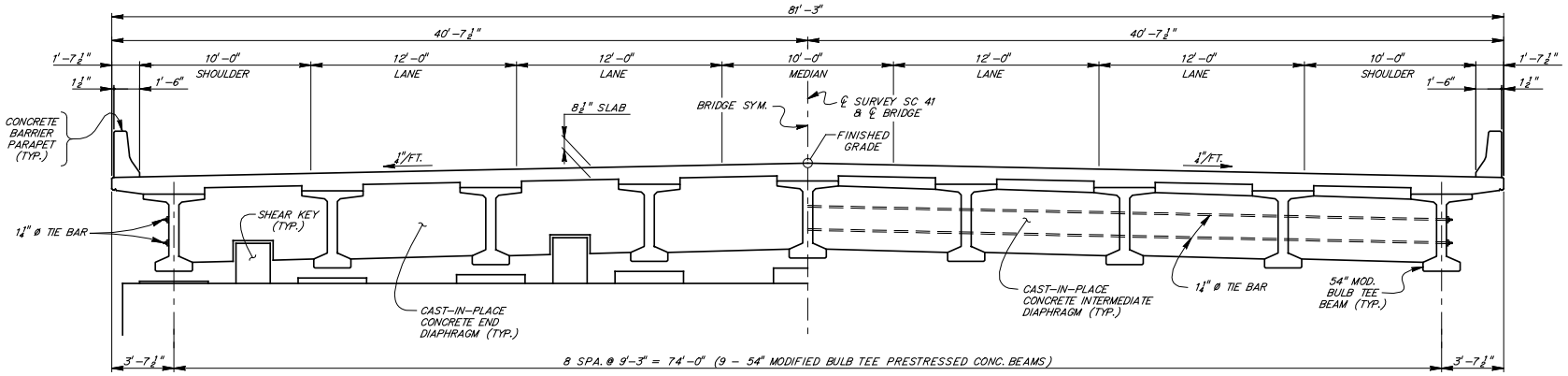
SCDOT	Project: **SC 41 Bridge Replacement over the Wando River** Berkeley and Charleston Counties, South Carolina	Title: **ESSENTIAL FISH HABITAT**	Dwn By: ES / Ckd By: DKO Date: SEP 2008 / Scale: As Shown EcoScience Project No.: 05-224	FIGURE **3**

APPENDIX E

Roadway and Bridge Typical Sections

PIN 32099

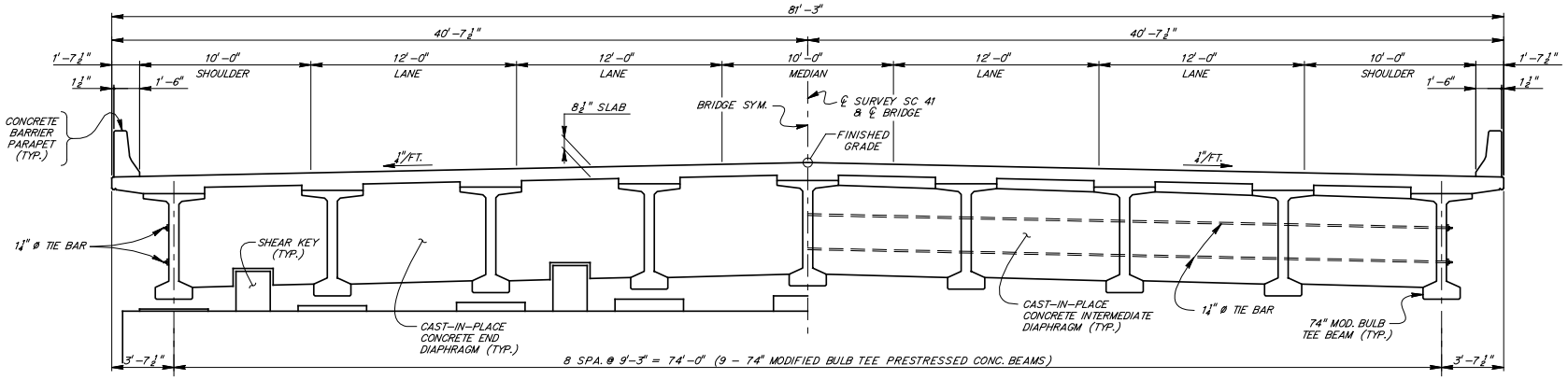
SHEET NO.	TOTAL SHEETS
16	32



HALF SECTION AT EXPANSION BENT
(END DIAPHRAGMS AT BENTS 3 & 15)

