WEST 526 LOWCOUNTRY CORRIDOR

Appendix O

Essential Fish Habitat Assessment and NOAA Consultation

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
https://www.fisheries.noaa.gov/region/southeast

February 26, 2021 F/SER47:CC/pw

(Sent via Electronic Mail)

Ms. Nicole Riddle
South Carolina Department of Transportation
Environmental Services Office
955 Park Street
Columbia, SC 29201

Dear Ms. Riddle:

NOAA's National Marine Fisheries Service (NMFS) reviewed the updated *Essential Fish Habitat Assessment I-526 Lowcountry Corridor West*, dated December 1, 2020, prepared on behalf of the Federal Highway Administration (FHWA). The South Carolina Department of Transportation (SCDOT) and FHWA propose improvements to the I-526 Lowcountry Corridor West in Charleston County. FHWA and SCDOT are pursuing the proposed action under the One Federal Decision/FAST Act 41 guidance. The FHWA and SCDOT have determined the proposed action will adversely affect salt marsh and tidal waters designated essential fish habitat (EFH) and, therefore, have included measures to avoid and minimize effects on EFH and will establish a plan to mitigate for unavoidable impacts to EFH. As the nation's federal trustee for the conservation and management of marine, estuarine, and anadromous fishery resources, the NMFS provides the following comments and recommendations pursuant to authorities of the Fish and Wildlife Coordination Act and the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

The NMFS reviewed the original EFH Assessment, dated May 8, 2020, and provided comments by letter dated September 2, 2020. In that letter, the NMFS noted the original EFH Assessment was comprehensive and highlighted the extensive coordination occurring before release of the original document. In the September letter, the NMFS also noted that of the 216.9 total acres of EFH within the project area, potentially up to 5.6 acres of EFH will be permanently impacted by fill, 12.9 acres of EFH will permanently impacted via shading, and 2.8 acres of EFH may be temporarily impacted. While these impacts are extensive and significant, FHWA, SCDOT, and NMFS expected the acreages to decrease during the design-build process. The FHWA and SCDOT committed to working with the NMFS and other resource agencies to develop a mitigation plan to ensure appropriate mitigation of all unavoidable impacts to EFH. Accordingly, the NMFS provided no EFH conservation recommendations for the proposed improvements to the I-526 Lowcountry Corridor West.

The updated EFH Assessment expands the original assessment in two primary ways: it changes the project design to include a shared use path (SUP) over the Ashley River, and it increases the proposed EFH impacts. The increased impacts to EFH result from adding the 12-foot-wide SUP on the westbound side of the bridge over the Ashley River. Importantly, the SUP does not connect to existing infrastructure on either side of the river to provide access for pedestrians or cyclists to the SUP. Neither the SCDOT nor FHWA estimate the potential EFH impacts from making these connections to the SUP as there is no funding available for these connections and no planned connections at this time (see page 43 of the revised EFH Assessment). SCDOT and FHWA note constructing accesses to the SUP would require separate authorization and regulatory review.

The updated EFH Assessment (Table 6) provides a table listing potential impacts for both Filbin Creek and the Ashley River. The EFH Assessment slightly revises both permanent direct and indirect impacts upward to 6.1 acres and 13.5 acres, respectively, and substantially increases the temporary indirect EFH impacts to 33 acres. However, not all temporary impacts will occur concurrently and may overlap. For example, in Filbin Creek, the temporary trestle will result in approximately 11.9 acres of temporary impacts, primarily shading. The use of timber mats and barges to build the temporary trestle will result in 11.9 acres of temporary impacts as well, but SCDOT may remove the mats and barges during trestle construction (Section 6). The EFH Assessment describes the same situation for the Ashley River. Appendix A of the updated EFH Assessment lists best management practices SCDOT will utilize during project construction to minimize impacts to EFH. The commitment by SCDOT and FHWA to compensatory mitigation remains, and these agencies will establish the EFH mitigation plan when pursuing the permits required by the Clean Water Act.

Based on the information provided in the updated EFH Assessment, the NMFS will not change its previous conclusion – there are no EFH conservation recommendations at this time for the proposed improvements to the I-526 Lowcountry Corridor West. However, this does not mean the NMFS supports inclusion of the SUP at this location. The SCDOT and FHWA correctly note there may be significant impacts to EFH associated with providing access to the SUP, including lengthy causeways, concrete bridges, boardwalks, and other elevated structures. The NMFS supports green infrastructure that increases access for pedestrians and cyclists. However, from a regional perspective, the purpose and need of a SUP at the I-526 Lowcountry Corridor West project is unclear given the proximity of another SUP already under development, including access infrastructure for pedestrians and cyclists. Accordingly, as FHWA and SCDOT complete reviews required by the National Environmental Policy Act for I-526 Lowcountry Corridor West, the NMFS recommends close examination of the purpose and need for the SUP and its independent utility without access infrastructure. As presented in the updated EFH Assessment, the SUP appears unusable until an additional project is pursued and that additional project may substantially impact nursery habitats supporting commercial and recreational fisheries.

The NMFS appreciates the opportunity to provide these comments and thanks the FHWA and SCDOT for their efforts in incorporating avoidance and minimization strategies and early engagement on the project. Please direct related correspondence to the attention of Cindy Cooksey at our Charleston Area Office. She may be reached at (843) 460-9922 or by e-mail at Cynthia.Cooksey@noaa.gov.

Sincerely,

WILBER.THOMAS.PAYSON.1365820186

Digitally signed by WILBER.THOMAS.PAYSON.1365820186
Date: 2021.02.27 13:46:00 -05'00'

/for

Virginia M. Fay
Assistant Regional Administrator
Habitat Conservation Division

cc: SCDOT, RiddleNL@scdot.org
FHWA, Jeffrey.Belcher@dot.gov
F/SER, Noah.Silverman@noaa.gov, Brian.Rosegger@noaa.gov
F/SER47, Cynthia.Cooksey@noaa.gov

UNITED STATES DEPARTMENT OF COMMERCE
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02/16/2021

F/SER31:AH
SERO-2020-02372

Chris Beckham
Environmental Permits Coordinator
South Carolina Department of Transportation
PO Box 191
Columbia, SC 29202-0191

Dear Mr. Beckham:

This letter responds to your request for consultation with us, the National Marine Fisheries Service (NMFS), pursuant to Section 7 of the Endangered Species Act (ESA) for the following action.

Agency	Project Number	SERO Number	Project Type
South Carolina Department of Transportation (SCDOT)	PIN P027507	SERO-2020-02372	Bridge Demolition and Construction

Consultation History

We received your letter requesting consultation on March 31, 2020. We requested additional information on May 6, May 8, and May 11, 2020. We received a single response to those requests on May 15, 2020. An additional request for information was sent on June, 23, 2020. We received a final response on June 24, 2020 and initiated consultation that day. On October 14, 2020, we learned you intended to change your proposed action. We received information describing the updated proposed action on November 19, 2020. The consultation package with the new information was deemed completed on December 22, 2020, and consultation was initiated that day. The project has been assigned the following tracking number in the NMFS Environmental Consultation Organizer (ECO), SERO-2020-02372; this project is a FAST-41 project. Please refer to this number in any future inquiries regarding this project.

Project Location

Address	Latitude/Longitude	Water body
Interstate 526 crossing of Ashley River, 6 miles (mi) north of Charleston, SC	32.835725, -80.02419 (North American Datum 1983)	Ashley River

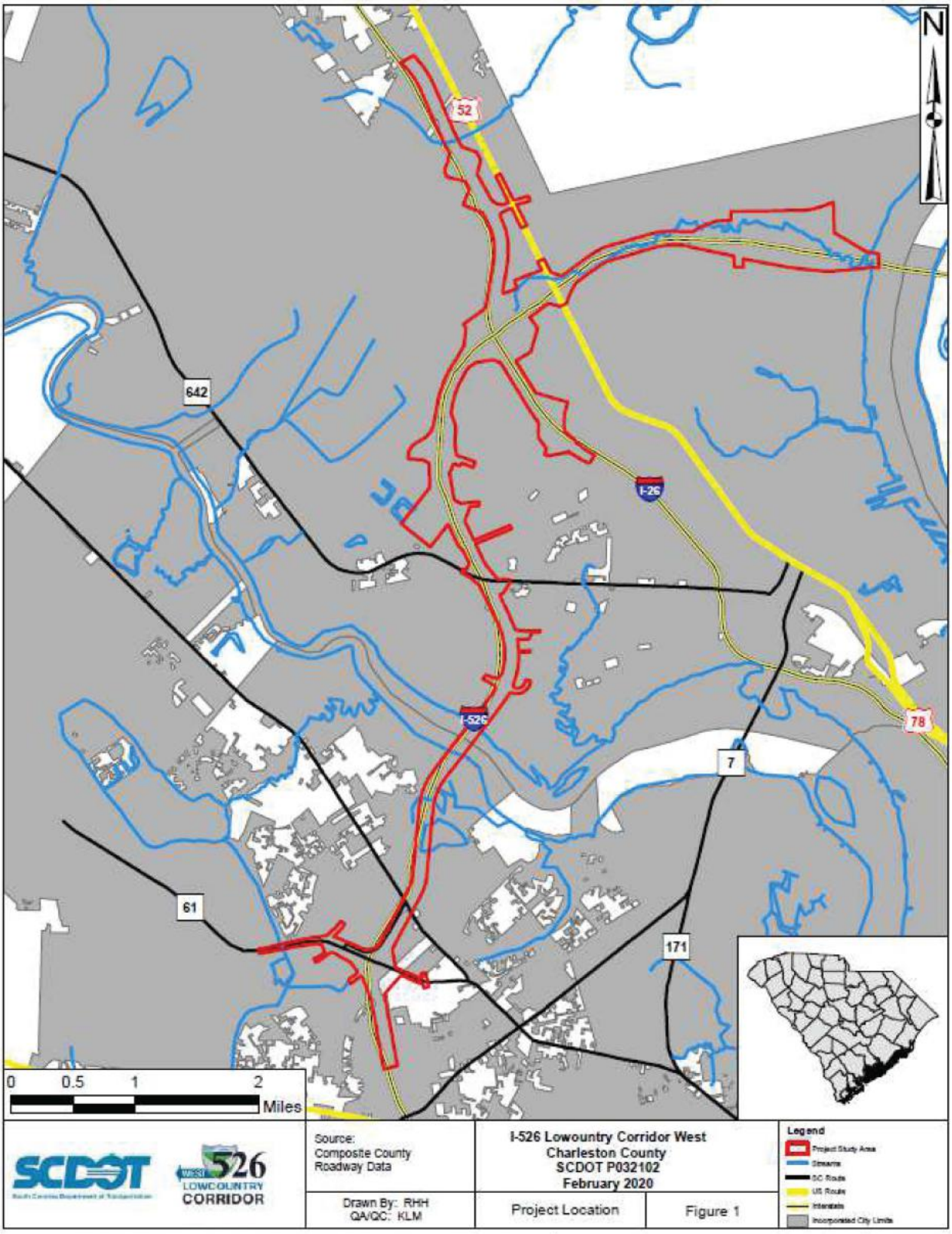


Image of the Project Location and Surrounding Area[1]

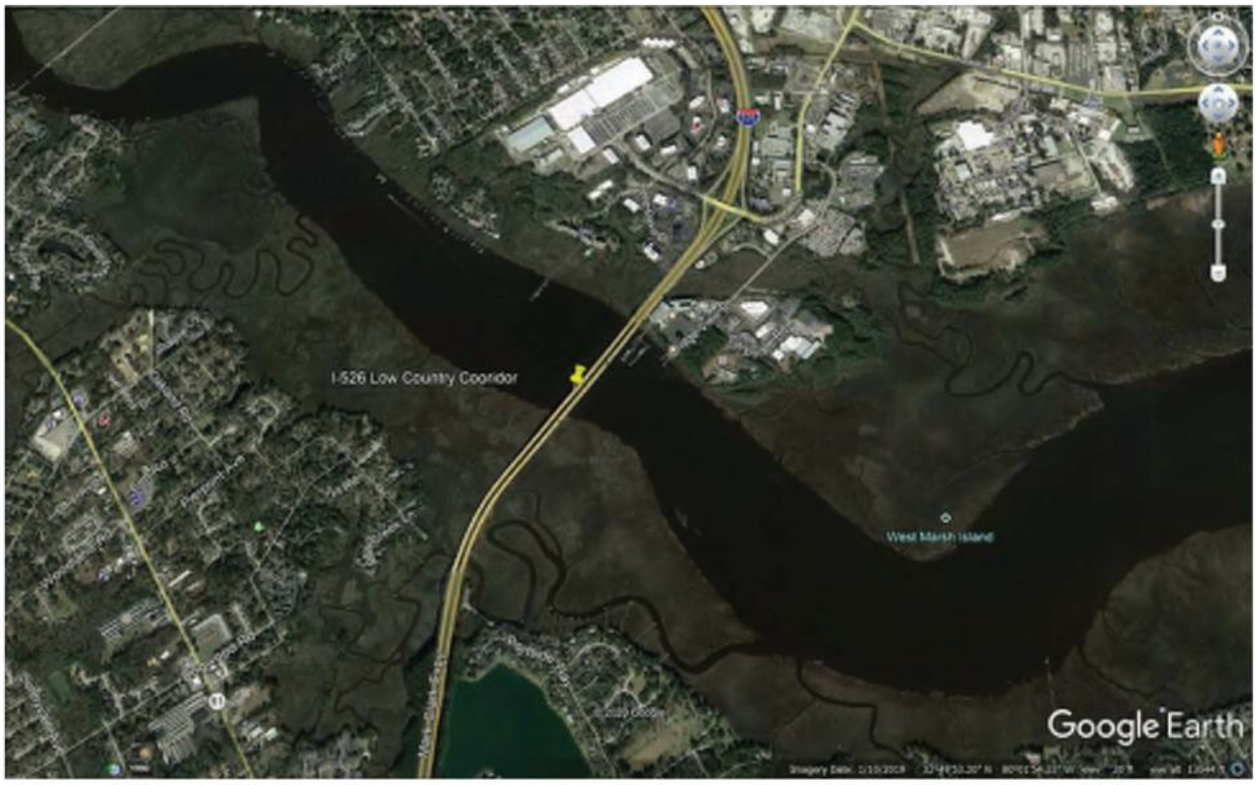


Image of the project location where construction may affect ESA-listed species (I-526 crossing the Ashley River) (© Google Earth 2019)

Existing Site Conditions

The Ashley River is tidally influenced, with the headwaters originating in Dorchester County, South Carolina. The river joins the Cooper River to form Charleston Harbor before discharging into the Atlantic Ocean. The entire drainage of the Ashley River system, including its headwaters in Cypress and Wassamassaw swamps, extends approximately 60 river miles. At the project site, the width of the main deeper-water navigational channel of the Ashley River is approximately 60 feet (ft) wide. The full width of the Ashley River at the project site is approximately 1,400 ft wide. Water depths in the river range from approximately 0 to 20 ft.[2] The mean tidal range is 5.68 ft and the diurnal range is 6.23 ft. Mean high water (MHW) is approximately 3.08 ft and mean low water is -3.16 ft at the center of the channel. Salinity at the project site ranges from 12 to 17 parts per thousand.[3] The project area does not contain any sensitive habitats or spawning areas for shortnose sturgeon or any distinct population segment of Atlantic sturgeon.

[1] Interstate 526 Lowcountry Corridor West - Biological Assessment for National Oceanic and Atmospheric Administration, National Marine Fisheries Service. Prepared by Civil Engineering Consulting Service. 20 pp with Appendices. November 16, 2020

[2] Ibid.

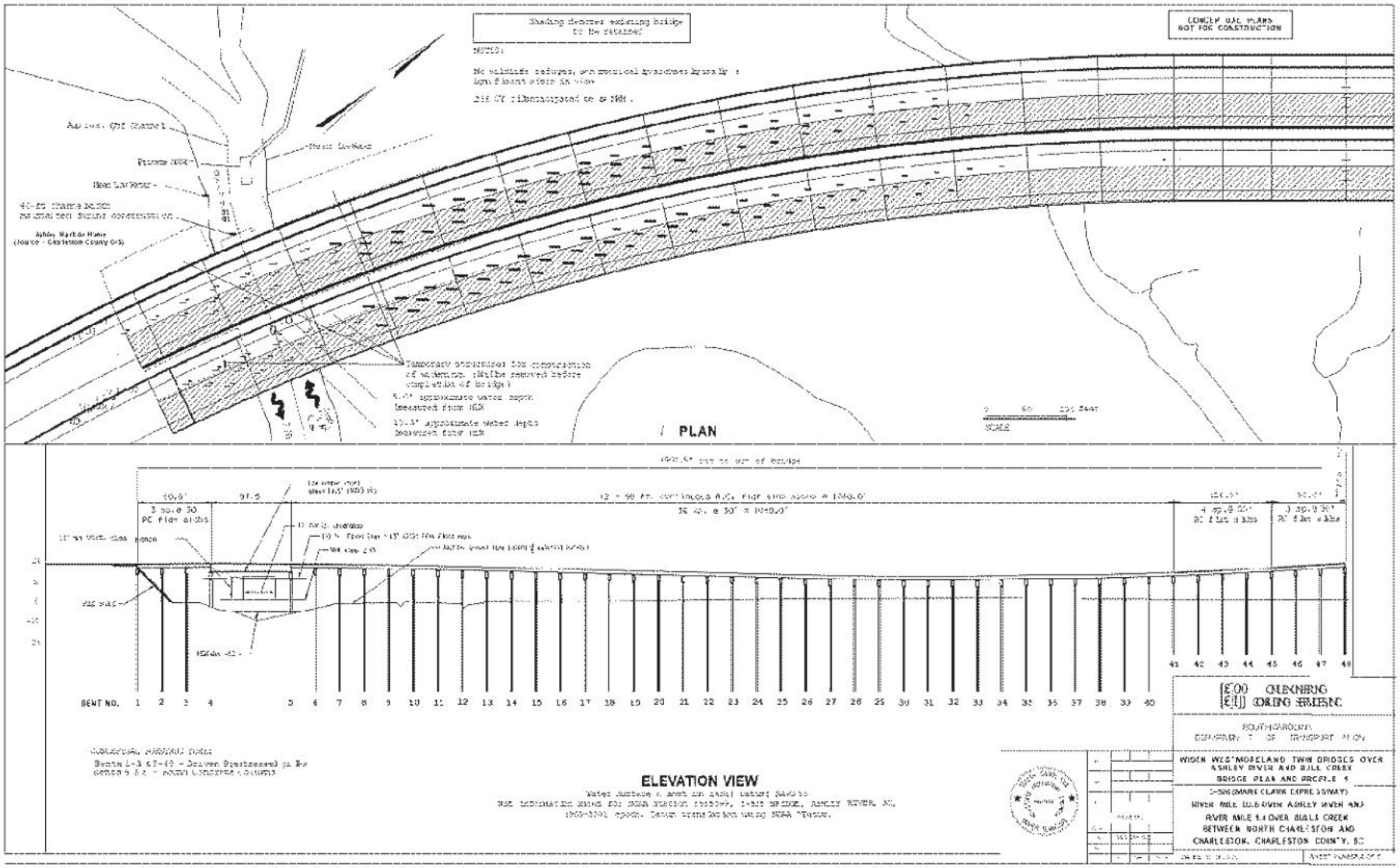
[3] Ibid.