TYPICAL SECTION
(SPANS 1, 2, 15 & 16 ONLY)
(LOOKING IN DIRECTION OF STATIONING)

HALF SECTION AT MIDSPAN
(INTERMEDIATE DIAPHRAGMS)



HALF SECTION AT EXPANSION BENT
(END DIAPHRAGMS AT BENTS 3, 6, 9, 12 & 15)

TYPICAL SECTION
(SPANS 3 THRU 14 ONLY)
(LOOKING IN DIRECTION OF STATIONING)

HALF SECTION AT MIDSPAN
(INTERMEDIATE DIAPHRAGMS)

DLV 8/22/2008 2:45:27 PM K:\Drawings\2004 Orders\04-01 Kennedy\preliminary\TYPICAL.dgn

SOUTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BRIDGE DESIGN COLUMBIA, S.C.

PRELIMINARY NOT FOR CONSTRUCTION

REV.			
REV.			
REV.			
REVIEWED	REB		
QUAN.			
DR.	D&V		
DES.	JSA		
	BY	CHK.	DATE

TYPICAL SECTIONS

SC 41 BRIDGE REPLACEMENT OVER WANDO RIVER

Triplett-King & Associates, Inc.
CONSULTING ENGINEERS
P.O. BOX 70
ROCK HILL, SOUTH CAROLINA 29731

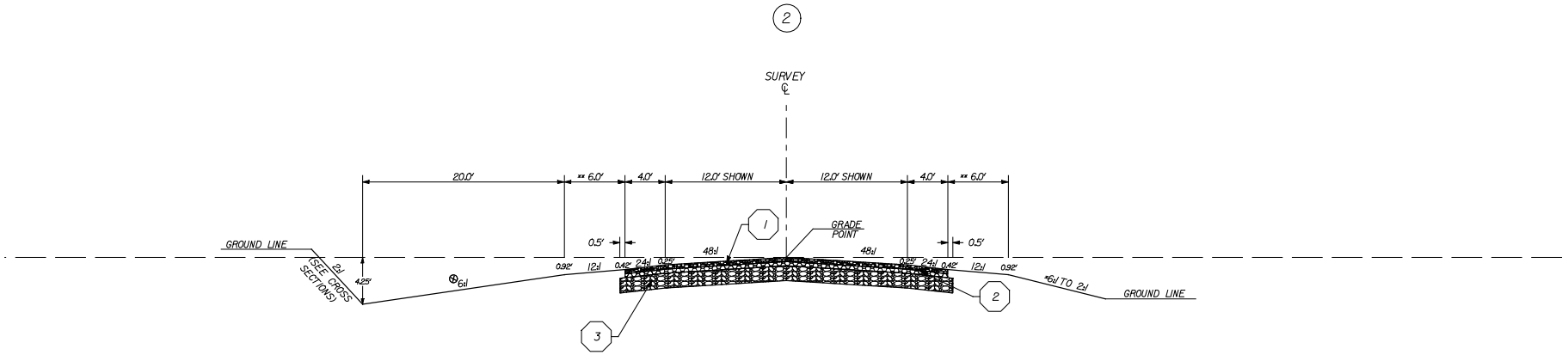
FILE NO.	ROUTE	COUNTY	DRAWING NO.
8.158B	SC 41	BERKELEY/CHARLESTON	B04-01

PIN 32099

FED. RD. DIV. NO.	STATE	COUNTY	FILE NO.	PROJECT NO.	ROUTE NO.	SHEET NO.	TOTAL SHEETS
3	S.C.	BERKELEY CHARLESTON	8.158B	BR-BR08(017)	S.C. 41	3A	

South Carolina Department of Transportation

TYPICAL SECTION OF IMPROVEMENT
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION
COLUMBIA, S.C.



FOR INFORMATION ONLY

LEGEND	
1	HOT MIX ASPHALT SURFACE COURSE TYPE B (200 LBS./SY.)
2	HOT MIX ASPHALT INTERMEDIATE COURSE TYPE B (200 LBS./SY.)
3	HOT MIX ASPHALT BASE COURSE - TYPE A (700 LBS./SY.)
4	OMITTED
5	OMITTED

DESIGN SPEED		
MPH	FROM STA.	TO STA.
60	237+00.00	313+89.18
35	10+18.02	18+50.00

EXCEPTIONS TO DESIGN SPEED		

REVISIONS	BY	DATE	DESCRIPTION OF REVISION
5			
4			
3			
2			
1			

DWG. _____ DATE _____ 1"= NTS HORZ.
CKD. _____ DATE _____ 1"= NTS VERT.

SC41/S33
SC41N

USE THIS SECTION ON:

S.C. ROUTE 41 / S-8-33 STA. 245+80.51 TO STA. 295+38.82

S.C. ROUTE 41N STA. 10+18.02 TO STA. 15+55.91

** ADD 3.5' WHERE GUARDRAIL IS ERECTED
* 0-5' HEIGHT 6:1
5'-10' HEIGHT 4:1
OVER 10' HEIGHT 2:1

NOTE:
DO NOT USE GRADED AGGREGATE BASE COURSE IN AREAS WITH 6' OR LESS IN WIDTH.

℄ NOTE:
THIS SLOPE MAY BE VARIED WHEN A DEEPER DITCH IS NECESSARY FOR DRAINAGE PURPOSES, USING A MINIMUM SLOPE OF 12:1 AND A MAXIMUM SLOPE OF 4:1. WHERE A DEEPER DITCH THAN PROVIDED BY A 4:1 IS NECESSARY, THE DITCH SHALL BE PLACED FARTHER FROM THE ℄ CONTINUING THE 4:1 SLOPE TO PROVIDE FOR THE NECESSARY DEPTH. SEE PROFILE FOR THE SPECIAL DITCH GRADES.

PAVEMENT DESIGN

REVISIONS NO.	DATE	DESCRIPTION	BY	CHECKED

REVISIONS NO.	DATE	DESCRIPTION	BY	CHECKED

DRAWN BY : A.C.C.
DATE : 05/19/08

REVIEWED BY : B.A.H.
DATE : 05/20/08

APPROVED BY : B.G.N.
DATE : 05/22/08

CIVIL ENGINEERING CONSULTING SERVICES, INC.