Project Description

The General William C. Westmoreland bridge (Westmoreland bridge) is part of I-526 and connects the City of North Charleston with the West Ashley area of Charleston and spans the Ashley River. The bridge is 3,908-ft long, with two 43-ft wide spans; one moving traffic eastbound, the other westbound. Each individual span carries two lanes of traffic, each is 12 ft wide, with a 5.5-ft inside shoulder, and a 10-ft outside shoulder, and an approximately 1.5-ft wide barrier on both sides. Additionally, a 14-ft shared use path to accommodate pedestrians and cyclists would be added to the upstream side of the bridge; the shared use path would be outside of the widened traffic lanes. The 14-ft path would be separated from the motorized travel lanes with a raised barrier separating the path from the outside 12-ft paved shoulder. Barriers for safety would be provided along both sides of the shared use path, which would also prevent fishing or casting from the path. The bridge has a vertical clearance of 35 ft over the Ashley River, when measured from MHW.[4] The project will widen each of the existing 42-ft spans, by 32 ft and 5.5 inches; upon completion each span will be approximately 75-ft wide. The bridge deck will remain at the same height above the Ashley River. The proposed minimum horizontal clearance for the main navigational opening would be 60 ft between fenders. This configuration will be similar to the existing bridge, or would be less restrictive. The vertical clearance of the proposed fixed span bridge would be a minimum of 35 ft from the MHW datum to meet the needs of mariners in the area.[5]

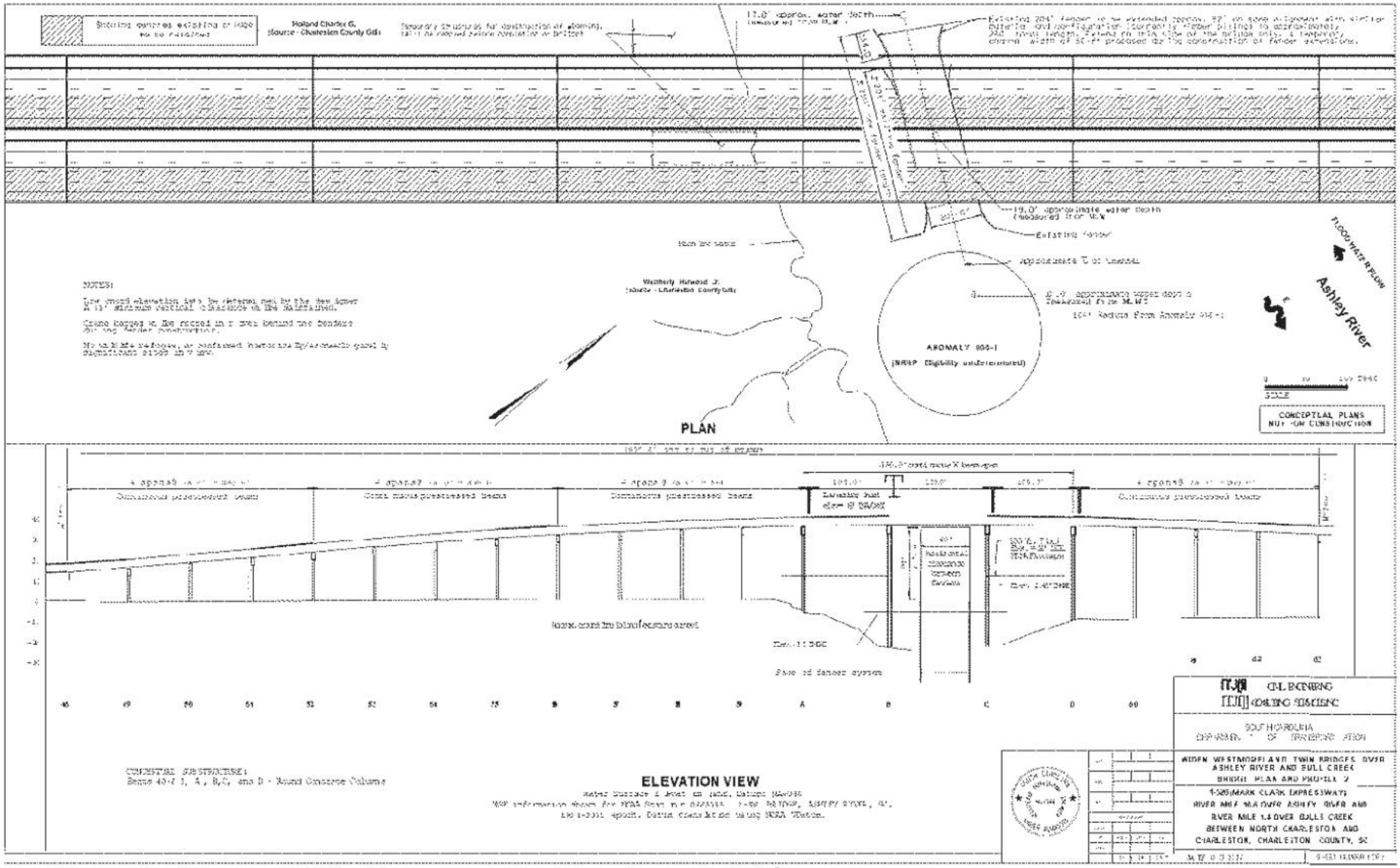
Temporary work trestles would be placed in marsh and wetland areas for construction access outside of the existing eastbound bridge (green cross hatching, images below). Temporary trestle would be approximately 40-ft wide and would be supported by steel pipe piles. The steel piles would be approximately 24-inches in diameter and would be installed with an impact hammer. It is estimated that 240, 24-inch steel pipe piles would be needed for the temporary work trestle. With one work crew performing installation, approximately 4 piles would be driven per day with an average of 350 impact hammer strikes per pile. If additional crews are utilized, more piles would be driven per day; however it is estimated that the contractor would have one crew working on the trestle at a time, given space limitations.[6]

[4] Ibid.
[5] Ibid.
[6] Ibid.



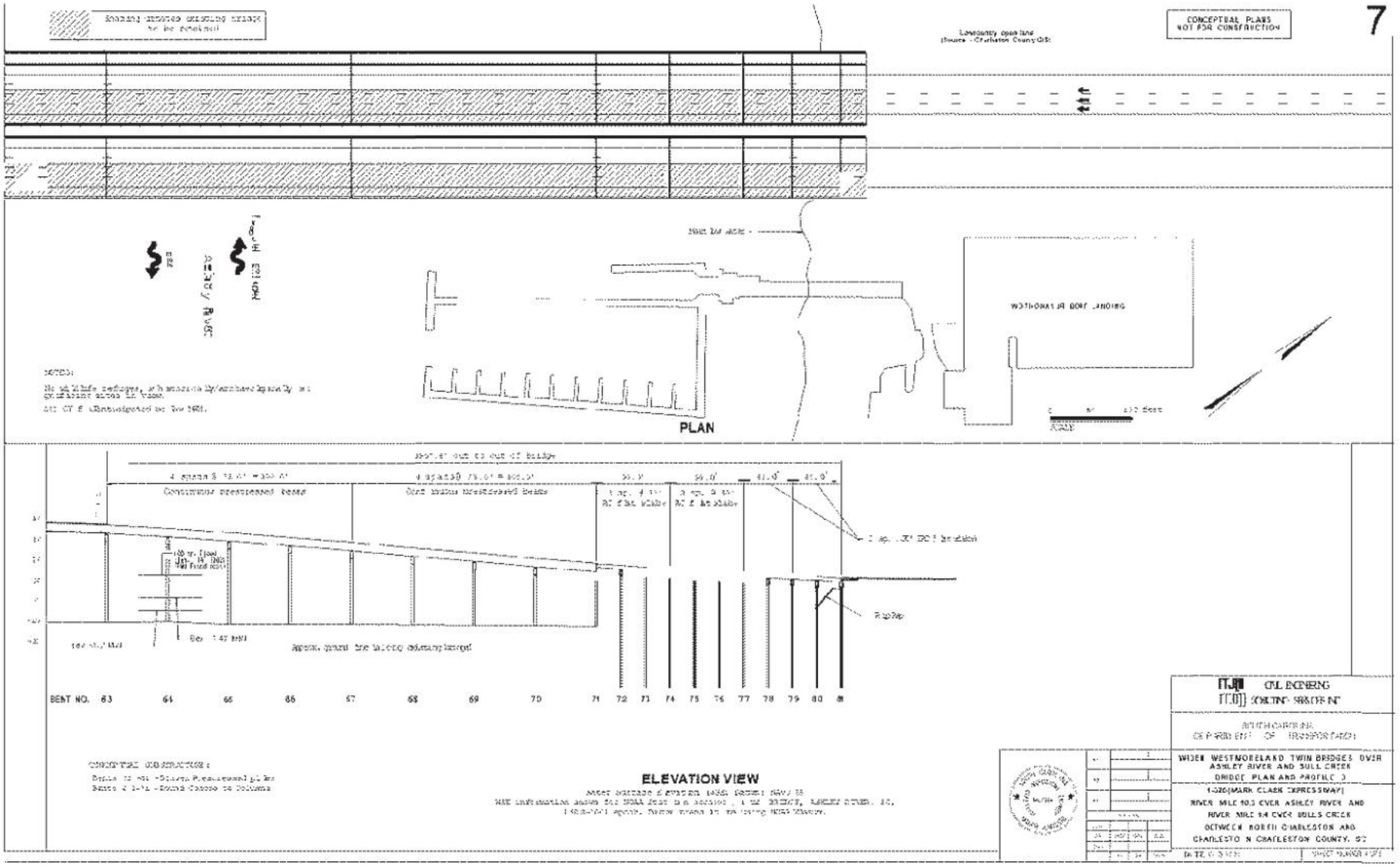
Plan Schematic of Bents and Piling Type on West/South Side of Ashley River (Image 1 of 3).[7]

[7] Ibid.



Plan Schematic of Bents and Piling Type over Ashley River (Image 2 of 3).[8]

[8] Ibid.



Plan Schematic of Bents and Piling Type on East/North Side of Ashley River (Image 3 of 3).[9]

[9] Ibid.

For access over marsh areas between the existing bridges, either trestles or a combination of barge, barge mats, and timber mats would be needed due to the limited space between the structures. Deeper water and the main channel of the Ashley River would be accessed via barges for construction. Barges may be delivered and moved via water and transport vessels or via land on flatbed trucks with cranes and other heavy equipment. At no point would barges in the Ashley River block more than 50% of the channel.[10]

Pre-stressed concrete piles will be installed (Bents 1-3; 6-48; and 72-80) with an H-pile steel "stinger" at the end of the concrete pile to prevent damage to the pile as it is driven into hard subsurface materials. Piles would be installed with an impact or vibratory hammer (for purposes of our analysis we assume impact hammering will be used). It is estimated a total of 649, 24-inch pre-stressed concrete piles would be needed for bridge widening. With one work crew performing installation, approximately 2 to 3 piles would be driven per day with an average of 300 impact hammer strikes per pile, for a total of up to 900 strikes per day.[11] If additional crews are utilized, more piles would be driven per day; however, it is assumed that the contractor would have 1 crew working on at a time, given space limitations.[12]

Drilled shafts would be installed at bents 48 through 71, and at bents A, B, C, and D. Bents 48 through 59 are located at the southerly or westerly (West Ashley) approach to the Ashley River. Bents A through D are at the deepest portion of the main channel of the Ashley River. Bents 60 through 71 are located at the northerly or easterly (North Charleston) approach to the Ashley River.[13]

Each drilled shaft would be approximately 7 ft in diameter. Each steel casing will house a drilled shaft, and each casing would be installed using a vibratory hammer. Once the steel casings are in place, the interior is drilled out so a rebar cage can be installed. Concrete would then be poured into the casing to create a large support structure in the water. Approximately 150 drilled shafts would be needed for the bridge widening. One steel casing per day would be constructed by one work crew, but an additional crew might be used, increasing installation to 2 shafts per day.[14]

The proposed project would also extend an existing fender system. The fender elements would likely consist of rubber fenders, with a steel panel and polyethylene facing. An additional sixty (24-inch) pre-stressed concrete piles would be driven in place via impact hammer to support the new fender systems with an average of 150 strikes per pile. These piles would not be load bearing and would not require extensive pile strikes such as those on the permanent bridge system.[15]

Construction is expected to begin in 2027. Construction of the bridge phase over the Ashley River would last approximately 3 years. Within that 3-year period, in-water work of an

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[10] Ibid.
[11] Up to 3 piles x 300 strike per pile = 900 strikes per day
[12] Ibid.
[13] Ibid.
[14] Ibid.
[15] Ibid.

estimated 6 months would be needed for pre-stressed pile bents and 17 months would be needed for drilled shaft bents. This project is expected to be delivered via the design build process and final construction sequencing will be determined by the contractor. The following is an outline of the likely construction sequence. This sequence may vary slightly depending on the selected contractor. Any modifications from this proposed by the contractor that could impact effects to listed species would require additional coordination with SCDOT and federal agencies.[16]

Pile Installation Information

Pile type(s)	Project Purpose	Number of Piles	Total Area Affected (ft^2)	Installation Method	Strikes or seconds per pile
Steel (24 inches)	Work Trestles	240	754	Impact hammer	350
Pre-stressed concrete (24 inches)	Bridge Widening	649	1,298	Vibratory or impact hammer	300
Steel casing for drilled shaft (84 inches)	Bridge Widening	150	5,500	Vibratory	500
Pre-stressed concrete (24 inches)	Fender System	60	189	Impact hammer	150

Construction Conditions

This project is being considered under the One Federal Decision process. As a result, the project is yet to be contracted, and many specific construction details are not currently available. To maintain competitiveness during the bid process for this project, SCDOT has not finalized the means and methods of construction to ensure contractors have the ability to propose specific methods and equipment. The project construction conditions therefore follow an outline of the likely construction activities and project designs. This may vary slightly depending on the selected contractor and bid process. Regardless, SCDOT has committed to ensuring the following are done:

- SCDOT Best Management Practices for erosion control are followed during construction;
- The appropriate National Pollution Discharge Elimination System permit is obtained;
- A Stormwater Pollution Prevention Plan is created;
- Equipment does not obstruct or impede passage through more than 50% of the Ashley River;
- "Slow starts" for pile driving, barge movement, and other vessel movement are used; and
- Demolition of existing in-water structures is avoided.

The contractor will be required to use sediment fences, turbidity curtains, and other best management practices to mitigate increases in turbidity during construction and demolition. Bridge removal and placement will be conducted in accordance with SCDOT standard specifications.

[16] Ibid.

Effects Determinations for Species the Action Agency or NMFS Believes May Be Affected by the Proposed Action

Species	ESA Listing Status[17]	Action Agency Effect Determination[18]	NMFS Effect Determination
Atlantic Sturgeon, South Atlantic DPS[19]	E	NLAA	NLAA
Shortnose Sturgeon	E	NLAA	NLAA

Critical Habitat
The project is not located in designated critical habitat, and there are no potential routes of effect to any designated critical habitat.

Analysis of Potential Routes of Effect to Species
Atlantic and shortnose sturgeon infrequently use Ashley River, including up to the I-526 Bridge. From 2011-2017, South Carolina Department of Natural Resources detected only three Atlantic sturgeon in the vicinity of the action area. Shortnose sturgeon have been detected in the Ashley River near the confluence with the Cooper River (approximately 8 river miles away) but are not generally found near the I-526 Bridge. Neither species uses the Ashley River for spawning, nor do they exhibit migratory behavior in the river. Based on the information available regarding how sturgeon use the Ashely River, we anticipate only the installation of Bents A-D and 59-81 could potentially effect sturgeon (B. Post, SCDNR to A. Herndon, NMFS 2020).

Sturgeon may be physically injured if struck by construction equipment, vessels, or materials. This effect is extremely unlikely to occur due to the infrequency with which sturgeon are likely to be near the action area. Additionally, sturgeon are able to move away from or avoid entirely the project site if disturbed.

Use of turbidity curtains, construction activities, and related construction noise may prevent or deter sturgeon from entering the project area. We believe the effects to these species from temporary exclusion from the project area due to construction activities, including related noise and presence of turbidity curtains, will be insignificant. The animals spend very little time or around the action area and only 25 (Bents A-D and 59-79) of the total 81 bents proposed will be installed in waters potentially accessible to sturgeon because of the depth around the bridge. Following installation of these bents sturgeon would potentially be excluded from a maximum area of 3,574 square feet (ft^2).[20]

Noise created by pile driving activities can physically injure animals or change animal behavior in the affected areas. Injurious effects can occur in two ways. First, immediate adverse effects can occur to listed species if a single noise event exceeds the threshold for direct physical injury.

[17] E = Endangered
[18] NLAA = May affect, not likely to adversely effect
[19] DPS = Distinct Population Segment
[20] 17 Bents with Drilled Shafts (Bents A-D and 60-71) x 5 Drilled Shafts per Bent x 38.48 ft^2 per shaft = 3,270.8 ft^2; 8 Bents (72-79) with Pre-Stressed Concrete Pilings x up to 12 Pre-Stressed Concrete Pilings per Bent x 3.15 ft^2 per piling = 302.4 ft^2; 3,270.8 ft^2 + 302.4 ft^2 = 3,573.2 ft^2.

Second, effects can result from prolonged exposure to noise levels that exceed the daily cumulative exposure threshold for the animals, and these can constitute adverse effects if animals are exposed to the noise levels for sufficient periods. Behavioral effects can be adverse if such effects interfere with animals migrating, feeding, resting, or reproducing, for example. Our evaluation of effects to listed species as a result of noise created by construction activities is based on the analysis prepared in support of the biological opinion for SAJ-82.[21] The noise analysis in this consultation evaluates effects to ESA-listed fish identified by NMFS as potentially affected in the table above.

Eighty-five drilled shafts (5 shafts/bent; Bents A-D and 60-71) will be used in the mainstem of the Ashley River where sturgeon could occur. Each drilled shaft would be approximately 7 ft in diameter and installed with a vibratory hammer. Based on our noise calculations, installation of these piles by vibratory hammer, could cause a single-strike or peak-pressure injurious noise effect at a distance of 6 ft. Sturgeon could also be injured by cumulative sound exposure caused by vibratory hammer use, but we believe this route of effect is extremely unlikely to occur. The cumulative sound exposure level (cumulative SEL) of multiple pile strikes by vibratory hammer over the course of a day may cause injury to a sturgeon weighing 102 grams or more at a distance of 16 ft away; sturgeon weighing less than 102 grams are not anticipated in the project area. We anticipate sturgeon are unlikely to be in the project area based on the best available information. Additionally, due to the mobility of sturgeon, we expect them to move away from noise disturbances, even if they were in the project area. Therefore, we believe this potential route of effect is extremely unlikely to occur.

Sturgeon behavior (i.e., foraging, migrating, spawning) could be adversely affected by vibratory hammer use, but we believe behavioral effects will be insignificant. Installation of the drilled shafts could result in behavioral effects radius of up to 3,280 ft. Based on the best available information, sturgeon to do not appear to be using the Ashley River for foraging, migrating, spawning; thus, we anticipate sturgeon are unlikely to be in the project area and are an unlikely to have any essential life activities interrupted by the proposed action.

Up to 96 pre-stressed concrete pilings (12 shafts/bent; Bents 72-79) will be installed in the mainstem of the Ashley River where sturgeon could occur. To be conservative toward the species we will assume an impact hammer will be used to install those pilings. Sturgeon could be injured by the noise energy created during the installation, but we believe that effect is extremely unlikely to occur. Based on our noise calculations, installation of these piles by impact hammer, we anticipate sound levels for a single strike impact will not reach the threshold of potential injury to fish. Sturgeon could also be injured by cumulative sound exposure. The cumulative SEL of multiple pile strikes by impact hammer over the course of a day may cause injury to a sturgeon weighing 2 grams or more at a distance of 49 ft from the piles being driven; sturgeon weighing less than 2 grams are not anticipated in the project area. We anticipate sturgeon are unlikely to be in the project area based on the best available information. Additionally, due to the mobility of sturgeon, we expect them to move away from noise disturbances, even if they were in the project area. Therefore, we believe this potential route of effect is extremely unlikely to occur.

[21] NMFS. Biological Opinion on Regional General Permit. SAJ-82 (SAJ-2007-01590), Florida Keys, Monroe County, Florida. June 10, 2014.

Sturgeon behavior could be adversely affected by impact hammer use, but we believe behavioral effects will be insignificant. Installation of the pre-stressed concreted piles could result in behavioral effects radius of up to 707 ft. Based on the best available information, sturgeon to do not appear to be using the Ashley River for foraging, migrating, spawning; thus, we anticipate sturgeon are unlikely to be in the project area and are an unlikely to have any essential life activities interrupted by the proposed action.

Conclusion

Because all potential project effects to listed species were found to be extremely unlikely to occur, insignificant, or beneficial, we conclude that the proposed action is not likely to adversely affect listed species under NMFS's purview. This concludes your consultation responsibilities under the ESA for species under NMFS's purview. Consultation must be reinitiated if a take occurs or new information reveals effects of the action not previously considered, or if the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat in a manner or to an extent not previously considered, or if a new species is listed or critical habitat designated that may be affected by the identified action. NMFS's findings on the project's potential effects are based on the project description in this response. Any changes to the proposed action may negate the findings of this consultation and may require reinitiation of consultation with NMFS.

We look forward to further cooperation with you on other projects to ensure the conservation of our threatened and endangered marine species and designated critical habitat. If you have any questions on this consultation, please contact Andy Herndon, Consultation Biologist, at (727) 824-5367, or by email at Andrew.Herndon@noaa.gov.

Sincerely,

REECE.KARLA.M.1365885962 Digitally signed by REECE.KARLA.M.1365885962 Date: 2021.02.16 16:08:20 -05'00'

for David Bernhart
Assistant Regional Administrator
for Protected Resources

File: 1514-22.l.2

South Carolina Department of Transportation

December 1, 2020

Ms. Cynthia Cooksey
NOAA National Marine Fisheries Service
Southeast Regional Office
Habitat Conservation Division
219 Fort Johnson Road
Charleston, SC 29412

RE Updated Essential Fish Habitat Assessment and Consultation Request for I-526 Lowcountry Corridor, Charleston County, South Carolina; SCDOT PIN P027507

Dear Ms. Cooksey:

The South Carolina Department of Transportation (SCDOT) on behalf of the Federal Highway Administration (FHWA) is pursuing the proposed action under the One Federal Decision/FAST Act 41 guidance. SCDOT and FHWA previously requested consultation with National Oceanic and Atmospheric Administration National Marine Fisheries (NOAA Fisheries) for Essential Habitat for species under their jurisdiction in compliance with the Magnuson-Stevens Fishery Conservation and Management Act for the above referenced project. We appreciate your response letter on September 2, 2020, indicating that NOAA Fisheries concurred with the findings from our May 8, 2020 Essential Fish Habitat (EFH) Assessment. Since the submittal of the EFH assessment there has been a proposed project design change that will increase impacts to EFH.

The project design change consists of proposing a shared use path (SUP) as part of the proposed widening of existing bridges over the Ashley River. The proposed widening includes two 12-foot-wide additional travel lanes and shoulders in each direction. Additionally, a 14-foot-wide SUP accommodating pedestrians and cyclists would be included as part of the westbound widening. The SUP would be located on the west (upstream) side of westbound travel lanes. Direct effects from constructing the SUP would include a minor increase in the amount of prestressed concrete piles and drilled shafts needed to support the wider bridge structures as well as additional fill for bridge approaches. The addition of the proposed SUP will increase impacts to EFH in the form of permanent fill, permanent shading, and temporary construction impacts. The previous determination that the project will adversely affect EFH has not changed by the addition of the SUP.

Providing pedestrian and cyclist access connecting to the bridge SUP would be planned and permitted by others, likely local municipalities and/or Charleston County. This may lead to indirect or cumulative potential impacts to EFH. At this time local entities have not identified funding nor developed conceptual plans regarding the connection locations. Indirect or cumulative impacts to EFH are discussed, but have not been quantified.

The attached EFH Assessment narrative and tables have been updated to reflect the increased impact to EFH as a result of the inclusion of the SUP. In addition, during the review of information previously provided it was noted that impacts were accurately described in the narrative portion of the submittal but inaccurately summarized in the impacts summary table. The summary table had less impacts than what the narrative described. This discrepancy was addressed in this submittal. Additional revisions to the EFH Assessment include:

- Section 2 – Updates to construction schedule and introduced the SUP over Ashley River

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and potential future access

- Clarify that the entire project may not be design-build; changes made throughout document to reflect this
- Section 6
  - Impact tables updated and corrected to reflect revised EFH impacts
  - Narrative, tables, and figures related to the Ashley River were updated based on the revised design and included SUP
  - Section 6.2 – Clarify shading impacts for Ashley River EFH; extent of impacts for Filbin Creek EFH
  - Section 6.3 – Trestle assumptions changed to 40ft wide for both EFH evaluation areas
  - Section 6.4 – Impacts from temporary construction were expanded to include temporary use of barges or timber mats to construct the temporary trestles.
  - Table 6-10 – Summary of impact totals updated for accuracy and to account for additional impacts discussed above.
  - Section 6.6 – New section added to discuss potential cumulative impacts to EFH related to inclusion of SUP
- Section 7 – EFH-specific BMPs were moved to Appendix A.
- Section 8 – New section added to specifically discuss mitigation for EFH impacts
- Appendix B was added to document Agency Coordination and Consultation, per FHWA request

This information is being provided directly to you for your review and comment. This request is being provided per the One Federal Decision guidance under which this project falls. Per coordination with NMFS and in accordance with the adjusted milestones, this request is being submitted to your agency for review. Please contact myself or Shane Belcher with FHWA with any questions or comments.

Sincerely,

Nicole Riddle

Nicole Riddle
Public Involvement Coordinator/ Biologist

NLR/wr

enclosures

EFH Assessment (Revised November 11, 2020)

ec: Shane Belcher, FHWA
Pace Wilbur, NOAA Fisheries
Noah Silverman, NOAA Fisheries
Brian Rosegger, NOAA FIsheries
Chad Long, SCDOT
Joy Riley, SCDOT
Nicole Riddle, SCDOT
Mark Mohr, Three Oaks Engineering
Russell Chandler, Three Oaks Engineering

File: Env/RPG1

Updated Essential Fish Habitat Assessment and NOAA Fisheries Consultation

I-526 Lowcountry Corridor WEST

Charleston County, South Carolina

12/1/20

Project ID: P027507

Prepared for:

SCDOT

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1. Introduction

The South Carolina Department of Transportation (SCDOT), in cooperation with the Federal Highway Administration (FHWA), is preparing an Environmental Impact Statement (EIS) for the proposed I-526 Lowcountry Corridor WEST Project (I-526 LCC WEST) to address the existing and future transportation demands on the I-526 corridor from Paul Cantrell Boulevard to Virginia Avenue in North Charleston, South Carolina. The purpose of the project is to increase capacity and improve operations at the I-26/I-526 interchange and along the I-526 mainline from Paul Cantrell Boulevard to Virginia Avenue.

The project is subject to regulations protecting essential fish habitat (EFH) pursuant to the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) of 1976 (as amended 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). Waters designated as EFH by the South Atlantic Fisheries Management Council (SAFMC) and the Mid-Atlantic Fisheries Management Council (MAFMC) occur within the boundaries of the project. SCDOT is coordinating with the National Marine Fisheries Service (NOAA Fisheries) to ensure proper assessment of EFH and to communicate efforts to minimize and mitigate EFH impacts. All coordination between SCDOT and NOAA Fisheries can be found in Appendix A of this report.

This document describes the existing conditions of EFH within the project area and the potential impacts to EFH by the proposed action.

Figure 1-1. I-526 LCC WEST Project Study Area

2. Proposed Action

The proposed project consists of 3.5 miles and 9.2 miles of improvements to 1-26 and I-526 respectively for a total of 12.7 miles. The boundaries of the project study area (PSA), shown in Figure 1, generally follow the section of I-526 from Paul Cantrell Boulevard to Virginia Avenue including the I-26/I-526 interchange. The I-526 LCC WEST project also proposes upgrades/changes to five interchanges along I-526; the I-526 at Paul Cantrell Boulevard interchange; the I-26/I-526 system-to-system interchange; the I-526 at Rivers Avenue; the I-526 at N Rhett Avenue and the I-526 at Virginia Avenue interchange. These project limits were selected as the rational end points for the transportation improvements and the environmental review, also referred to as logical termini. The western terminus of Paul Cantrell and the eastern terminus of Virginia Avenue are major points of congestion based on traffic analyses for the project. Construction activities are scheduled to begin in 2027.

The proposed project occurs within the Cooper River watershed [8-digit Hydrologic Unit Code (HUC) 03050201] and may impact EFH associated with two main waterbodies, the Ashley River of the Ashley River Watershed [10-digit HUC 03050201-06] and Filbin Creek of the Cooper River Watershed [10-digit HUC 03050201-07]. I-526 crosses the Ashley River between North Charleston and West Ashley. This portion of the project occurs between the coordinates 32.837486°, -80.022572° and 32.828582°, -80.029641°. I-526 passes through the Filbin Creek floodplain from Attaway Street to its confluence with the Cooper River. This portion of the project occurs between the coordinates 32.893394°, -80.000548° and 32.891651°, -79.967041°. Figure 2 depicts the two areas of the project where EFH is present.

Components of the proposed action that will result in impacts to EFH include construction of additional bridge structures over the Ashley River to accommodate the proposed widening of I-526 and a shared-use path, construction of new structures for collector distributor (C-D) roads over portions of Filbin Creek and its associated floodplain, and construction of improved interchange access for the I-526 connections at North Rhett Avenue and Virginia Avenue.

3. Existing Environment

The project area was assessed for the presence of EFH and two main areas were identified; the portion that crosses the Ashley River and the portion that crosses Filbin Creek near North Rhett Avenue to its junction with the Cooper River. These two areas are described in this section as two separate EFH evaluation areas, as shown in Figure 3-1. The total area of EFH within the project area is summarized at the end of this section.

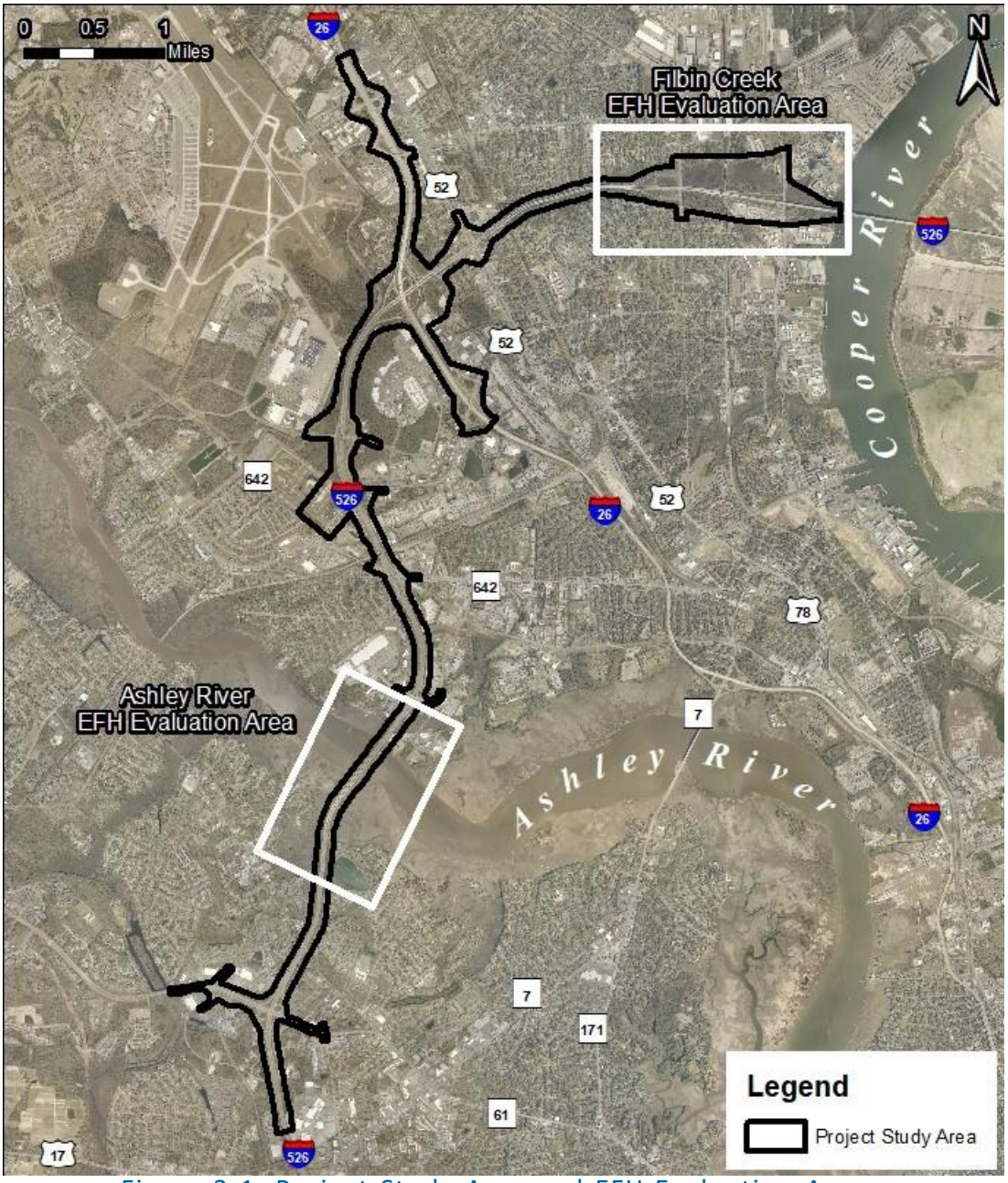


Figure 3-1. Project Study Area and EFH Evaluation Areas

Each essential fish habitat type provides ecosystem services necessary for a variety of species. Differences between habitat types pertain to vegetative cover, flood regime, salinity, and sediment. Six different types of EFH were identified within the project boundary: estuarine emergent wetlands, estuarine tidal creeks, intertidal non-vegetated flats, palustrine emergent wetlands, riverine tidal creeks, unconsolidated bottom, and oysters. Maps of the different types of EFH existing in the Ashley River evaluation area and Filbin Creek evaluation area are displayed in Figure 3-2 and Figure 3-3, respectively.

Using GIS software and recent aerial imagery (2019), GIS shapefiles were produced of all predicted habitat type boundaries within the EFH evaluation areas based on their photographic signatures. These shapefiles were uploaded to a Trimble Geo7x GPS unit and printed maps were generated to ground truth the predicted habitat boundaries in the field from December 9th to December 12th, 2019. Field assessments were conducted during low tide to allow for all potential habitat types to be evaluated. During the ground truthing process, qualitative and quantitative data was collected at sample sites to either confirm predicted habitats or indicate a needed change of the predicted habitat in that area. Data collected include habitat type, vegetation composition, current tidal conditions, and salinity. The extent of the EFH habitat boundaries was recorded using the GPS unit. The location of these data collection sites was collected using the GPS unit. The shapefiles of the predicted habitat boundaries were then refined using the GPS locations and data collected in the field.

3.1. Ashley River EFH

The Ashley River evaluation area occurs between Paul Cantrell Boulevard and Leeds Avenue and extends 300 feet from both sides of the existing I-526 centerline. This section of the project occurs within the Ashley River Watershed (HUC 03050201-06). Within this evaluation area is the Ashley River, Bulls Creek, and their respective wetlands and tributaries. There are two water quality monitoring stations within the Ashley River watershed, including Station MD-049 upstream of the EFH evaluation area and Station MD-135 downstream of the evaluation area. Station MD-049 is listed on SCDHEC's Section 303(d) list due to impairments related to elevated levels of Enterococcus bacteria, turbidity, and pH. Station MD-135 is not listed as impaired on the 2016 and draft 2018 303(d) lists.

Table 3-1 provides a summary of the EFH types and approximate acreage identified within the Ashley River evaluation area based on aerial photography review and ground truthing efforts. Figure 3-2 provides an overview of the different EFH types associated with the Ashley River and Bulls Creek. Figure 3-3 displays the qualitative determination of EFH within the evaluation area.

Table 3-1: Ashley River EFH Evaluation Area

EFH Type	Quality	Acres
Estuarine Emergent Wetland	High	48.3
Estuarine Tidal Creek	High	4.1
Intertidal Non-Vegetated Flat	High	0.6
Unconsolidated Bottom	High	21.1
Oyster Reef	High	0.5
Total		**74.6**

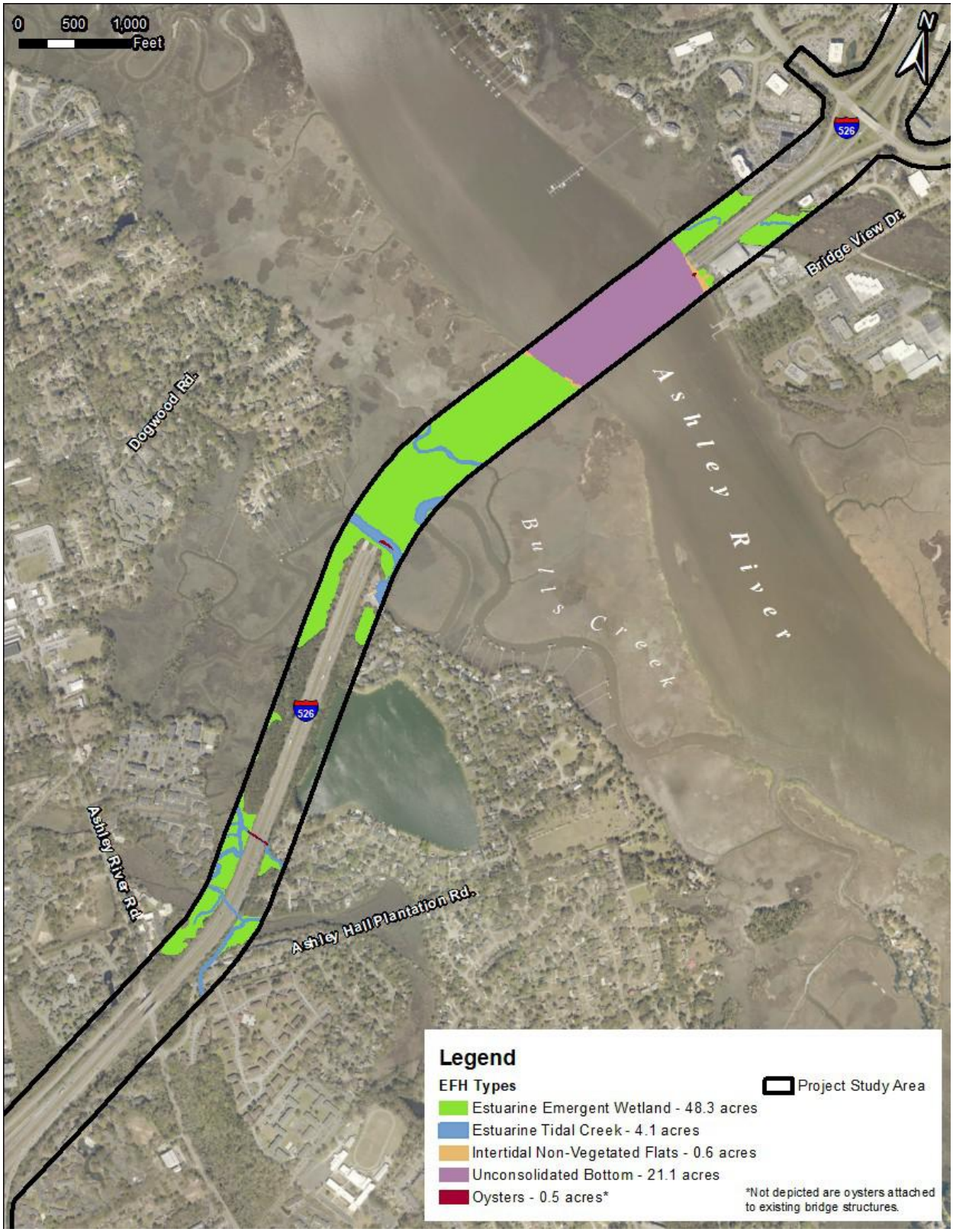


Figure 3-2. Ashley River Evaluation Area – EFH Types

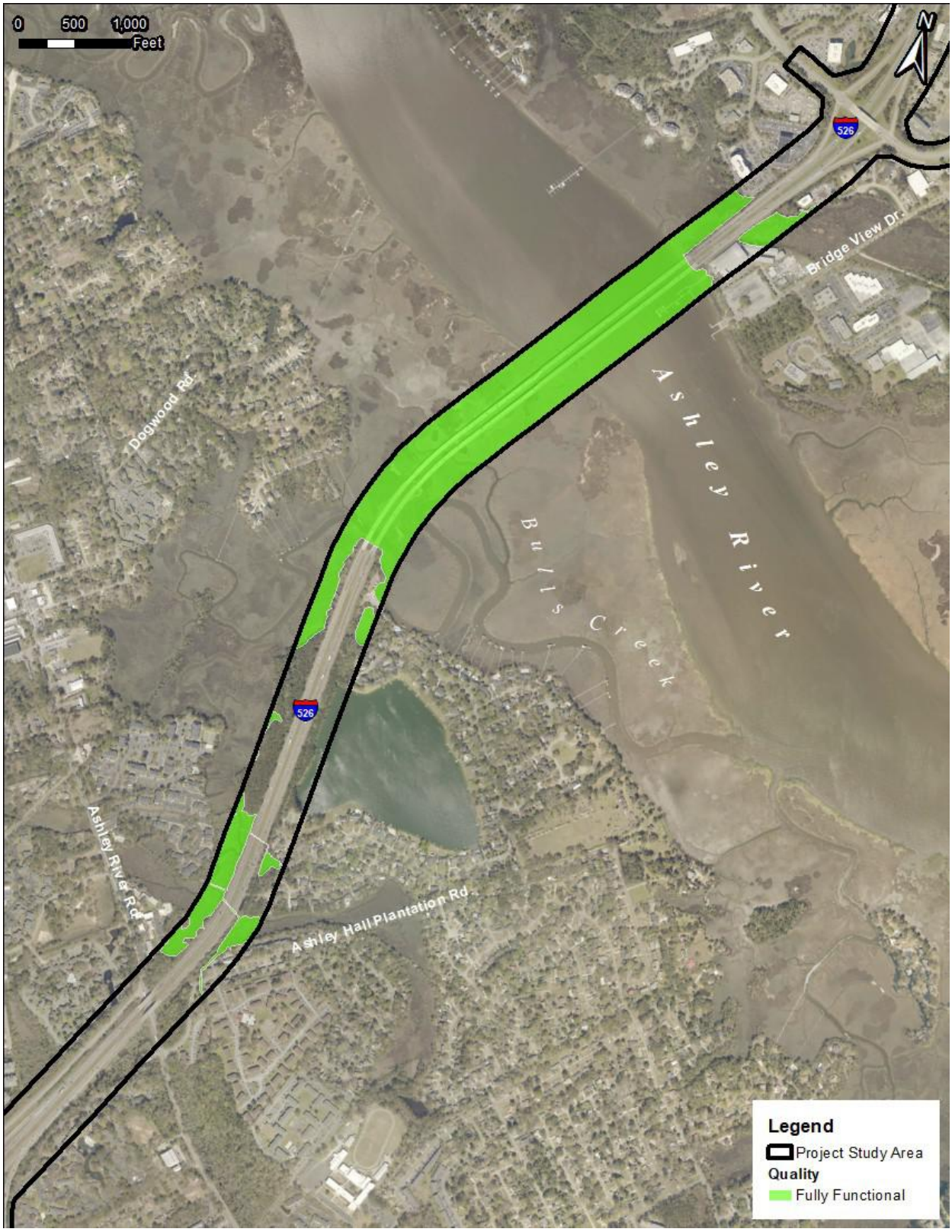
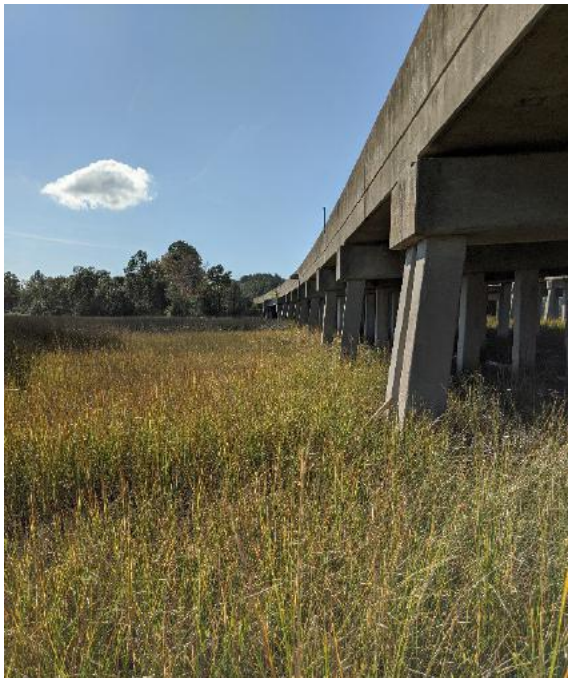