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION

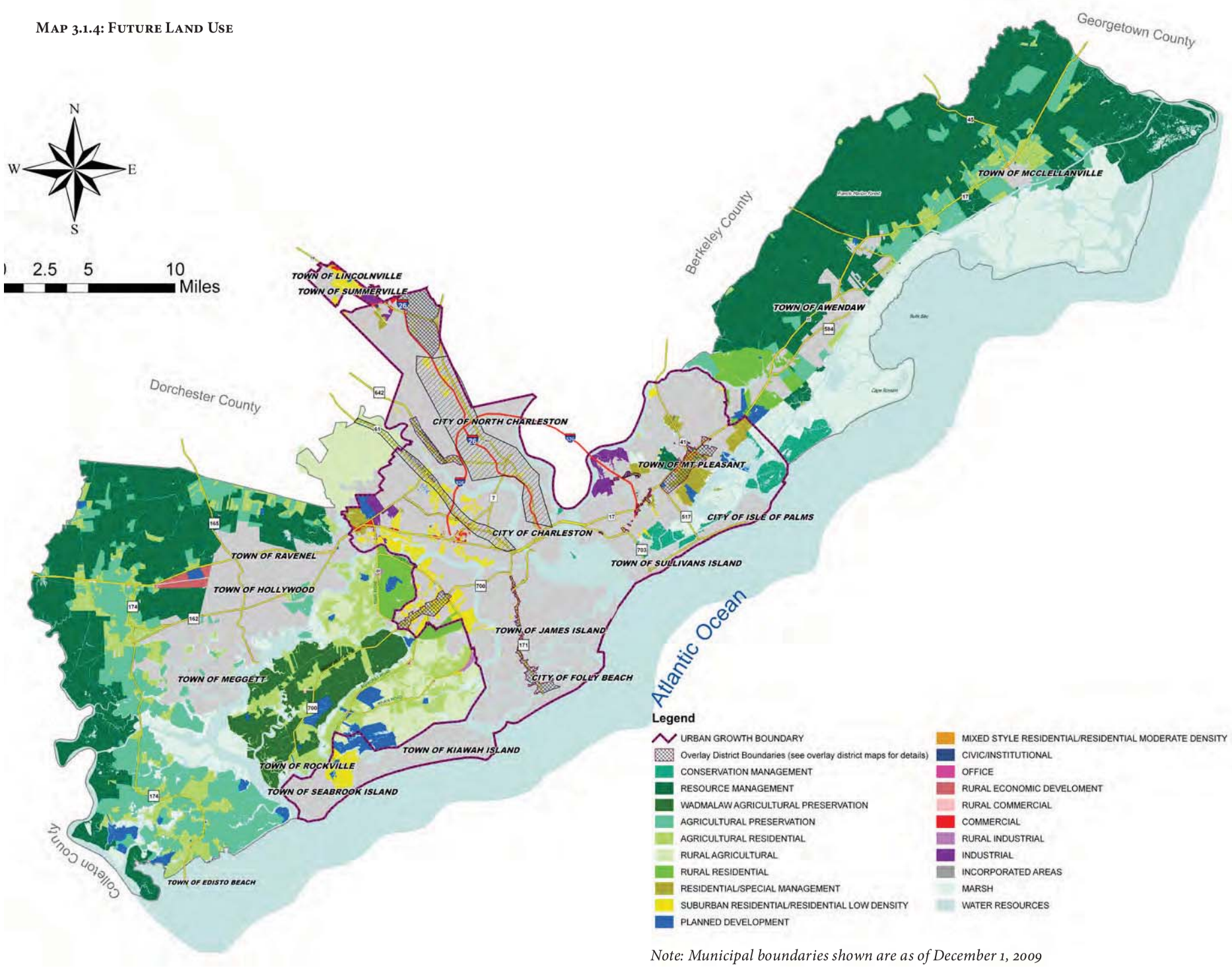
S.C. ROUTE 41 BRIDGE REPLACEMENT OVER WANDO RIVER