Figure 3-3 Ashley River Evaluation Area - EFH Quality

Estuarine Emergent Wetland



Estuarine emergent wetland. Taken next to I-526 near Bulls Creek, facing southwest. (Photo by Three Oaks Engineering)

Estuarine emergent wetlands are salt or brackish marshlands that are intertidal, or regularly inundated by the tide cycle. The vegetation of these wetlands is typically dominated by one or two plant species that remain standing at least until the beginning of the next growing season (USFWS, 1979). This habitat serves as a nursery for many fish and other aquatic organisms. The high primary productivity of estuarine emergent wetlands provides abundant food stores for prey species and larval fish in the form of detritus. The shallow water column of these wetlands during high tides provides both a low-energy environment away from wave action and currents as well as a refuge for these organisms to avoid predation by larger predators. Other ecosystem services provided by estuarine emergent wetlands are the trapping of pollutants, storing of sediment, and the attenuation of floodwaters (SAFMC, 2016a).

This habitat makes up the majority of EFH within the Ashley River evaluation area, covering 48.3 acres. These estuarine emergent wetlands are saltmarsh, mostly dominated by smooth cordgrass (*Sporobolus alterniflora*). In areas of slightly higher elevation that receive less saltwater flooding during the tide cycle, the vegetation is dominated by black needlerush (*Juncus roemerianus*). These estuarine emergent wetlands are fully functional in that all ecosystem services essential to fisheries are present. Existing disturbances, such as the existing I-526 structures, have not significantly altered functions of this habitat. The estuarine emergent wetlands surrounding Bulls Creek and the Ashley River are functioning as high quality EFH.

Intertidal Non-Vegetated Flat

An intertidal area is a subsystem of an estuarine environment that lies between the high and low tide lines (USFWS, 1979). Intertidal non-vegetated flats are sediment deposits that occur across areas of gentle slope within the intertidal zone. These are dynamic habitats because of the drastic changes in salinity and temperature that occur each tide cycle (SAFMC, 2020c). Despite being called “non-vegetated”, these flats can have extensive communities of microalgae that benefit macroinvertebrates and other benthic feeders.

Intertidal non-vegetated flat. Taken from mouth of Filbin Creek, facing south. (Photo by Three Oaks Engineering)

Along the South Atlantic coast, these flats typically have very fine sediments, which are inhabitable by benthic organisms such as nematodes, copepods, annelids, bivalves, etc. High tide brings food and predators onto the flat while low tide provides residents a temporal refuge from the mobile predators (SAFMC, 2020c). Therefore, intertidal non-vegetated flats are important foraging habitat for managed species. Intertidal non-vegetated flats cover a combined 0.6 acres of the Ashley River evaluation area. These intertidal non-vegetated flats are fully functional in that all ecosystem services essential to fisheries are present. Existing disturbances, such as the existing I-526 structures, have not significantly altered functions of this habitat. The intertidal flats located within the project area are functioning as high quality EFH.

Estuarine Tidal Creek

Estuarine tidal creek. Taken from within Bulls Creek, facing east. (Photo by Three Oaks Engineering)

Estuarine tidal creeks are sinuous drainage channels that are subject to the ebb and flow of each tide cycle. As the tide rises, tidal waters flow upstream filling the channel before spilling into the surrounding marshlands. The depths of tidal creeks vary depending on tide range, land use, and distance upstream from coastal inlet channels. Shallow depths of tidal creeks serve as nurseries for fish, crustaceans, and mollusks because they are inaccessible to larger predators (SAFMC, 2016a). Tidal creeks also have soft-bottom substrate that provides benefits like those provided by intertidal flats.

The only named estuarine tidal creek system identified within the Ashley River EFH evaluation area is Bulls Creek. Bulls Creek varies in width from approximately 80 feet near the confluence with the Ashley River to less than 2 feet in its uppermost extents. Bull Creek and its tributaries are estuarine tidal creeks, with an observed salinity range of 4-20 parts per thousand. There is 4.1 acres of estuarine tidal creek habitat identified within the Ashley River evaluation area. Bulls Creek and its tributaries are fully functional in that all ecosystem services essential to fisheries are present. Existing disturbances, such as the existing I-526 structures, have not significantly altered functions of this habitat. The sections of Bulls Creek that are within and adjacent to the project area are functioning as high quality EFH.

Unconsolidated Bottom

Unconsolidated bottom includes all wetland and deep-water habitats with at least 25% cover of particles smaller than stones, less than 30% vegetative cover, and subtidal, permanently flooded, intermittently exposed, or semi-permanently flooded water regimes (USFWS, 1979). This designation was chosen to describe the group of habitats that are permanently to semi-permanently beneath tidal waters. Within the Ashley River evaluation area, unconsolidated bottom habitat is associated with the main channel of the Ashley River.

The Ashley River drains to the Charleston Harbor and receives seawaters from the Atlantic Ocean during high tides. The channel of the Ashley River within the project area ranges from 3-20 feet deep (NOAA, 2020b). The depth of the water level fluctuates with the range of the tide. The Ashley River has a soft-bottom substrate and a stable water column that provides spawning and foraging habitat for benthic and pelagic organisms. Unconsolidated bottom accounts for 21.1 acres within the Ashley River Evaluation area. This habitat is fully functional in that all ecosystem services essential to fisheries are present. Existing disturbances, such as the existing I-526 structures, have not significantly altered functions of this habitat. The unconsolidated bottom located within the project area is functioning as high quality EFH.

Unconsolidated bottom. Taken from western bank of Ashley River, facing southeast. (Photo by Three Oaks Engineering)

Oysters

Oysters on existing bridge structures in the Ashley River. (Photo by Three Oaks Engineering)

The Eastern oyster (*Crassostrea virginica*) is harvested along the coast of South Carolina. Oysters primarily settle and develop in intertidal habitats creating beds, reefs, or banks. These reefs contain live oysters as well as remaining shells from previous generations (NOAA, 2020d). The waters of the Ashley River are classified as Shellfish Management Growing Areas (SMGA) by the South Carolina Department of Health and Environmental Control (SCDHEC) and is within SCDHEC Shellfish Management Growing Area 10B. Shellfish harvesting is prohibited throughout the waters of Charleston Harbor including the portion of the Ashley River in the project area. No commercial culture, grant, or mariculture permits, or recreational shellfish grounds are located within the evaluation area (SCDHEC, 2019). Furthermore, SCDNR does not have any managed state or recreational shellfish grounds within the Ashley River evaluation area (SCDNR, 2019). Spatial data from 2015 of intertidal oyster reefs and shell deposits located by SCDNR did not depict any occurrences within the Ashley River evaluation area.

During field investigations clusters of oysters were found occupying a variety of surfaces (bridge piles, riprap, culverts, and natural surfaces) within the Ashley River evaluation area. Oysters that were present along riprap or other horizontal surfaces were captured with point data and logged on a GPS. Oysters attached to existing bridge structures were observed around the entire circumference or perimeter of the structures. It was estimated oysters were on average three feet

in height and generally two to three oysters in thickness. Using the data logged with GPS points and accounting for oysters present on existing bridge structure sizes at an average height of three feet an estimated 0.5 acres of oysters are present in the Ashley River EFH evaluation area. The oysters in the Ashley River EFH evaluation area are high quality EFH.

3.2. Filbin Creek Evaluation Area

The boundaries of the Filbin Creek evaluation area are more variable than the Ashley River evaluation area due to proposed interchange improvements at North Rhett Avenue and Virginia Avenue. Beginning at Attaway Street, this evaluation area has a width of 300 feet from both sides of the existing I-526 centerline. From Attaway Street to North Rhett Avenue, the evaluation area expands to approximately 1,200 feet from the existing I-526 centerline. This section of the project occurs within the Cooper River Watershed (HUC 03050201-07). Within this evaluation area is the main channel of Filbin Creek, surrounding wetlands and tributaries of Filbin Creek, and the confluence of Filbin Creek and the Cooper River. There is one water quality monitoring station found within the Filbin Creek evaluation area. Station MD-249 is located along Filbin Creek and is listed on SCDHEC's 2016 and draft 2018 Section 303(d) lists due to impairments related to elevated levels of *Enterococcus* bacteria. Two other water quality monitoring stations are found nearby within the Cooper River. Station MD-044 and Station MD-248 are located upstream and downstream of the project, respectively. Neither MD-248 nor MD-044 are listed on the 303(d) list.

Table 3-2 provides a summary of the EFH types and acreage identified within the Filbin Creek evaluation area based on aerial photography review and ground truthing efforts. Figure 3-4 provides an overview of the different EFH types associated with Filbin Creek. Figure 3-5 displays the qualitative differences in EFH throughout the evaluation area.

Table 3-2: Filbin Creek Evaluation Area

EFH Type	Quality	Acres
Estuarine Emergent Wetland	High	24.1
	Low	35.2
Estuarine Tidal Creek	High	7.5
	Low	7.8
Intertidal Non-Vegetated Flats	High	2.4
Palustrine Emergent Wetland	Low	59.8
Riverine Tidal Creek	Low	1.3
Unconsolidated Bottom	High	3.9
Oyster Reef	High	0.3
Total		**142.3**

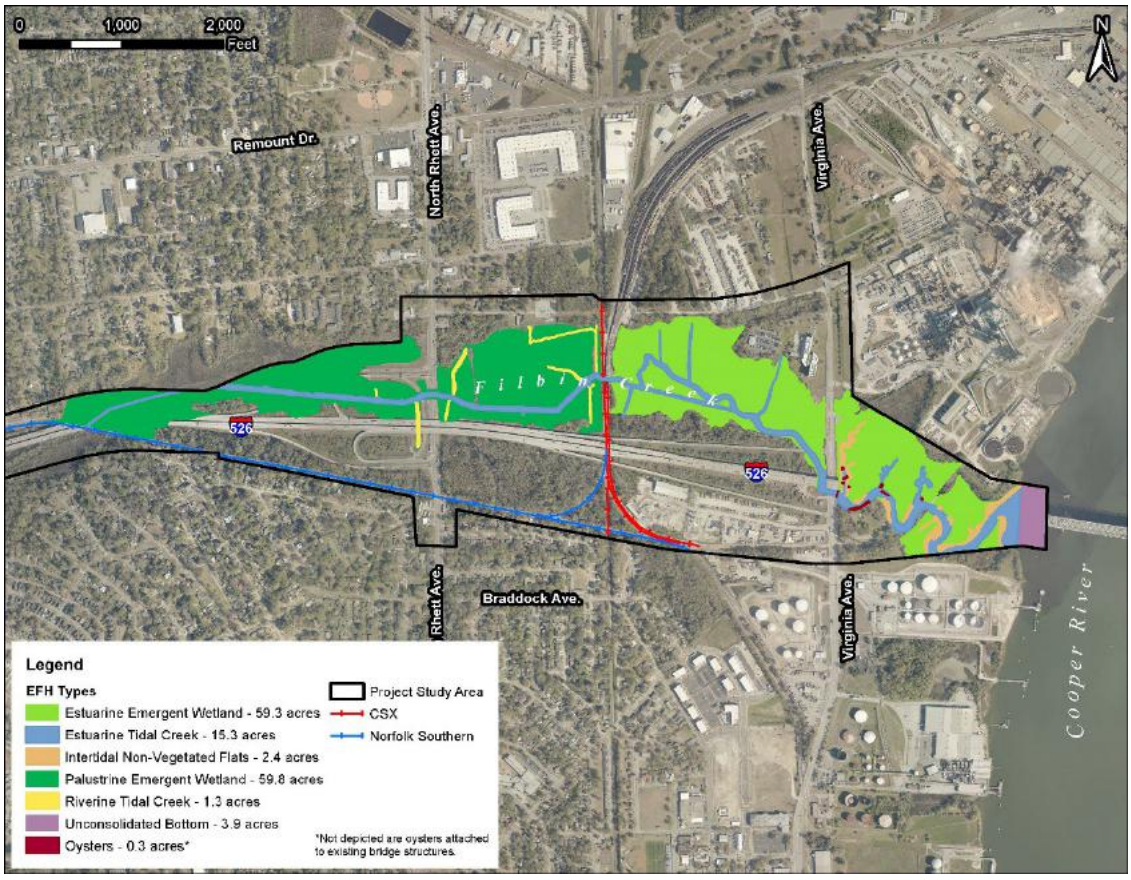


Figure 3-4. Filbin Creek Evaluation Area – EFH Types

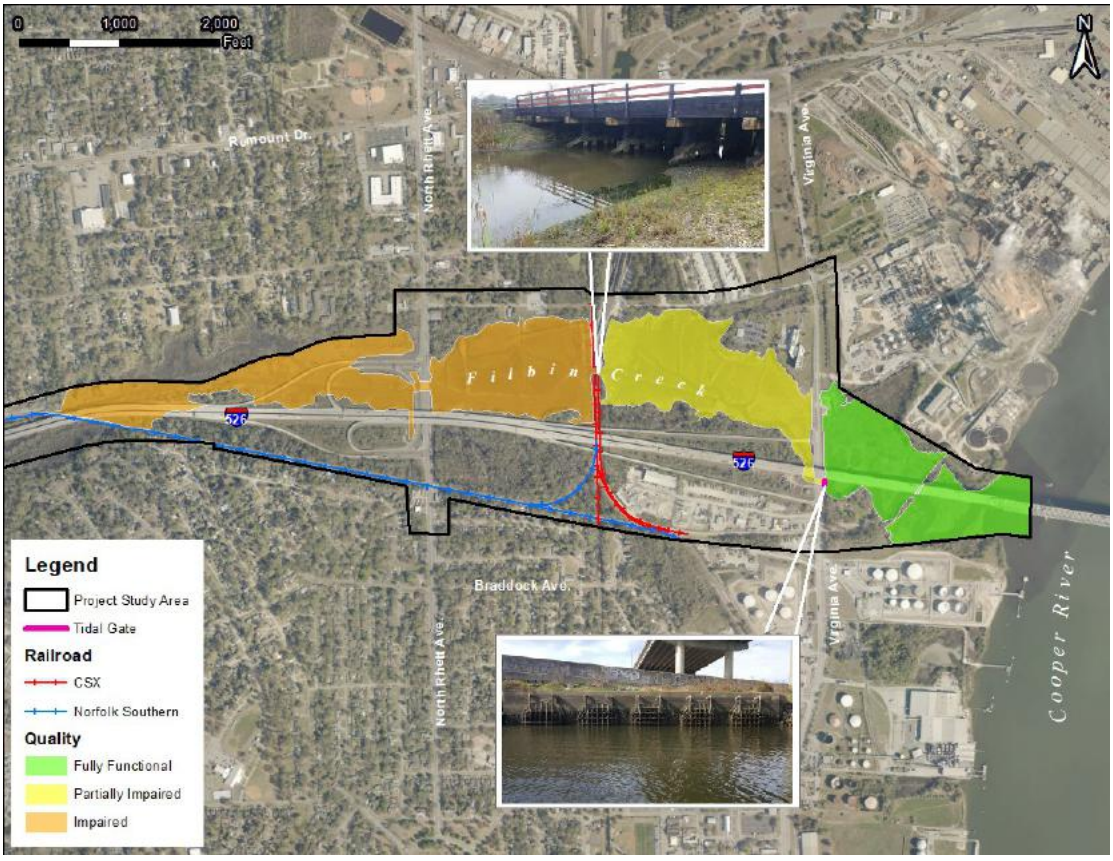


Figure 3-5. Filbin Creek Evaluation Area – EFH Quality

Estuarine Emergent Wetland

Estuarine emergent wetland habitat makes a large portion of EFH within the Filbin Creek Evaluation Area, covering 59.3 acres in total. Estuarine emergent wetlands within the Filbin Creek evaluation area can be qualitatively separated into two different plant communities with respect to tidal regime: east of Virginia Avenue and west of Virginia Avenue. The section of Filbin Creek east of Virginia Avenue to the Cooper River, is similar in quality and function to the estuarine emergent wetlands described in the Ashley River evaluation area. These wetlands receive an uninhibited tidal regime and the vegetative community is dominated by smooth cordgrass (*Sporobolus alterniflora*) and black needlerush (*Juncus roemerianus*). Sea oxeye daisy (*Borrichia frutescens*) and saltgrass (*Sporobolus pumilus*) are found along the fringes of this habitat. These estuarine emergent wetlands are fully functional in that all ecosystem services essential to fisheries are present. Existing disturbances, such as the existing I-526 structures, have not significantly altered functions of this habitat. The estuarine emergent wetlands to the east of Virginia Avenue are high quality EFH.

Estuarine emergent wetland.
(Photo by Three Oaks Engineering)

Upstream of the tidal gate, west of Virginia Avenue and east of the CSX railroad causeway, is also classified as estuarine emergent wetland. The estuarine emergent wetlands in this section of the evaluation area are dominated by giant cordgrass (*Sporobolus cynosuroides*) and common reed (*Phragmites australis*) in areas that appear to receive regular tidal influence. In areas of slightly higher elevation that receive even less saltwater during the tidal flooding events, the vegetation is dominated by marsh alder (*Iva frutescens*), groundsel bush (*Baccharis halimifolia*), and rattlebox (*Sesbania punicea*). This change in vegetative community can be attributed to the altering of saltwater flood regime by the tidal gate at Virginia Avenue. Salinity measurements taken from waters in this section of the evaluation area ranged between 3-12 parts per thousand. The presence of saline waters and the vegetation indicate that some tidal connectivity remains despite the tidal gate. However, there appears to be a natural transition from highly salt tolerant vegetation to a more brackish and less salt tolerant vegetation. This likely a function of limited connectivity to tidal flows because of the functional tide gate at Virginia Avenue. This section of estuarine emergent wetlands is considered partially impaired in that some ecosystem services essential to fisheries have been diminished. Specifically, regular tidal exchange is effectively limited by the tidal gate. It is expected the tidal gate will remain in place and thus, the ecosystem services provided by the estuarine emergent wetland habitat type are not expected to function at a high level and will likely continue to see a transition to a more brackish vegetative community. Access to this habitat by managed fishery species is considered restricted due to the tidal gate limiting tidal exchange. While salinity levels remain high, this habitat is still considered partially impaired. Due to partial impairment and the obvious vegetative succession, the area west of Virginia Avenue and east of the CSX railroad causeway is considered low quality estuarine emergent wetland EFH.

Estuarine Tidal Creek

Riverine tidal creek adjacent to Filbin Creek. (Photo by Three Oaks Engineering)

Filbin Creek and its tributaries are largely a system of estuarine (saltwater) tidal creeks that drain to the Cooper River. A total of 15.3 acres of estuarine tidal creeks are present in the Filbin Creek evaluation area. The Filbin Creek estuarine system is complicated by the tidal gate at Virginia Avenue and two railroad causeways west of Virginia Avenue. However, from the east of Virginia Avenue to the Cooper River is a fully functional estuarine tidal creek. The width of Filbin Creek varies from 70-90 feet and the observed salinity in this section ranged from 4-15 parts per thousand. This section of Filbin Creek is fully functional in that all ecosystem services essential to fisheries are present. Existing disturbances, such as the existing I-526 structures, have not significantly altered functions of this habitat. The estuarine tidal creeks east of Virginia Avenue are considered high quality EFH.

Tidal gate at Virginia Avenue. (Photo by Three Oaks Engineering)

West of Virginia Avenue, Filbin Creek flow is considerably altered by the tidal gate which limits the amount of tidal exchange upstream during normal tidal cycles. West of Virginia Avenue and east of the CSX railroad causeway, salinity measurements taken from Filbin Creek and its tributaries ranged from 4-8 parts per thousand. Because these measurements exceed 0.5 parts per thousand, these waters are still considered estuarine tidal creeks (USFWS, 1979). The estuarine tidal creeks, including the main channel of Filbin Creek, in this section of the evaluation area are partially impaired because of the restricted connectivity to downstream EFH and the limited access by managed fishery species. However, this impairment does not result a complete degradation of the quality of EFH in the context of estuarine tidal creek habitat. Enough tidal influence is still present that the main channel of Filbin Creek west of Virginia Avenue to the CSX railroad causeway is still considered high quality EFH.

CSX railroad causeway and bridge. (Photo by Three Oaks Engineering)

West of the CSX railroad causeway to the western-most limits of EFH in the Filbin Creek evaluation area the main channel of Filbin Creek remains an estuarine tidal creek because of its direct connection to the tidal gate and obvious tidal influence. Salinity measurements at the surface of Filbin Creek in this segment of the evaluation area were consistently documented as 0 parts per thousand despite visual evidence of tidal influence. This can likely be attributed to stormwater runoff having a more regular influence than saline waters infiltrating the tidal gate this far upstream. Samples taken from the bottom of the channel contained salinity in quantities more than the 0.5 parts per thousand required to maintain estuarine tidal creek designation. The main channel of Filbin Creek in this section west of the CSX railroad causeway is considered impaired because some ecosystem services essential to fisheries have been diminished or lost. The presence of the tidal gate at Virginia Ave restricts tidal flow and access to this habitat by managed fishery species is therefore more restricted. Additionally, stormwater runoff having a more regular influence than saline waters would suggest that this portion of Filbin Creek, while tidally influenced, receives more influence from stormwater runoff and freshwater flows from headwaters further upstream than through tidal exchanges. Although some tidal action still reaches this area, the ecological integrity is impaired. Therefore, estuarine tidal creek areas west of the CSX railroad causeway are considered low-quality EFH.

Intertidal Non-Vegetated Flat

Intertidal non-vegetated flat. Taken from mouth of Filbin Creek, facing south. (Photo by Three Oaks Engineering)

An intertidal area is a subsystem of an estuarine environment that lies between the high and low tide lines (USFWS, 1979). Intertidal non-vegetated flats are sediment deposits that occur across areas of gentle slope within the intertidal zone. These are dynamic habitats because of the drastic changes in salinity and temperature that occur each tide cycle (SAFMC, 2020c). Despite being called "non-vegetated", these flats can have extensive communities of microalgae that benefit macroinvertebrates and other benthic feeders. Along the South Atlantic coast, these flats typically have very fine sediments, which are inhabitable by benthic organisms such as nematodes, copepods, annelids, bivalves, etc. High tide brings food and predators onto the flat while low tide provides residents a temporal refuge from the mobile predators (SAFMC, 2020c). Therefore, intertidal non-vegetated flats are important foraging habitat

for managed species. Intertidal non-vegetated flats cover 2.4 acres of the Filbin Creek portion of the project area. These intertidal non-vegetated flats are fully functional in that all ecosystem services essential to fisheries are present. Existing disturbances, such as the existing I-526 structures, have not significantly altered functions of this habitat. The intertidal non-vegetated flats in the Filbin Creek EFH evaluation area are high quality EFH.

Palustrine Emergent Wetland

Palustrine emergent wetlands are like estuarine emergent wetlands in that their vegetative community is dominated by one or more annual plant species. However, these freshwater marshlands have a salinity of less than 0.5 parts per thousand (USFWS, 1979). These wetlands, where present, occur upstream of the estuarine emergent wetlands and receive less tidal influence. Although the low salinity of these waters limits its use by several managed fish species, tidal freshwater plays an important role as the transition zone between freshwater habitats upstream and the tidal saltwater habitats downstream. Palustrine emergent wetlands provide nursery habitat for managed species as well as the prey of managed species (SAFMC, 2016a). Like other wetland habitats, palustrine emergent wetlands provide important ecosystem services of absorbing pollutants, storing sediments, and attenuating floodwaters.

Palustrine emergent wetland. (Photo by Three Oaks Engineering)

Palustrine emergent wetland habitat was only found within the Filbin Creek Evaluation Area, occurring west of the CSX railroad causeway and east of the Norfolk Southern railroad causeway. There are 59.8 acres of palustrine emergent wetlands in the Filbin Creek evaluation area. These wetlands are a monoculture plant community dominated by the non-native common reed (*Phragmites australis*). All salinity recordings of waters in this area were 0 parts per thousand. These characteristics can be attributed to the restricted connectivity to other EFH waters caused by the existing causeway associated with North Rhett Avenue, CSX railroad causeway and the tidal gate at Virginia Avenue. Additionally, multiple outfall pipes that appear to carry local stormwater to Filbin Creek are present in this section of the evaluation area. The regular influx of freshwater runoff further weakens the tidal exchange received by these wetlands.

The palustrine emergent wetlands in the Filbin Creek evaluation area are impaired because multiple ecosystem services essential to fisheries have been diminished or lost. The monoculture of the invasive common reed, the restricted flows resulting from the tidal gate and CSX railroad causeway, and regular flushing of freshwater stormwater runoff all contribute to impairment of this section of Filbin Creek. Although some tidal action still reaches this area in the main channel of Filbin Creek,

the ecological integrity of the adjacent wetlands is ultimately impaired in the context of EFH. Therefore, the palustrine emergent wetlands associated with Filbin Creek are considered low-quality EFH.

Riverine Tidal Creek

Riverine tidal creeks are sinuous drainage channels that are subject to the ebb and flow of each tide cycle. However, these tidal creeks have a salinity of less than 0.5 parts per thousand (USFWS, 1979). As the tide rises, tidal waters flow upstream filling the channel before spilling into the surrounding wetlands. The depths of tidal creeks vary depending on tide range, land use, and distance upstream from coastal inlet channels. Shallow depths of tidal creeks serve as nurseries for fish, crustaceans, and mollusks because they are inaccessible to larger predators (SAFMC, 2016a).

Riverine tidal creek adjacent to Filbin Creek (Photo by Three Oaks Engineering)

Riverine tidal creeks account for 1.3 acres in the Filbin Creek evaluation area. Located west of the CSX railroad causeway are multiple small tributaries that feed into the main channel of Filbin Creek. Salinity measurements of these tributaries were consistently documented as 0 parts per thousand despite visual evidence of tidal influence. This can be attributed to stormwater runoff having a more regular influence than saline waters infiltrating from the main channel of Filbin Creek. These tributaries are therefore designated as riverine tidal creeks based on the lack of salinity but obvious tidal influence. The riverine tidal creeks are impaired because some ecosystem services essential to managed fisheries have been diminished or lost. No salt tolerant species were observed in these waters during field surveys. The presence of the tidal gate at Virginia Ave restricts tidal flow and access to this habitat by managed fishery species is therefore more restricted. Additionally, stormwater runoff having a more prevalent influence than saline waters serves as an impairment for some managed fishery species. Therefore, the riverine tidal creeks within the Filbin Creek evaluation area are considered low quality EFH.

Unconsolidated Bottom

Unconsolidated bottom includes all wetland and deep-water habitats with at least 25% cover of particles smaller than stones, less than 30% vegetative cover, and subtidal, permanently flooded, intermittently exposed, or semi-permanently flooded water regimes (USFWS, 1979). This

designation was chosen to describe the group of habitats that are permanently to semi-permanently beneath tidal waters.

Unconsolidated bottom. Taken from mouth of Filbin Creek (Photo by Three Oaks Engineering)

The Cooper River is a coastal river that drains to Charleston Harbor and receives seawater from the Atlantic Ocean during tidal exchange. Channel depth of the Cooper River at the mouth of Filbin Creek ranges from 2-30 feet (NOAA, 2020b). The depth of the water level fluctuates with the range of the tide. This habitat has a soft-bottom substrate and a stable water column that provides spawning and foraging habitat for benthic and pelagic organisms. Unconsolidated bottom habitat accounts for 24.2 acres within the Filbin Creek Evaluation Area. This habitat is fully functional in that all ecosystem services essential to fisheries are present. Existing disturbances, such as the existing I-526 structures, have not significantly altered functions of this habitat. The unconsolidated bottom in the Filbin Creek evaluation area is functioning as high quality EFH.

Oysters

Oyster reef in Filbin Creek at low tide. (Photo by Three Oaks Engineering)

The Eastern oyster is harvested along the coast of South Carolina. Oysters primarily settle and develop in intertidal habitats creating beds, reefs, or banks. These reefs contain live oysters as well as remaining shells from previous generations (NOAA, 2020d). The waters of the Ashley River and Filbin Creek are within an area classified as Shellfish Management Growing Areas (SMGA) by the South Carolina Department of Health and Environmental Control (SCDHEC). Both evaluation areas are within SCDHEC Shellfish Management Growing Area 10B. Shellfish harvesting is prohibited throughout the waters of Charleston Harbor. No commercial culture, grant, or mariculture permits, or recreational shellfish grounds are located within the evaluation area (SCDHEC, 2019). SCDNR does not have any managed state or recreational shellfish grounds within the Filbin Creek evaluation area (SCDNR, 2019). Spatial data from 2015 of intertidal oyster reefs and shell deposits previously located by SCDNR does not show any occurrences within either evaluation area.

During field investigations clusters of oysters were found occupying a variety of surfaces (bridge piles, riprap, tidal gate, natural surfaces) within the Filbin Creek evaluation area east of Virginia Avenue. Oysters that were present along riprap or other horizontal surfaces were captured with

point data and logged on a GPS. Oysters attached to existing bridge structures were observed around the entire circumference of the structures. It was estimated oysters were three feet in height and generally two to three oysters in thickness. Using the data logged with GPS points and accounting for oysters present on existing bridge shaft diameters at an average height of three feet an estimated 0.3 acres of oysters are present in this section in the Filbin Creek EFH evaluation area. The oysters in the Filbin Creek EFH evaluation area are high quality EFH.

3.3. Existing EFH Summary

EFH within the project area is found in both the Ashley River and Filbin Creek Evaluation Areas. Both systems are tidally influenced and have similar habitats. Table 3-3 provides a total acreage for each EFH type and quality found within the project area.

Table 3-3: EFH Habitat Acreage

EFH Type	Quality	Acres
Estuarine Emergent Wetland	High	72.4
	Low	35.2
Estuarine Tidal Creek	High	11.6
	Low	7.8
Intertidal Non-Vegetated Flats	High	3
Palustrine Emergent Wetland	Low	59.8
Riverine Tidal Creek	Low	1.3
Unconsolidated Bottom	High	25
Oysters	High	0.8
TOTAL EFH Area		***216.9***

4. Essential Fish Habitat Species

As mandated by the Magnuson-Stevens Act, the eight regional councils are tasked with identifying, describing, mapping and protecting EFH in their respective jurisdictions. The SAFMC is tasked with conserving and managing fisheries for the South Atlantic region, which includes the coast of South Carolina (SAFMC, 2020a). Some fisheries managed by the MAFMC also have designated EFH along the coast of South Carolina. Species habitat descriptions provided by SAFMC and MAFMC and geospatial data from the NOAA EFH Mapper were used to assist in the identification of which managed fisheries may be affected by any potential impacts to either of the habitat types listed in the previous section as a result of the proposed project. The following species or groups of species have designated EFH present within the project area.

4.1. Habitat Areas of Particular Concern

Habitat areas of particular concern (HAPC) are discreet subsets of EFH that are considered high priority areas for conservation, management, or research. HAPCs receive such designation because they are rare, sensitive, stressed by development, or important to overall ecosystem function (SAFMC, 2020b). HAPC for a given fishery can include intertidal habitats, estuarine habitats, and deep-water habitats used for migration, spawning, and rearing of fish or other managed organisms. “At the interface of NOAA trust resources and SCDOT projects, oyster reefs are the most common

HAPC in South Carolina. Coastal inlets and other designated HAPCs are present in the state but will rarely be encountered by SCDOT (SCDOT SCREENING FORM CITATION).” HAPCs present within the project area include all oysters found within the Ashley River and Filbin Creek evaluation areas.

4.2. Federally Managed Species

Penaeid Shrimp

Essential habitat for white shrimp (*Litopenaeus setiferus*) and brown shrimp (*Farfantepenaeus aztecas*) is present within the project area. These penaeid shrimp species are managed by the SAFMC because of their economic and ecological significance (SAFMC, 2020d). These shrimp species, like all penaeid shrimp, have an annual life cycle. Penaeid shrimp spawn year-round in deepwater habitats offshore, larval shrimp move to estuarine areas, and new adults return to offshore areas to spawn. White shrimp begin to migrate to estuarine waters in April and May, whereas brown shrimp migrate to estuarine waters from February to April (NOAA). Juvenile shrimp forage and mature in tidally influenced nursery areas where the mud-silt substrate and salinity range provide a suitable feeding environment. Once maturity is reached, Brown shrimp egress to offshore areas between May and August. White shrimp egress from August to December (NOAA). Some smaller adult individuals may remain in the estuary over the winter (SAFMC). According to the fishery management plan (FMP) for shrimp, essential habitat for White and Brown shrimp includes estuarine emergent wetlands, palustrine emergent wetlands, intertidal non-vegetated flats, riverine tidal creeks, estuarine tidal creeks, and coastal inlets (SAFMC, 1993). HAPC for these shrimp species is identified as all coastal inlets, which is not present within the project area (SAFMC, 2016c).

Snapper-Grouper Complex

The snapper-grouper complex managed by the SAFMC is made up of 59 species across ten families: sea basses and groupers (*Serranidae*), wreckfish (*Polyprionidae*), snappers (*Lutjanidae*), porgies (*Sparidae*) grunts (*Haemulidae*), jacks (*Carangidae*), tilefishes (*Malacanthidae*), triggerfishes (*Balistidae*), wrasses, (*Labridae*), and spadefishes (*Eppiphidae*) (SAFMC). Species in the complex spawn offshore in hard-bottom areas (SAFMC, 2016d). Snapper-grouper larvae are transported to estuarine areas by tides and currents where they grow to maturity. The nursery areas of estuarine waters and wetlands provide shelter from predation as well as an abundance of food. Snapper-grouper species are predatory, feeding on smaller fish and invertebrates. Adult snapper-groupers can be found feeding in estuarine environments (SAFMC, 2016c). Several species within the complex, such as the gray snapper (*Lutjanus griseus*), are known to use tidal freshwaters as well. According to the FMP for the snapper-grouper complex, EFH for all life stages includes estuarine emergent wetlands, riverine tidal creeks, estuarine tidal creeks, and coastal inlets. HAPC for the snapper-grouper complex is identified as all coastal inlets and oyster beds (SAFMC, 2016b). All oysters present within the project area are considered HAPC for the snapper-grouper complex.

Bluefish

Bluefish (*Pomatomus saltatrix*) is a fish species managed the MAFMC (MAFMC, 1989). Bluefish live up to 12 years, reaching maturity at 2 years of age. Spawning occurs multiple times a year in the offshore waters of the South Atlantic and Mid-Atlantic Bights. Juvenile bluefish are known to occur in estuarine environments where they feed on smaller fish and avoid predation by larger fish in the

offshore waters (MAFMC, 2020). According to the EFH spatial data from NOAA, EFH for the juvenile life stage of bluefish includes estuarine tidal creeks and coastal inlets (NOAA, 2019). No HAPC are designated for Bluefish.

Summer Flounder

Summer flounder (*Paralichthys dentatus*) is a fish species managed by summer flounder, scup, and black seabass FMP of the MAFMC. Summer flounder live up to 14 years, reaching maturity between 2-3 years of age. Spawning occurs several times during the fall and early winter in offshore waters of the continental shelf (NOAA, 2020a). Larval summer flounder are transported by tides and currents from offshore areas to estuarine areas where they grow to maturity. Summer flounder stay along the bottom of the water column where they hide against the substrate to hunt and ambush their prey. Larval summer flounder feed on zooplankton and small invertebrates while juveniles and adults feed on invertebrates and fish. Larvae, juvenile, and adult summer flounder are known to commonly occur in estuarine environments, venturing into offshore waters during spawning season. According to the FMP for summer flounder, intertidal non-vegetated flats, estuarine tidal creeks, and coastal inlets are designated as EFH for the larval, juvenile, and adult life stages of summer flounder. HAPC for summer flounder includes submerged aquatic vegetation, which is not present within the project area (MAFMC, 1987).

Other Fishes

The waters of the Ashley River and Filbin Creek evaluation areas also serve as nursery and forage habitat for other species including red drum (*Sciaenops ocellatus*). Red drum is an important state-managed fishery and estuarine environments within the project area provide habitat necessary for the development and survival of several life stages of red drum. Highly migratory pelagic species such as Atlantic blacktip shark (*Carcharhinus limbatus*) are managed by NOAA Fisheries. Spatial data from the EFH mapper indicates the presence of EFH for highly migratory pelagic species within the project boundary (NOAA, 2019). Estuarine environments within the project area may also be of importance to the Atlantic blacktip shark.

5. Alternatives Analysis

The sections below discuss the No-Build Alternative and the potential impacts from the Recommended Preferred Alternative on EFH for recreational and commercial fisheries and federally managed species. Adverse effects analyzed of the Proposed Project Alternative include direct and indirect physical, chemical, or biological alterations resulting in the reduction to quality and quantity of EFH and managed species.

5.1. No Build Alternative

Under the No Build Alternative, EFH would remain as described in Section 3. The existing roadway and bridges would remain in place with no additional structures being placed in EFH. No long-term effects are expected from the No Build Alternative.

5.2. Recommended Preferred Alternative

Under the Recommend Preferred Alternative there are two additional bridge structures to be constructed over the Ashley River to accommodate the widening of I-526, construction of new structures C-D roads over portions of Filbin Creek and its associated floodplain, and construction of improved interchange access for the I-526 connections at North Rhett Avenue and Virginia Avenue.

Most of the EFH within the project area is proposed to be spanned with bridges at the completion of construction. Due to the project being in the early stages of design, the exact methods used to construct the proposed bridges have not been determined. Additionally, since the project will be constructed in phases, the extent and duration of impacts will ultimately be determined and calculated at final design. The contractor will construct the project based on guidelines and conditions established by SCDOT, FHWA, and state and federal regulatory agencies including South Carolina Department of Health and Environmental Control Ocean and Coastal Resources Management (SCDHEC-OCRM), US Army Corps of Engineers (USACE), US Fish and Wildlife Service (USFWS), and NOAA Fisheries.

5.3. Construction Methods

Choosing which bridge construction method to use can be a complicated endeavor dependent on several factors. Construction schedule, bridge layout and complexity, material costs, soil conditions, and contracting methods must be compared against wetland impacts, mitigation requirements, benefits, and costs.

Due to the wetland and stream crossings that function as EFH and the corresponding challenges these crossings present to bridge construction, a range of construction methods will be evaluated. From a construction standpoint, the soft soils encountered in EFH environments do not support construction equipment, material delivery trucks, or material storage and can settle significantly under load. Therefore, the soils generally require very deep foundations to support bridge loads. These types of foundations require larger equipment and extra effort to install as compared to similar size bridges in firmer soil conditions. Construction access points will likely also be limited, complicating the logistics of equipment usage, material storage, and delivery potentially resulting in longer construction times.

Building bridges over EFH environments as found in the project area can be accomplished with multiple methods. Some methods are more cost effective by maximizing construction efficiency, while other methods sacrifice some level of building efficiency to provide a lesser impact on the environment. The duration of temporary impacts associated with the potential construction access methods noted below will ultimately be determined by the final design established by the contractor in coordination with SCDOT and will also be dependent upon uncontrollable variables including weather and other unanticipated environmental conditions. In South Carolina, four different methods, or a combination thereof, are typically used to build bridges over sensitive environments such EFH. These methods include causeway on temporary fill, causeway on barges and/or timber mats, temporary bridge or trestle, and top-down construction. A brief explanation of these construction methods and temporary impacts associated with each are discussed below.