TYPICAL SECTION

APPENDIX F

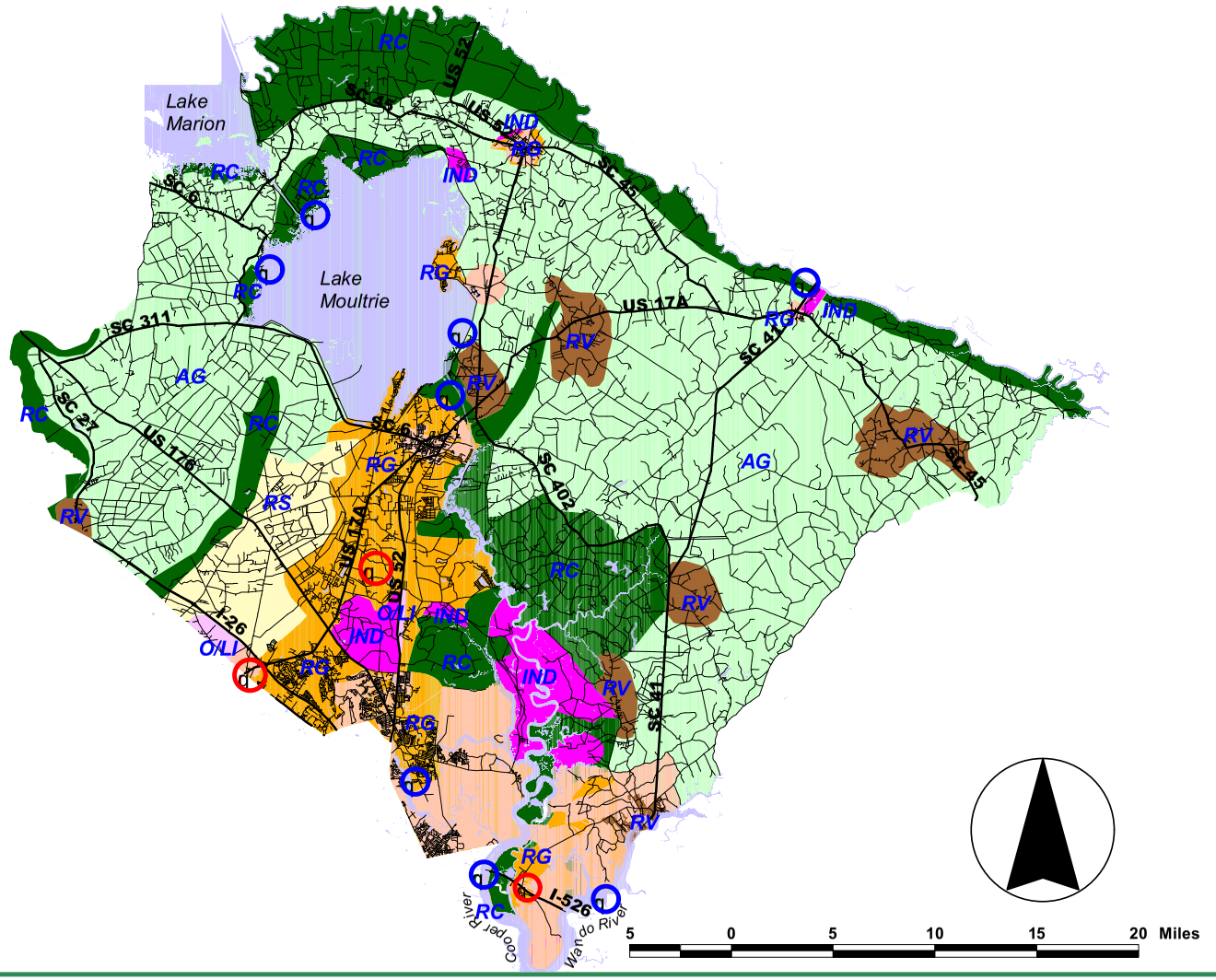
Future Land Use Maps

Map 3.1.4: Future Land Use



Note: Municipal boundaries shown are as of December 1, 2009

Map 1: Future Land Uses



Legend

- Roads
- Highways
- Lakes and Rivers
- Municipal Limits

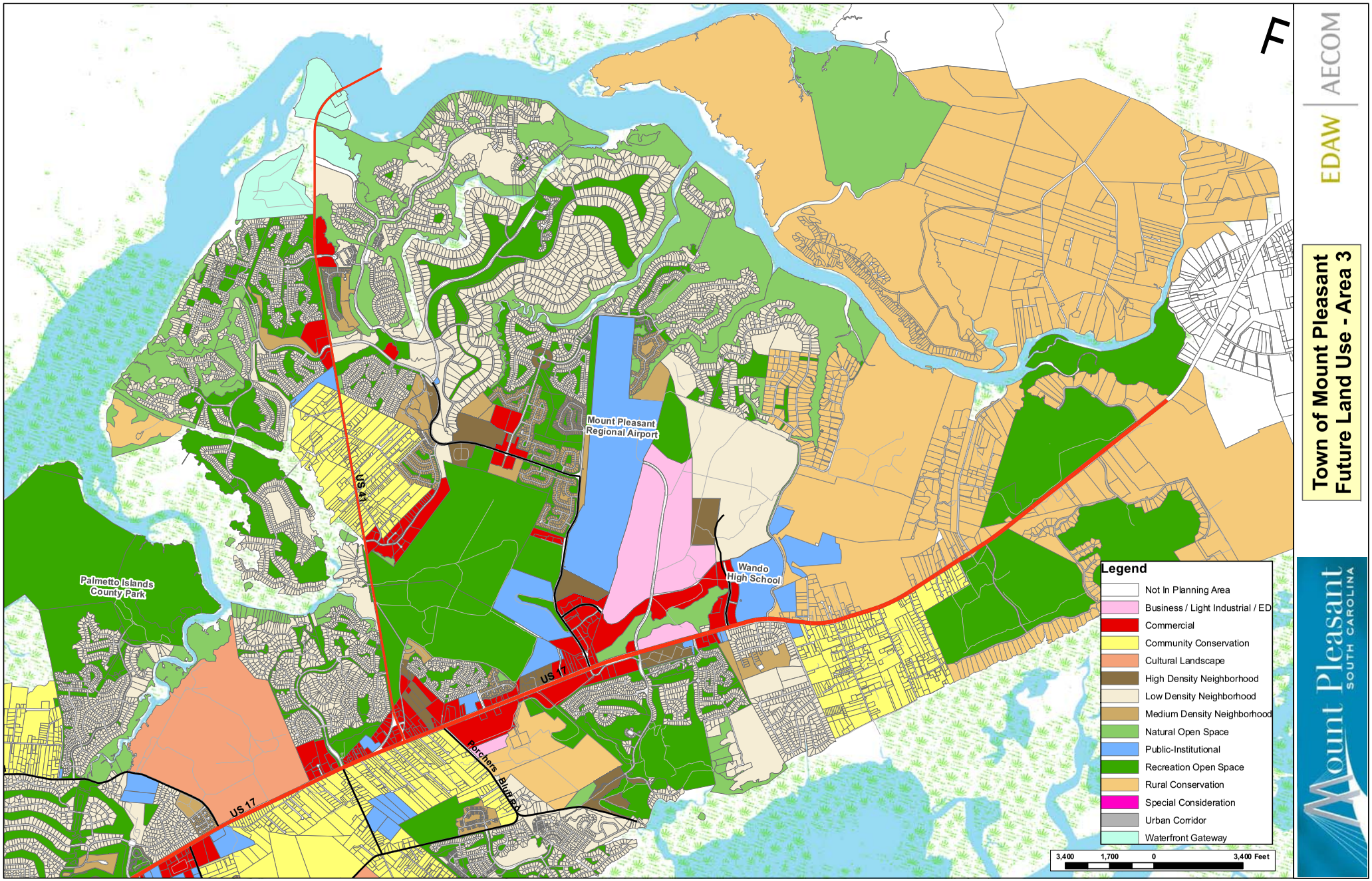
Future Land Uses

- Industry (IND)
- Office/Light Industrial (O/LI)
- Residential Growth Area (RG)
- Resource Conservation (RC)
- Rural Settlement (RS)
- Rural Village (RV)
- Agriculture (AG)
- Regional Commercial Center
- Possible Recreation Site

Data Source: Berkeley County GIS, 1998 and BCD COG 1998
Date of Map Creation: 1.29.99
DGIS/Berkeley/Land_use/flu

Berkeley Charleston Dorchester Council of Governments
5290 Rivers Ave., Suite 400
North Charleston, SC 29406-6357
(843)529-0400, Fax (843)529-0305

Berkeley County Comprehensive Plan



Town of Mount Pleasant Future Land Use - Area 3

EDAW | AECOM

Mount Pleasant SOUTH CAROLINA