Causeway on Temporary Fill

This construction method would involve placing a geotextile mat topped with dirt or stone fill on the marsh to create a temporary embankment causeway or access road alongside the proposed bridge alignment. The fill causeway provides access for material delivery and support for cranes and other construction equipment, typically extending from the nearest adjacent upland or haul road. Once construction of the bridge is complete, the fill is removed, and the marsh is allowed to restore itself naturally. Prior to the placement of fill, a geotextile fabric is typically placed over the marsh/wetland surface thus allowing all or most of the discharged fill material to be removed from the area and limiting the disruption of the native soils and vegetative root mass. Silt fencing would be installed along the toe of the fill slopes to prevent runoff and displacement of fill material into adjacent waters.

Impacts to EFH associated with a fill causeway would be temporary and may include the smothering of aquatic organisms, subsidence/compaction of the marsh ground surface, and the disruption/inhibition of hydrology and tidal flows on either side of the fill causeway. Depending on the size of the bridge being constructed, temporary fill causeways would likely need to be in place for six to 24 months.

Causeways on temporary fill will not be utilized as the sole method of construction access for the proposed project. This construction method may be utilized adjacent to existing fill or to establish access to other construction methods discussed below. The preliminary design and identified construction access areas minimize the use of causeway on temporary fill. The contractor will coordinate with SCDOT to determine where causeways on temporary fill are allowable.

Causeway on Barges and/or Timber Mats

This construction method would involve placing floating barges and/or portable timber mats over the waterway or marsh alongside/adjacent the proposed bridge alignment. These type barges are designed to link together and would be placed side by side to produce a temporary access causeway. This method provides similar benefits as a fill causeway; however, once construction is completed, the barges or timber mats are more easily removed from the site. Temporary impacts to the marsh caused by floatable barges or timber mats may be similar to placing temporary fill. Impacts

associated with barges and mats are generally considered less damaging to the environment due to the potential displacement or runoff of sediment associated with fill dirt.

Impacts to the tidal salt marsh environment associated with the placement of barges and/or timber mats would be temporary and may include the smothering of aquatic organisms, subsidence/compaction of the marsh ground surface, and the disruption/inhibition of hydrology and tidal flows on either side of the barge or mat. Depending on the size of the bridge being constructed, the barges and/or timber mats would likely need to be in place for six to 24 months. This construction method may be utilized adjacent to existing fill or to establish access to other construction methods discussed below.

Temporary Bridge/Trestles

This construction method involves the utilization of a temporary bridge or pile supported trestles constructed alongside the proposed bridge alignment. Once construction is completed on the new permanent bridge, the temporary bridge/trestles are removed. Typically, the piles are either pulled out of the ground or cut or snapped off below ground level. Impacts to the marsh environment from temporary trestle bridges are less than the previous two methods (causeway on barges/timber mats or causeway on temporary fill), since the only point of contact between the temporary bridge/working area and the marsh is at the pile locations. However, this method generally includes longer construction times, and subsequently more project costs, due to the construction of temporary bridge structures.

Impacts to the tidal salt marsh environment associated with the construction of a temporary bridge or pile supported trestle would be temporary and may include an increase in noise levels during pile driving activities, scouring or deposition of sediment around the piles, shading of marsh vegetation, and localized mortality of aquatic organisms. Movements of aquatic species within the tidal salt marsh and feeder creeks would be less affected by this construction method than the other methods discussed. Depending on the size of the bridge being constructed, the temporary bridge or trestle structures would likely need to be in place for six to 24 months.

Top-Down Construction

This construction method involves utilizing completed portions of the new bridge structure to construct the bridge. The ends (outer bents) of the new bridge are constructed from existing adjacent upland areas, if available, or from the roadway approach fills. The remainder of the bridge is then constructed from the completed end portions. The top-down construction method would result in little to no temporary impacts to the marsh environment; however, the duration of construction is generally longer as the contractor is restricted to working from the nearest upland embankment or from the ends of the finished bridge structure rather than at multiple points along the proposed alignment. Due to these restrictions, top-down construction is not considered as a practicable sole alternative for building long bridge structures.

Top-down methods may not be particularly suitable for all construction access for this project due to the multiple bridges and the need to set up and break down the construction system at each site. Due to proposed project interchanges also being built on bridge structure, top-down construction methods would not be practical in these situations due to the variations in deck geometry and the

multiple bridge alignments. Top-down may be utilized during construction but will not be the sole method used by the contractor.

Selection of a Construction Method

The project construction schedule will largely affect which construction method is the most advantageous. For instance, a tight construction schedule will favor the use of barge/timber mat causeways as these can be disassembled and mobilized to multiple sites relatively rapidly. A longer construction schedule would favor the use of temporary construction bridges since these structures require extra time to put in place. The proposed project necessitates cost effectiveness, flexibility with multiple bridge sites, alignment curvature, intersections on structure and minimization of EFH impacts. Based on the consideration of all these variables, the proposed construction of the bridges over the main channel of the Ashley River and associated EFH would most likely involve the utilization of timber mats, trestles, and barges for construction access, although existing approaches may also be used as construction access areas for top-down construction if determined by the contractor to be feasible. Additionally, due to the intricate network of tidal creek feeder channels located within the tidal salt marsh wetlands, pile supported trestles would likely be used to minimize impacts and maintain the movement of tidal waters and aquatic organisms to the upper reaches of the marsh.

Construction Sequencing

The following describes the general sequence of events that are anticipated to take place during construction based on the conceptual design of the two proposed Ashley River bridges, new structures for C-D roads over portions of Filbin Creek and its associated floodplain, and new interchange access for the I-526 connections at North Rhett Avenue and Virginia Avenue. Site preparation would begin with the installation of perimeter BMPs and then clearing of vegetation from the approach embankments for equipment access. The embankments would then be graded as necessary for the roadway approaches and abutments and used for the placement of cranes and other construction equipment. Piles would likely be installed at the end bents and drilled shafts (approximately six-foot in diameter) installed at all interior bents within the waterway and adjacent tidal salt marsh wetlands. End bent piles would likely not be installed in the waterway or wetlands but rather within the upland embankments. Bridge construction access areas for the end bents would be located within existing upland areas to the maximum extent practicable.

Within the marsh, the bridge foundations would be installed from either temporary pile supported trestles, ballasted/floating barges, timber mats, or a combination of these methods. Floatable barge or temporary trestle sections would also likely be used as “fingers” to access the interior bent locations and construct the drilled shafts, bent columns, and caps and to erect the prestressed concrete beams. These sections will be moved from bent to bent as construction progresses.

The drilled shafts for the interior bents would likely be installed using a wet-construction method utilizing steel casings to protect the integrity of the shaft, as well as, to contain spoils during excavation of the shafts. The casing would also be used to contain slurry used to stabilize the excavation. The slurry would be captured and contained during placement of the shaft and reinforcing concrete columns. During this operation, permanent fixtures, including the drilled shafts and associated columns, would be placed. Once the drilled shafts are installed, column and cap construction would be performed from the barges or temporary trestles to complete the interior

bents. After completion of the bents, cranes operating from the barges or temporary trestles would be utilized to construct the superstructure of the bridges, which entails placement of the beams, deck, and railings. All timber mats, barges, and trestles and associated piles would be removed in their entirety upon completion of the bridges.

6. Potential Impacts to Essential Fish Habitat

Construction activities are expected to begin in 2027. Construction methods are not yet finalized because the project is still in the conceptual design phase. Final design and construction will occur in phases once SCDOT has selected a contractor to complete each respective phase. The Recommended Preferred Alternative will require two additional bridge structures to be constructed over the Ashley River to accommodate the widening of I-526 and potential shared-use path, construction of new structures for C-D roads over portions of Filbin Creek and its associated floodplain, and construction of improved interchange access for the I-526 connections at North Rhett Avenue and Virginia Avenue. Figures 6-1 and 6-2 depict a typical section of the proposed structures over the Ashley River and the C-D roads over Filbin Creek, respectively.

Most of the EFH within the project area is proposed to be spanned with bridges. Due to the project being in the early stages of design, the exact methods used to construct the proposed bridges have not been determined. Additionally, since the project will be constructed in phases, the specific construction methods and extent and duration of impacts will ultimately be determined and calculated at final design. All contractors will be required to follow guidelines and conditions established state and federal regulatory and commenting agencies.

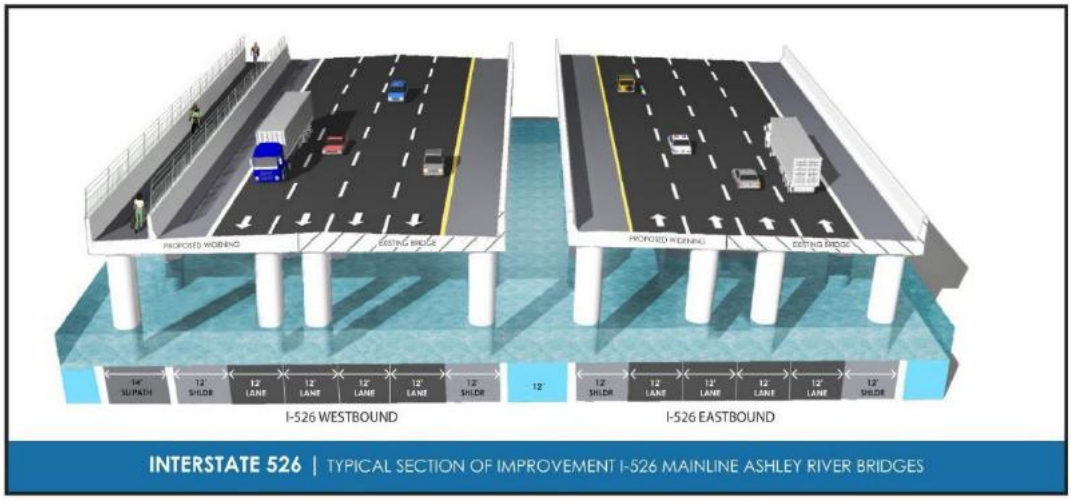


Figure 6-1. Typical Section of Improvements over Ashley River

Construction of the proposed bridge structures will likely include a combination of drilled shafts and pile driving for the bridge support structures. Bridge construction access will be in upland areas to the maximum extent practicable. Work in deep water habitats will likely occur from barges. Temporary work trestles may be installed over the tidal marsh using pile driving. Timber mats and/or barges may be used over salt marsh areas also.

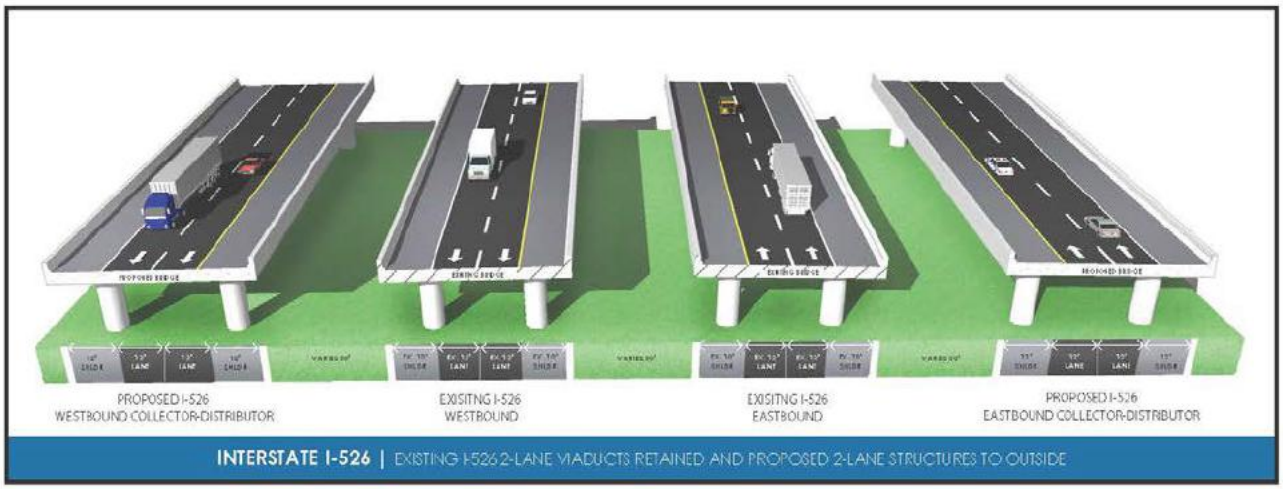


Figure 6-2. Typical Section of Improvements and New Viaduct Over Filbin Creek

SCDOT has assumed the contractor will utilize temporary trestle to the greatest extent practical to avoid impacts to EFH and tidal wetlands. Use of temporary fill causeways as the only method for construction access was not considered a practicable alternative due to extremely high impacts to wetlands and EFH. This scenario is based on conceptual plans and represents a worst-case scenario established for threatened and endangered species impacts and was applied to this EFH evaluation. The conceptual plan includes a conservative combination of pile driving techniques to install bridge support structures and a temporary trestle to be used during construction and drilled shafts for bridge support structures in the main channel of the Ashley River. During final design and during construction, the contractor(s) will be responsible for coordinating with SCDOT and NOAA Fisheries regarding design changes that would alter the effects on EFH.

This analysis is based on the conceptual design of the Recommended Preferred Alternative**.** The Recommended Preferred Alternative is depicted in relation to Ashley River evaluation area EFH in Figure 6-3 and in relation to Filbin Creek evaluation area EFH in Figure 6-4. Due to the conceptual level of design, the final construction limits and final bridge span arrangements are not known at this time. The proposed impacts discussed in subsequent sub-sections are the best attempt to quantify potential impacts to EFH based on the conceptual design. Additionally, the potential impact to managed species will vary based on life stage, habitat use, distribution, and abundance. Table 6-1 summarizes possible temporary and permanent impacts to EFH in the project area.

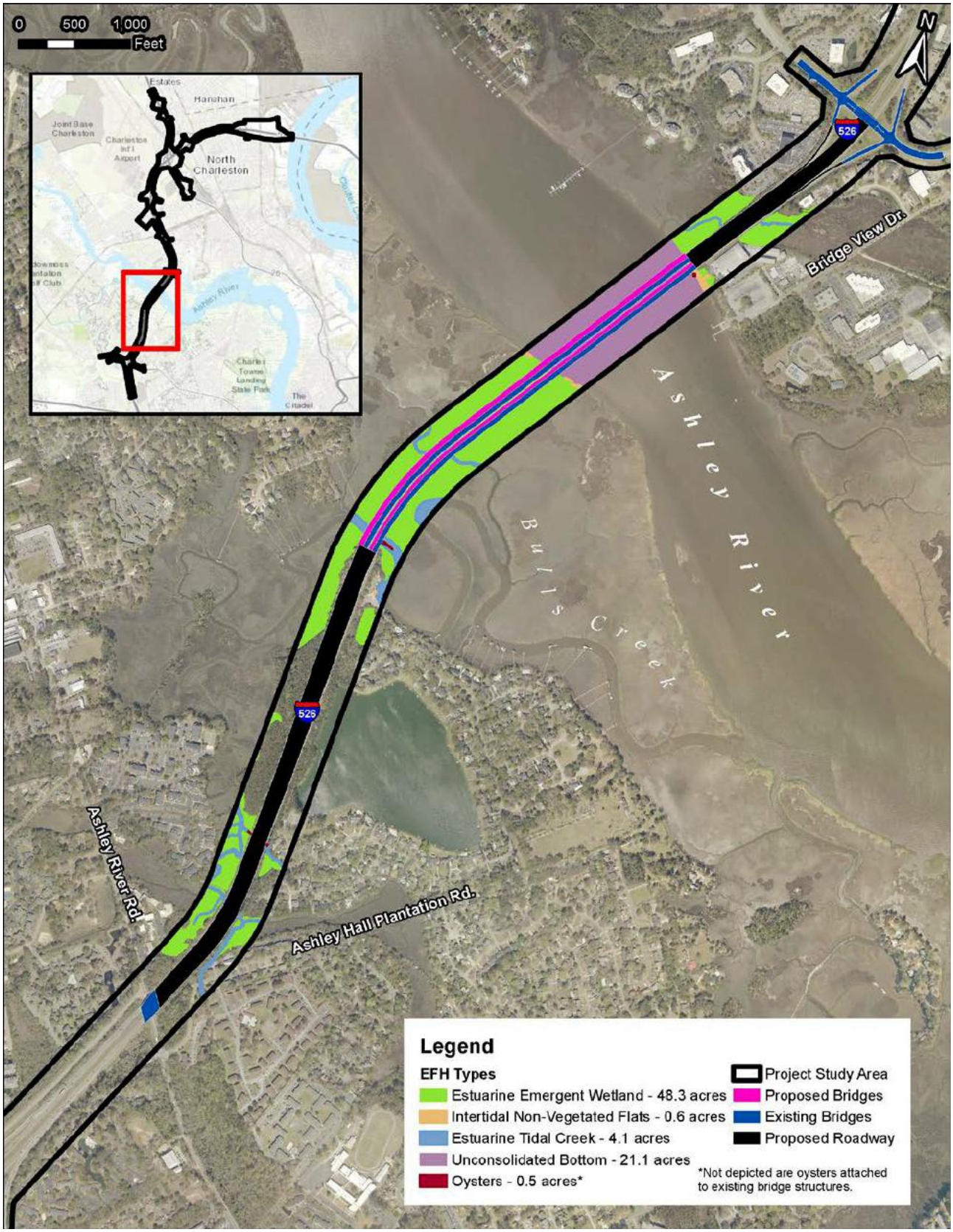


Figure 6-3. Recommended Preferred Alternative Over Ashley River EFH

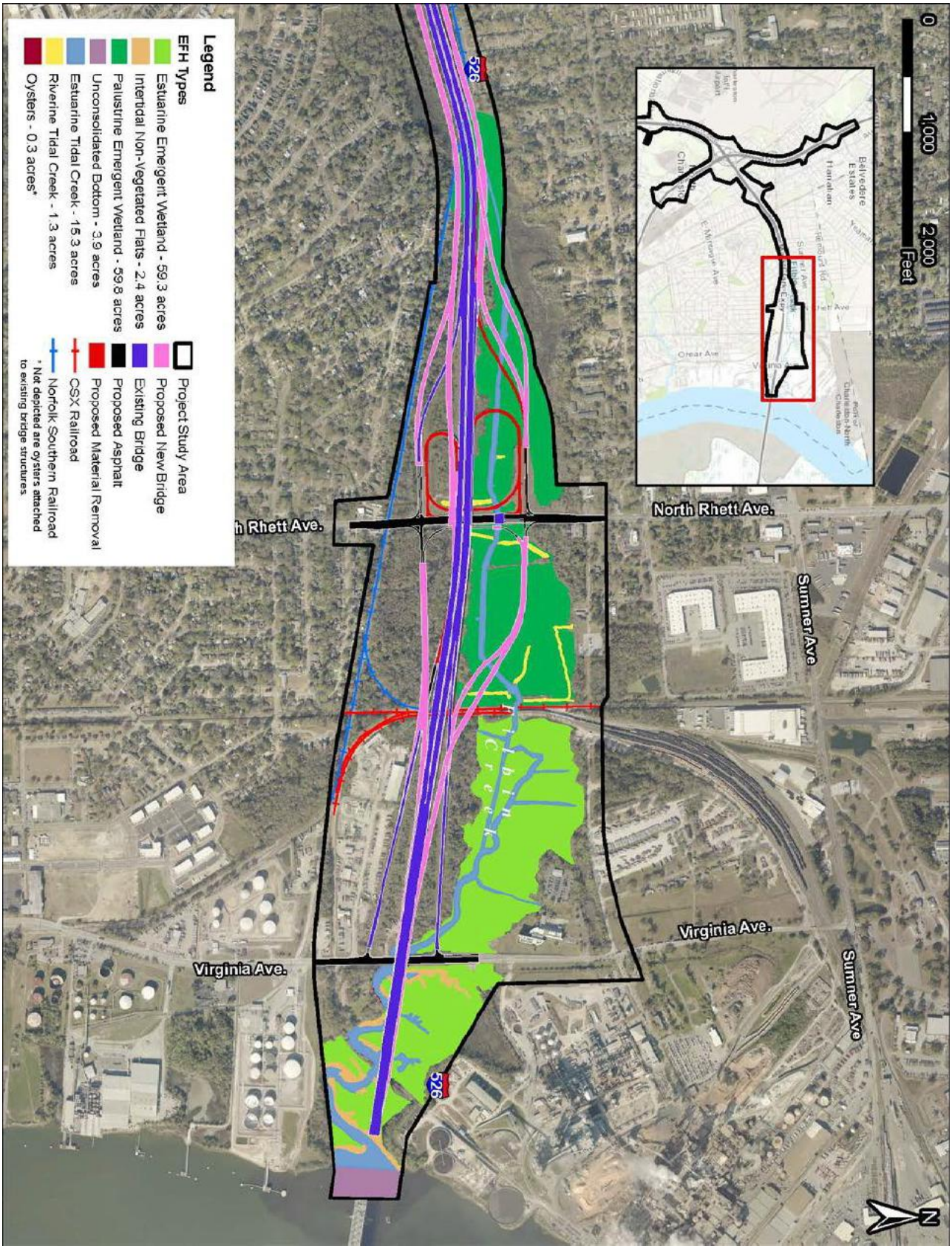


Figure 6-4. Recommended Preferred Alternative Over Filbin Creek EFH

Table 6-1. Potential Impacts to EFH

Habitat Type	Permanent Impacts		Temporary Impacts	
	Direct	Indirect	Direct	Indirect
Estuarine Emergent Wetlands	Fill, Bridge Piles/ Shafts	Shading	Temporary Trestle Piles, Barges, Timber Mats*	Shading, Siltation
Estuarine Tidal Creek	Fill, Bridge Piles/ Shafts	None	Temporary Trestle Piles, Barges, Timber Mats*	Siltation
Intertidal Non-Vegetated Flats	Fill, Bridge Piles/ Shafts	None	Temporary Trestle Piles, Barges, Timber Mats*	Siltation
Palustrine Emergent Wetlands	Fill, Bridge Piles/ Shafts	Shading	Temporary Trestle Piles, Barges, Timber Mats*	Shading, Siltation
Riverine Tidal Creek	Fill, Bridge Piles/ Shafts	None	Temporary Trestle Piles, Barges, Timber Mats*	Siltation
Unconsolidated Bottom	Fill, Bridge Piles/ Shafts	None	Temporary Trestle Piles, Barges, Timber Mats*	Siltation
Oysters	Fill, Bridge Piles/ Shafts	None	Temporary Trestle Piles, Barges, Timber Mats*	Siltation

* Impacts are estimated based on a conceptual design. The final design, location, and use of temporary trestle piles or barges is unknown at this time of this report.

6.1. Permanent Impacts - Direct

Direct impacts to EFH will result from the placement of permanent fill for bridge approaches or bridge structures and sub-structures, such as concrete bridge pilings or shafts. Bridge approaches and existing causeways will generally align with existing roadway alignments but may be required to expand to accommodate additional lanes and shoulders of the proposed widening. Bridge structure and sub-structure will consist of prestressed concrete piles and shafts that are drilled and poured in place. The prestressed piles may have an H-pile steel “stinger” at the end of the concrete pile to prevent damage to the pile as it is driven into hard subsurface materials. Piles may be installed with a hammer or vibratory hammer. Bridge shafts or columns would likely be installed using drilled shaft construction, which typically includes the following process: install steel casing using vibratory hammer, drill inside casing to remove material, install rebar cage, pour concrete inside casing. Bridge piles and drilled shafts will impact EFH as permanent fill.

All EFH types identified within the project study boundary may be impacted with the placement of permanent fill in some form during construction of the project. Final construction limits and final bridge span arrangements are not finalized at this stage in the design. Therefore, the following potential impacts represent an estimation of the worst-case scenario for the placement of new fill for bridge approaches, bridge structure, and bridge sub-structure.

Ashley River Evaluation Area

SCDOT proposes to construct two additional bridges over the Ashley River to the west (upstream) of the existing structures. The two new structures will be tied into the existing bridges to accommodate the proposed 8-lane widening. The new westbound structure will also include an area designated for a future shared-use path (SUP). The SUP would be located on the west side of the bridges, adjacent to the westbound travel lanes. The path would be separated from the motorized travel lanes with a raised barrier separating the path from the outside paved shoulder. Barriers for safety would be provided along both sides of the SUP which would also prevent fishing or casting from the path. Providing pedestrian and cyclist connections to the SUP would be planned and permitted by others, likely local municipalities and/or Charleston County. The permanent direct impacts to EFH associated with the Ashley River bridges will impact high quality estuarine emergent wetlands, high quality intertidal non-vegetated flats, oysters, and high quality unconsolidated bottom EFH.

It is estimated that 709 24-inch prestressed concrete piles would be needed for the bridge widening over the Ashley River. With one work crew performing installation, approximately 2.5 piles would be driven per day with an average of 300 impact hammer strikes per pile. If additional crews are utilized, more piles would be driven per day. It is assumed the contractor would likely utilize multiple crews to expedite construction time. The placement of the 709 24-inch concrete piles may result in permanent impacts to ≤0.1 acres to high quality estuarine emergent wetlands, ≤0.1 acres to high quality estuarine tidal creek, ≤0.1 acres to high quality intertidal non-vegetated flats, ≤0.1 acres to high quality unconsolidated bottom, and≤0.1 acres to high quality oysters.

At the approaches to, and over the main channel of the Ashley River, drilled shafts are proposed to support the new bridge structures. Each shaft would be approximately 7 feet in diameter. Approximately 150 drilled shafts would be needed for the bridge widening. One shaft per week would be constructed by one work crew, but multiple crews could install shafts concurrently. It is assumed the contractor would likely utilize multiple crews to expedite construction time. The placement of 150 7-foot concrete shafts will result in approximately ≤0.1 acres to high quality estuarine emergent wetlands, ≤0.1 acres to high quality estuarine tidal creek, ≤0.1 acres to high quality intertidal non-vegetated flats, ≤0.1 acres to high quality unconsolidated bottom, and ≤0.1 acres to high quality oysters.

Expansion of existing bridge approaches and the possible widening of the existing causeway adjacent to EFH will occur as part of the widening of I-526 LCC WEST. The proposed widening will utilize the existing median and shoulders to the greatest extent practicable and attempt to limit permanent direct impacts to EFH. Based on EFH types adjacent to existing bridge approaches and causeways in the Ashley River evaluation area it can be assumed that some impacts to estuarine emergent wetlands, estuarine tidal creeks, and intertidal non-vegetated flats may occur. Improvements to the bridge approaches would impact approximately 1.3 acres of high quality estuarine emergent wetlands, ≤0.1 acres of high quality estuarine tidal creek, and ≤0.1 acres of high quality intertidal non-vegetated flats.

Table 6-2 summarizes the potential permanent direct impacts to EFH within the Ashley River evaluation area. The total impacts represent an estimation of the worst-case scenario for the

placement of new fill for bridge approaches, bridge structure, and bridge sub-structure associated with the Recommended Preferred Alternative. EFH quality for areas impacted are designated as HQ for high quality and LQ for low quality.

Table 6-2. Estimated Permanent Direct Impacts to Ashley River EFH

	EFH Type				
Impact Type	Estuarine Emergent Wetlands	Estuarine Tidal Creek	Intertidal Non-Vegetated Flats	Unconsolidated Bottom	Oyster
Concrete Piles	≤0.1 acres (HQ)	≤0.1 acres (HQ)	≤0.1 acres (HQ)	≤ 0.1 acres (HQ)	≤0.1 acres (HQ)
Drilled Shafts	≤0.1 acres (HQ)	≤0.1 acres (HQ)	≤0.1 acres (HQ)	≤ 0.1 acres (HQ)	≤0.1 acres (HQ)
Approach/Causeway Fill	1.3 acres (HQ)	≤0.1 acres (HQ)	≤0.1 acres (HQ)	0 acres	0 acres (HQ)
Total	**1.5 acres**	**0.3 acres**	**0.3 acres**	**0.2 acres**	**0.2 acres**

Filbin Creek Evaluation Area

SCDOT proposes to construct multiple new viaduct bridges to provide access to new C-D routes and to modify interchanges at I-526 and North Rhett Avenue and at I-526 and Virginia Avenue. The permanent direct impacts to EFH associated with these new structures will permanently impact high and low quality estuarine emergent wetlands, high and low quality estuarine tidal creeks, high quality intertidal non-vegetated flats, low quality palustrine emergent wetlands, high quality riverine tidal creeks, and high quality oysters.

It is estimated that 35 24-inch prestressed concrete piles would be placed in EFH for the new bridges for C-D routes and modified interchanges adjacent to Filbin Creek EFH. With one work crew performing installation, approximately 10 piles could be driven per day with an average of 400 impact hammer strikes per pile. If additional crews are utilized, more piles would be driven per day. The placement of the 35 24-inch concrete piles would result in permanent impacts to ≤0.1 acres of high quality estuarine tidal creek, ≤0.1 acres of low quality palustrine emergent wetland, and ≤0.1 acres of low quality riverine tidal creek EFH.

The conceptual design also calls for a total of 190 concrete shafts to be placed in EFH for the construction of the new bridges for C-D routes and modified interchanges adjacent to Filbin Creek. There will be multiple sized drilled shafts ranging from 6-foot in diameter to 10-foot in diameter. A maximum of 2 shafts could be installed per week by one crew, but multiple crews could install supports concurrently.

78 of the 190 drilled shafts will be located east of Virginia Avenue and may result in the permanent impact to ≤0.1 acres of high quality estuarine emergent wetlands, ≤0.1 acres of high quality estuarine tidal creek, ≤0.1 acres of high quality intertidal non-vegetated flats, and ≤0.1 acres of high quality oysters. The placement of the other 112 of 190 drilled shafts in EFH will be located to the west of the CSX railroad causeway to the western terminus of EFH in the Filbin Creek evaluation

area. The placement of these 112 shafts will result in permanent impacts to ≤0.1 acres of low quality estuarine tidal creek, ≤0.1 acres of low quality palustrine emergent wetlands, and ≤0.1 acres of low quality riverine tidal creek EFH.

Alteration of existing approaches and addition of new ramps associated with the I-526 and North Rhett Avenue interchange may require expanding existing causeway adjacent to EFH as part of the project. The proposed alteration of the interchange will utilize upland areas to the greatest extent practicable and attempt to limit permanent direct impacts to EFH. However, it can be assumed that there will be some impacts to EFH adjacent to existing interchange which includes low quality estuarine tidal creeks, low quality palustrine emergent wetlands, and low quality riverine tidal creeks may occur.

Furthermore, there is a proposed ramp connection to the east of the existing North Rhett Avenue causeway that allows for access to I-526 East from Virginia Avenue that is required for the Recommended Preferred Alternative. This connection is assumed to be on causeway to match the existing grades of the adjacent roadways and to meet vertical height requirements of the existing I-526 mainline bridges. Additionally, if the existing toe of fill along the North Rhett Avenue causeway is extended by approximately 20 feet, this would represent the worst-case scenario of placement of permanent roadway fill in EFH. The placement of fill for the ramp connection to I-526 eastbound and additional fill added to the North Rhett Avenue causeway would result in permanent impacts to ≤0.1 acres of low quality estuarine tidal creeks, approximately 1.2 acres of low quality palustrine emergent wetlands, and ≤0.1 acres of low quality riverine tidal creeks EFH.

The conceptual plans call also for the existing ramps associated with the existing North Rhett Avenue interchange to be removed at the completion of construction. The footprint for this proposed removal of material from EFH is approximately 2 acres. This may allow for the re-establishment of EFH in these previously impacted areas. However, this is part of the conceptual design and may be altered by the contractor once a final design is established. It is also possible the contractor may not remove the material to an elevation that would allow for the re-establishment of EFH. Therefore, this potential fill-removal is not included in our calculations for permanent direct impacts.

Table 6-3 summarizes the potential permanent direct impacts to EFH within the Filbin Creek evaluation area. The total impacts represent an estimation of the worst-case scenario for the placement of new fill for interchange improvements and bridge structure and sub-structure associated with the Recommended Preferred Alternative. Quality of areas impacted are designated as HQ for high quality and LQ for low quality.

Table 6-3 Estimated Permanent Direct Impacts Filbin Creek EFH

	EFH Type						
Impact Type	Estuarine Emergent Wetlands	Estuarine Tidal Creek	Intertidal Non-Vegetated Flats	Palustrine Emergent Wetlands	Riverine Tidal Creek	Unconsolidated Bottom	Oysters
Concrete Piles	0 acres	≤0.1 acres (HQ) ≤0.1 acres (LQ)	0 acres	≤0.1 acres (LQ)	≤0.1 acres (LQ)	0 acres	≤0.1 acres (HQ)
Drilled Shafts	≤0.1 acres (HQ)	≤0.1 acres (HQ) ≤0.1 acres (LQ)	≤0.1 acres (HQ)	≤0.1 acres (LQ)	≤0.1 acres (LQ)	0 acres	≤0.1 acres (HQ)
Approach/Causeway Fill	0 acres	≤0.1 acres (LQ)	0 acres	1.2 acres (LQ)	≤0.1 acres (LQ)	0 acres	0 acres
Total	**0.1 acres**	**0.5 acres**	**0.1 acres**	**1.4 acres**	**0.3 acres**	**0 acres**	**0.2 acres**

6.2. Permanent Impacts - Indirect

Permanent indirect impacts to EFH include the possible conversion of EFH due to loss of vegetation from shading. The proposed project would indirectly impact EFH by shading salt marsh grasses and freshwater wetland vegetation underneath the proposed bridges. The shading effects could potentially result in areas of sparse vegetation or the existing vegetation dying off. The extent of adverse indirect impact is dependent on several factors, including the proposed bridge orientation and height to width ratio. Impacts to salt marsh vegetation generally occur when the bridge height to bridge width ratio is less than 0.70 (Broome et al, 2005). No permanent loss of EFH is anticipated, but rather an anticipated loss of functions associated with vegetated EFH. These impacts were estimated under the assumption that only estuarine emergent wetlands and palustrine emergent wetlands would be impacted by shading.

A second indirect impact associated from the placement of new bridge structure and sub-structure in tidally influenced waters is the creation of suitable habitat for oyster propagation. The creation of oyster habitat may provide a net improvement to EFH as oysters are considered HAPC. While the new structures may provide similar surface areas for oysters to attach, it is not guaranteed they will attach to the new structures. However, based on existing conditions observed in the field the likelihood of oysters attaching and colonizing on new bridge structures and sub-structures is high. Therefore, creation of oyster habitat is evaluated as a permanent indirect impact for the project. It is assumed that oysters are the only habitat that will potentially benefit from the placement of new or additional bridge structures in EFH.

Ashley River Evaluation Area

Based on field assessments of EFH in the Ashley River evaluation area vegetation occurs from the western bank of the Ashley River and continues westward to the causeway adjacent to Bulls Creek. No vegetation was noted on the eastern banks of the Ashley River within the project area. Areas below the existing structures were observed as being shaded by the existing bridges and it is assumed that the new structure will also shade out vegetation and therefore impact EFH. Shading impacts are only assumed to occur to vegetated EFH which is limited to only estuarine emergent wetlands in the Ashley River evaluation area.

The existing bridge structures are approximately 1,700 feet long and approximately 43 feet wide over vegetated areas from the western bank of the Ashley River to the existing I-526 causeway. An additional structure that is approximately 32 feet wide will be constructed and attached to the existing eastbound bridge. An additional structure that is approximately 47 feet wide will be constructed and attached to the existing westbound bridge. The new westbound bridge will include the SUP. The final bridge widths at the end of construction will be approximately 75 feet and 90 feet wide, respectively, and will match existing bridge lengths. Based on the 0.7 bridge height to bridge width ratio (Broome et al, 2005), indirect impacts to vegetated salt marsh may occur in areas where the bridge height is approximately 53 feet or lower. The conceptual plans depict the proposed bridge heights staying below this 53-foot threshold for the entire length of the bridges. Therefore, it is assumed the entire footprint of the bridges will cause permanent impacts to EFH from shading. This equates to approximately 6.5 acres of shade impacts in EFH. However, the existing bridges have already impacted approximately 3.3 acres of EFH. This area has already been impacted and will not incur any additional shading because of the project. Therefore, the approximate 3.3 acres of existing impact are subtracted from the approximate 6.5 acre total, which nets an approximate total of 3.2 acres of permanent shade impacts to estuarine emergent wetlands from the project.

The placement of new bridge structure within the main channel of the Ashley River are anticipated to have a positive impact on oyster beds. The existing structures within the Ashley River currently serve as hard structure for oysters to attach and colonize. An estimated 14,000 square feet (0.3 acres) of surface area of existing bridge structure was observed with oysters present in the Ashley River Since the existing structures will be maintained, no loss of oyster habitat is anticipated. A net increase in oyster habitat is possible because of the placement of bridge structures within the Ashley River. Assuming an average height of three feet of oyster growth on each new bridge structure, it is anticipated approximately 22,000 square feet (0.5 acres) of new surface area will be available for oysters to colonize once construction is completed. While the new structures may provide similar surface areas for oysters to attach, it is not guaranteed they will attach to the new structures.

Table 6-4 summarizes the potential permanent indirect impacts to EFH within the Ashley River evaluation area. The total impacts represent an estimation of the worst-case scenario for the permanent shading and new oyster habitat associated with the Recommended Preferred Alternative. Quality of areas impacted are designated as HQ for high quality and LQ for low quality.

Table 6-4. Estimated Permanent Indirect Impacts Ashley River EFH

	EFH Type				
Impact Type	Estuarine Emergent Wetlands	Estuarine Tidal Creek	Intertidal Non-Vegetated Flats	Unconsolidated Bottom	Oyster
Shading Impact	3.2 acres (HQ)	0 acres	0 acres	0 acres	0 acres
Total	**3.2 acres**	**0 acres**	**0 acres**	**0 acres**	**0 acres**
Potential Benefit	Estuarine Emergent Wetlands	Estuarine Tidal Creek	Intertidal Non-Vegetated Flats	Unconsolidated Bottom	Oyster
Potential New Oyster Habitat	0 acres	0 acres	0 acres	0 acres	0.5 acres (HQ)
Total	**0 acres**	**0 acres**	**0 acres**	**0 acres**	**0.5 acres**

Filbin Creek Evaluation Area

The proposed bridge widths vary throughout Filbin Creek EFH due to the construction of new interchange ramps and connections to the proposed C-D routes. While bridge heights are not currently established for all structures during this conceptual design phase it is assumed that bridges located to the east of Virginia Avenue will approximately match existing bridge heights. No existing shading effects were observed in the field in areas to the east of Virginia Avenue in the Filbin Creek evaluation area. Therefore, no shading impacts to high quality estuarine emergent wetlands in the Filbin Creek evaluation area are anticipated.

From the west of the CSX railroad causeway to the western terminus of EFH in the Filbin Creek evaluation area the proposed interchange ramp bridges are approximately 36-50 feet wide and split in multiple locations to create connections to the proposed C-D routes. Shading impacts were quantified based on an average bridge of width of approximately 42 feet. Based on the 0.7 bridge height to bridge width ratio (Broome et al, 2005), indirect impacts to vegetated EFH may occur in areas where the bridge height is 30 feet or lower. Since bridge heights are not currently established for all structures during this conceptual design phase it was assumed that all bridges over vegetated EFH in the Filbin Creek evaluation area are 30 feet or less to evaluate a worst-case scenario for shading impacts to EFH. The proposed bridges west of the CSX railroad causeway would result in permanent shading impacts to approximately 10.3 acres of low quality palustrine emergent wetlands.

A second indirect impact associated from the placement of new bridge structure and sub-structure in tidally influenced waters is the creation of suitable habitat for oyster propagation. No oyster presence was observed in Filbin Creek west of Virginia Avenue. The placement of new bridge structure in EFH to the east of Virginia Ave are may have a positive impact on oyster beds. The existing structures within EFH to the east of Virginia Avenue currently serve as hard structure for oysters to attach and colonize. Since the existing structures will be maintained, no loss of oyster habitat is anticipated. A net increase in oyster habitat is anticipated from the placement of bridge structures east of Virginia Avenue. While the new structures may not result in exactly the same surface area for oysters to attach, assuming an average height of three feet of oyster growth on

each new bridge structure it is anticipated <0.1 acres of new surface area will be available for oysters to colonize once construction is completed. While the new structures may provide similar surface areas for oysters to attach, it is not guaranteed they will attach to the new structures.

Table 6-5 summarizes the potential permanent indirect impacts to EFH within the Filbin Creek evaluation area. The total impacts represent an estimation of the worst-case scenario for the permanent shading and new oyster habitat associated with the Recommended Preferred Alternative. Quality of areas impacted are designated as HQ for high quality and LQ for low quality.

Table 6-5. Estimated Permanent Indirect Impacts to Filbin Creek EFH.

	EFH Type						
Impact Type	Estuarine Emergent Wetlands	Estuarine Tidal Creek	Intertidal Non-Vegetated Flats	Palustrine Emergent Wetlands	Riverine Tidal Creek	Unconsolidated Bottom	Oysters
Shading Impact	0 acres	0 acres	0 acres	10.3 acres (LQ)	0 acres	0 acres	0 acres
Total	**0 acres**	**0 acres**	**0 acres**	**10.3 acres (LQ)**	**0 acres**	**0 acres**	**0 acres**
Potential Benefit	Estuarine Emergent Wetlands	Estuarine Tidal Creek	Intertidal Non-Vegetated Flats	Palustrine Emergent Wetlands	Riverine Tidal Creek	Unconsolidated Bottom	Oysters
Potential New Oyster Habitat	0 acres	0 acres	0 acres	0 acres	0 acres	0 acres	<0.1 acres (HQ)
Total	**0 acres**	**0 acres**	**0 acres**	**0 acres**	**0 acres**	**0 acres**	**<0.1 acres (HQ)**

6.3. Temporary Impacts - Direct

Temporary direct impacts to EFH will result from the placement of temporary fill for construction access for the project. Bridge construction access would be in upland areas to the maximum extent practicable. However, for access over marsh areas between the existing bridges either trestle or a combination of barge, barge mats, and timber mats would be needed due to the limited space between the structures. Deeper water and the main channel of the Ashley River and Filbin Creek will likely be accessed via barges for construction. Barges may be delivered and moved via water and transport vessels or via land on flatbed trucks with cranes and other heavy equipment. The piles required to construct the temporary trestle would act as temporary fill to EFH.

Ashley River Evaluation Area

Temporary trestle would be approximately 40 feet wide and would be supported by steel pipe piles. The steel piles would be approximately 24-inches in diameter and would be installed using a vibratory hammer. It is estimated that 240 24-inch steel pipe piles would be needed for temporary work trestle. With one work crew performing installation, approximately 4 piles would be driven per day with an average of 350 impact hammer strikes per pile. If additional crews are utilized, more piles would be driven per day.

The placement of temporary piles will act as fill and will result in a temporary loss of EFH. The use of temporary trestles in the EFH associated with the Ashley River will result in temporary fill impacts

to approximately ≤0.1 acres of high quality estuarine emergent wetlands, ≤0.1 acres of high quality estuarine tidal creek, ≤0.1 acres of high quality intertidal non-vegetated flats, ≤0.1 acres of high quality unconsolidated bottom, and ≤0.1 acres of high quality oysters EFH.

Table 6-6 summarizes the potential temporary direct impacts to EFH within the Ashley River evaluation area. The total impacts represent an estimation of the worst-case scenario for the temporary fill associated with placement of temporary trestle piles to construct the Recommended Preferred Alternative. Quality of areas impacted are designated as HQ for high quality and LQ for low quality.

Table 6-6. Estimated Temporary Direct Impacts to Ashley River EFH.

	EFH Type				
Impact Type	Estuarine Emergent Wetlands	Estuarine Tidal Creek	Intertidal Non-Vegetated Flats	Unconsolidated Bottom	Oyster
Temporary Trestle Piles	≤0.1 acres (HQ)	≤0.1 acres (HQ)	≤0.1 acres (HQ)	≤0.1 acres (HQ)	≤0.1 acres (HQ)
Total	**0.1 acres**	**0.1 acres**	**0.1 acres**	**0.1 acres**	**0.1 acres**

Filbin Creek Evaluation Area

Since the design for the temporary work trestle will not be completed until the project is awarded to a contractor, these impacts represent an estimated worst-case scenario. Temporary trestle would be approximately 40 feet wide and would be supported by steel pipe piles. The steel piles would be approximately 24-inches in diameter and would be installed using a vibratory hammer. It is estimated that 650 24-inch steel pipe piles would be needed for temporary work trestle. With one work crew performing installation, approximately 10 piles could be driven per day with an average of 400 impact hammer strikes per pile. If additional crews are utilized, more piles could be driven per day.

The placement of temporary piles will act as fill and will result in a temporary loss of EFH. It is anticipated that the use of temporary trestles of temporary trestles will result in temporary fill impacts to ≤0.1 acres of high quality estuarine emergent wetland, to ≤0.1 acres of low quality estuarine emergent wetland, ≤0.1 acres of high quality estuarine tidal creek, ≤0.1 acres of low quality estuarine tidal creek, ≤0.1 acres of high quality intertidal non-vegetated flats, ≤0.1 acres low quality palustrine emergent wetlands, ≤0.1 acres of low quality riverine tidal creek, ≤0.1 acres of high quality unconsolidated bottom, and ≤0.1 acres of high quality oysters EFH.

Table 6-7 summarizes the potential temporary direct impacts to EFH within the Filbin Creek evaluation area. The total impacts represent an estimation of the worst-case scenario for the temporary fill associated with placement of temporary trestle piles to construct the Recommended Preferred Alternative. Quality of areas impacted are designated as HQ for high quality and LQ for low quality.

Table 6-7. Estimated Temporary Direct Impacts to Filbin Creek EFH.

	EFH Type						
Impact Type	Estuarine Emergent Wetlands	Estuarine Tidal Creek	Intertidal Non-Vegetated Flats	Palustrine Emergent Wetlands	Riverine Tidal Creek	Unconsolidated Bottom	Oysters
Temporary Trestle Piles	≤0.1 acres (HQ) ≤0.1 acres (LQ)	≤0.1 acres (HQ) ≤0.1 acres (LQ)	≤0.1 acres (HQ)	≤0.1 acres (LQ)	≤0.1 acres (LQ)	≤0.1 acres (HQ)	≤0.1 acres (HQ)
Total	**0.2 acres**	**0.2 acres**	**0.1 acres**	**0.1 acres**	**0.1 acres**	**0.1 acres**	**0.1 acres**

6.4. Temporary Impacts – Indirect

During construction activities and demolition of the existing bridge, temporary indirect impacts such siltation may occur along the margins of the estuarine emergent wetland, estuarine tidal creek, intertidal non-vegetated flats, palustrine emergent wetland, riverine tidal creek, unconsolidated bottom, and oyster reef habitats. Temporary siltation may cause indirect impacts by affecting thermal loading in the environment as well as temporarily increasing turbidity. Alterations in light attenuation in the water column can cause decreased visibility for organisms, affecting feeding, movement, and predator avoidance. Redistribution of sediments can alter nutrient distribution, dissolved oxygen levels, and primary productivity locally and throughout the estuarine waters. When suspended sediments begin to settle on the floor of the estuary, this can cause indirect impacts to benthic communities by smothering and burying organisms (Berry et al., 2003). Since turbidity is a natural condition along South Carolina's coast, impacts from the proposed project are expected to be relatively minor. Impacts should be minimal and would be limited to the immediate area of the construction.

Timber mats and/or barges may cause temporary impacts to vegetation during construction. It is possible vegetation could die while covered by mats or barges. These areas are expected to regenerate vegetation once construction is completed, but there may be a lag due to compaction of the marsh from the weight of construction equipment. Additionally, possible conversion of EFH due to loss of vegetation from shading of vegetation from construction access. The proposed project would indirectly impact EFH by shading salt marsh grasses and freshwater wetland vegetation underneath the proposed temporary trestles. Due to the conceptual design it is difficult to quantify an area of EFH that may be impacted by temporary placement of timber mats and barges. During final design and permitting, the contractor would be responsible for coordinating with SCDOT, FHWA, and NOAA Fisheries regarding design changes that would alter the effects on EFH.

Ashley River Evaluation Area

Multiple temporary trestles and trestle-fingers are anticipated for the construction of the bridges over the Ashley River. Temporary trestles and trestle-fingers would be approximately 40 feet wide, approximately 4,600 feet long and would be supported by steel pipe piles. Based on the 0.7 bridge height to bridge width ratio (Broome et al, 2005), indirect impacts to vegetated EFH may occur in areas where the bridge height is 28 feet or lower. Trestle heights are anticipated to be below 20 feet

for the length of the temporary structure which would result in shading impacts to the high quality estuarine emergent wetland vegetation. Two trestles would be required, one for construction of each bridge over the Ashley River. Additionally, trestle fingers or a combination of timber mats/barges may be utilized to construct each bent of the new bridge. One of the trestles is expected to be placed between the existing Ashley River bridges. This area will be permanently shaded at the completion of construction. Therefore, the footprint of this trestle is not included as a temporary shading impact. The other proposed temporary trestle would result in the temporary shading impact to approximately 2 acres of high quality estuarine emergent wetlands.

Although temporary trestles are the preferred method of construction access for the construction of the new bridges, it is anticipated that timber mats and/or barges may also be required; specifically, for the construction of the temporary trestles. The contractor may need to use mats and/or barges for the entire length of the temporary trestle to install piles, bents, and install the work platform. Any additional use of mats and barges beyond the use of construction access for the temporary trestle is unknown at this time and is subject to the discretion of the contractor. For the trestle located between the two existing bridges over the Ashley River the contractor will have limited space to construct the trestle. The use of mats and barges are not considered practical in this area. It is expected the contractor will install this trestle using a top-down method. Therefore, it is assumed the contractor will only need timber mats or barges for the construction of one trestle in this section of the project. For the purposes of impacts quantification and analysis, it is assumed that timber mats and barges would both be approximately 40 feet wide and would match the length of the proposed trestle, approximately 2,300 feet. All timber mats and barges associated with the trestle construction would be removed upon completion of the trestle. The placement of timber mats and barges may cause temporary impacts to vegetation, including possible shading impacts to approximately 2 acres of high quality estuarine emergent wetlands. Siltation caused by the placement and removal of barges and timber mats is not anticipated to exceed 0.1 acres of impact to estuarine tidal creeks, intertidal non-vegetated flats, unconsolidated bottom, and oysters.

Table 6-8 summarizes the potential temporary indirect impacts to EFH within the Ashley River evaluation area. The total impacts represent an estimation of the worst-case scenario for the temporary shading and siltation impacts associated with the placement and removal of temporary trestles, barges, or timber mats to construct the Recommended Preferred Alternative. Quality of areas impacted are designated as HQ for high quality and LQ for low quality.

Table 6-8. Estimated Temporary Indirect Impacts to Ashley River EFH.

	EFH Type				
Impact Type	Estuarine Emergent Wetlands	Estuarine Tidal Creek	Intertidal Non-Vegetated Flats	Unconsolidated Bottom	Oyster
Barges, Timber Mats, Shading, Siltation	4 acres (HQ)	≤0.1 acres (HQ)	≤0.1 acres (HQ)	≤0.1 acres (HQ)	≤0.1 acres (HQ)
Total	**4 acres**	**≤0.1 acres**	**≤0.1 acres**	**≤0.1 acres**	**≤0.1 acres**

Filbin Creek Evaluation Area

Multiple temporary trestles and trestle-fingers are anticipated for the construction of the C-D bridges and interchange ramps over EFH associated with Filbin Creek. Temporary trestle would be approximately 40 feet wide and would be supported by steel pipe piles. Based on the 0.7 bridge height to bridge width ratio (Broome et al, 2005), indirect impacts to vegetated EFH may occur in areas where the bridge height is 28 feet or lower. Trestle heights are anticipated to be below 20 feet for the length of the structure which would result in shading impacts to the palustrine emergent vegetation and estuarine emergent wetlands associated with Filbin Creek. Multiple trestles and trestle-fingers will be required during construction with an estimated length of 17,025 feet of temporary structure. The proposed temporary trestle would shade approximately 3.2 acres of high quality estuarine emergent wetlands, ≤0.1 acres of low quality estuarine emergent wetlands, and approximately 8.6 acres of low quality palustrine emergent wetlands EFH.

Although temporary trestles are the preferred method of construction access, it is anticipated that timber mats and barges may be used to provide access for the construction of the temporary trestle. For the purposes of impacts quantification and analysis, it is assumed that timber mats and barges would both be approximately 40 feet wide It is assumed that the length of timber mats and barges would match the approximate width and length of the temporary trestle; approximately 17,025 feet long. Once the temporary trestle is constructed, all timber mats and barges associated with the trestle construction would be removed. Any additional use of mats and barges beyond the use of construction access for the temporary trestle is unknown at this time and is subject to the discretion of the contractor. The placement of timber mats and barges may cause temporary impacts to vegetation, including possible shading impacts to approximately 3.2 acres of high quality estuarine emergent wetlands, ≤0.1 acres of low quality estuarine emergent wetlands, and approximately 8.6 acres of low quality palustrine emergent wetlands EFH. Siltation caused by the placement and removal of barges and timber mats is estimated to impact approximately ≤0.1 acres of estuarine tidal creeks, riverine tidal creeks, intertidal non-vegetated flats, unconsolidated bottom, and oysters, respectively.

Table 6-9 summarizes the potential temporary indirect impacts to EFH within the Filbin Creek evaluation area. The total impacts represent an estimation of the worst-case scenario for the temporary shading and siltation associated with the placement and removal of temporary trestles, barges, or timber mats to construct the Recommended Preferred Alternative. Quality of areas impacted are designated as HQ for high quality and LQ for low quality.

Table 6-9. Estimated Temporary Indirect Impacts to Filbin Creek EFH.

	EFH Type						
Impact Type	Estuarine Emergent Wetlands	Estuarine Tidal Creek	Intertidal Non-Vegetated Flats	Palustrine Emergent Wetlands	Riverine Tidal Creek	Unconsolidated Bottom	Oysters
Barges, Timber Mats, Shading, Siltation	6.4 acres (HQ) ≤0.2 acres (LQ)	≤0.1 acres (HQ) ≤0.1 acres (LQ)	≤0.1 acres (HQ)	17.2 acres (LQ)	≤0.1 acres (LQ)	≤0.1 acres (HQ)	≤0.1 acres (HQ)
Total	**6.6 acres**	**0.2 acres**	**0.1 acres**	**17.2 acres**	**0.1 acres**	**0.1 acres**	**0.1 acres**

6.5. EFH Impacts Summary

Permanent direct impacts to EFH will result from the placement of permanent fill for bridge approaches or bridge structures and sub-structures, such as concrete bridge pilings or shafts. The permanent direct impacts to EFH associated with the Ashley River bridges will impact high quality estuarine emergent wetlands, high quality intertidal non-vegetated flats, oysters, and high quality unconsolidated bottom EFH. The permanent direct impacts to EFH associated with Filbin Creek will permanently impact high quality and low quality estuarine emergent wetlands, high quality and low quality estuarine tidal creeks, high quality intertidal non-vegetated flats, low quality palustrine emergent wetlands, low quality riverine tidal creeks, and high quality oysters.

Permanent indirect impacts to EFH include the possible conversion of EFH due to loss of vegetation from shading. Permanent shading impacts are expected to occur to high quality estuarine emergent wetlands in the Ashley River evaluation area and low quality palustrine emergent wetlands in the Filbin Creek evaluation area. A second indirect impact associated from the placement of new bridge structure and sub-structure in tidally influenced waters is the creation of suitable habitat for oyster propagation. This may result in a net benefit to oysters in both evaluation areas within the project limits.

Temporary direct impacts to EFH will result from the placement of temporary fill for construction access for the project. The piles required to construct the temporary trestle would act as temporary fill to EFH. The use of temporary trestles in the EFH associated with the Ashley River will result in temporary direct impacts to high quality estuarine emergent wetlands, high quality estuarine tidal creek, high quality intertidal non-vegetated flats, high quality unconsolidated bottom, and high quality oysters. The use of temporary trestles in Filbin Creek EFH will temporarily impact high quality and low quality estuarine emergent wetlands, high quality and low quality estuarine tidal creeks, high quality intertidal non-vegetated flats, low quality palustrine emergent wetlands, low quality riverine tidal creeks, and high quality oysters.

During construction temporary indirect impacts will occur in EFH. Temporary indirect impacts to EFH from shading or loss of vegetation associated with placement of timber mats, barges, and temporary trestle construction access. The proposed temporary trestle would shade approximately high quality estuarine emergent wetlands and low quality palustrine emergent wetlands EFH. Additionally,

localized siltation may occur.

Table 6-10 summarizes all impacts to EFH within the project limits. The total impacts represent an estimation of the worst-case scenario for the respective impact types discussed in previous sections. Quality of areas impacted are designated as HQ for high quality and LQ for low quality.

Table 6-10. Summary of Estimated Impacts to EFH for I-526 WEST LCC.

	EFH Type							
Impact Type	Estuarine Emergent Wetlands	Estuarine Tidal Creek	Intertidal Non-Vegetated Flats	Palustrine Emergent Wetlands	Riverine Tidal Creek	Unconsolidated Bottom	Oysters	Total per Impact Type
Permanent Direct (Concrete Piles, Drilled Shafts, Approach/Causeway Fill)	1.6 acres (HQ)	0.5 acres (HQ)	0.4 acres (HQ)	1.4 acres (LQ)	0.3 acres (LQ)	0.2 acres (HQ)	0.4 acres (HQ)	3.1 acres (HQ)
		1.3 acres (LQ)						3 acres (LQ)
Permanent Indirect (Shading)	3.2 acres (HQ)	0 acres	0 acres	10.3 acres (LQ)	0 acres	0 acres	0 acres	3.2 acres (HQ)
								10.3 acres (LQ)
Temporary Direct (Temporary Trestle Pilings)	0.2 acres (HQ)	0.2 acres (HQ)	0.2 acres (HQ)	0.1 acres (LQ)	0.1 acres (LQ)	0.2 acres (HQ)	0.2 acres (HQ)	1 acre (HQ)
	0.1 acres (LQ)	0.1 acres (LQ)						0.4 acres (LQ)
Temporary Indirect (Barges, Timber Mats, Shading, Siltation)	14.4 acres (HQ)	0.2 acres (HQ)	0.2 acres (HQ)	17.2 acres (LQ)	0.1 acres (LQ)	0.2 acres (HQ)	0.2 acres (HQ)	15.2 acres (HQ)
	0.2 acres (LQ)	0.1 acres (LQ)						17.8 acres (LQ)
Total per EFH Type	19.4 acres (HQ)	0.9 acres (HQ)	0.8 acres (HQ)	29 acres (LQ)	0.5 acres (LQ)	0.6 acres (HQ)	0.8 acres (HQ)	22.5 acres (HQ)
	0.3 acres (LQ)	1.5 acres (LQ)						31.3 acres (LQ)
							TOTAL IMPACTS	***53.8 acres***

6.6. Cumulative Impacts to EFH

SCDOT has updated the design of the bridges crossing the Ashley River to include an accommodation for a future shared use path (SUP). Although this path will not connect to existing pedestrian and bicycle facilities, it will provide a critical link for the future overall mobility of pedestrians and cyclists in the project corridor. Currently, there are no dedicated pedestrian or bicycle facilities near the I-526 crossing of the Ashley River. The I-526 Ashley River SUP will provide a critical link for existing pedestrian and bicycle connectivity, as well as provide a connection for future improvements by other project sponsors. Providing pedestrian and cyclist connections to the bridge path would be planned and permitted by others, likely local municipalities and/or Charleston County.

Future SUP connection locations may be constrained by the I-526 interstate facility and adjacent roadway networks, private property ownership, and adjacent wetlands and EFH. However, the proposed SUP accommodation does not preclude future shared-use connection alternatives. Although the SUP accommodation will be located on the west side of the Ashley River bridges, future paths could be completed on either the westbound or eastbound side of I-526. SCDOT has coordinated with local municipalities and reviewed concepts of future SUP connections to verify future connections would be feasible on either the westbound and eastbound sides of I-526. The proposed SUP accommodation does not dictate possible future alignments of any shared-use connections.

Future projects to complete connections to the SUP are likely to result in impacts to EFH. Although future impacts are expected to complete connections to the SUP, the inclusion of the SUP as part of the I-526 LCC WEST project eliminates the need for a separate shared-use structure over the Ashley River. This helps to avoid and minimize impacts related to the construction of future shared-use infrastructure near the Ashley River. Construction of future shared-use infrastructure would likely consist of a boardwalk, concrete bridge, or other reasonable types of elevated structures to cross wetlands and EFH. It is also possible that permanent fill causeways may be required to provide appropriate connections for elevated structures from uplands. Any future shared-use infrastructure will likely impact EFH with permanent direct, permanent indirect, temporary direct, and temporary indirect impacts. Placement of fill for bridge approaches, construction access, and placement of bridge piles are all possible sources of future impacts related to any future shared-use path connections.

Funding does not currently exist for additional shared-use infrastructure and there are no planned connections at this time. Any future shared-use infrastructure connections will require additional EFH impacts analysis and all required authorizations from state and federal regulatory agencies.

7. Avoidance and Minimization

Impacts to EFH would be minimized to the maximum extent practicable. As the project design progresses, the actual construction limits will be refined, and further avoidance and minimization measures taken to reduce the amount of impact to EFH. The concepts for bridges over both estuarine and riverine tidal creeks have been designed to span the entire creek channels and avoid any roadway fill impacts to the channels where practicable. In addition, maximizing the length of spans and the distance between bents and columns where practicable will minimize the amount of fill being placed in EFH.

Through coordination efforts with NOAA Fisheries, the SCDOT and NOAA Fisheries have developed the following EFH-specific list of general best management practices (BMPs) to minimize construction-related impacts to EFH and water quality within the project watershed. A copy of the EFH-specific BMPs are included in Appendix A. It is anticipated that many of these BMPs will be incorporated as conditions/commitments to the Section 404/401 permit. In accordance with the permit, the project plans and/or Environmental Compliance Plan will clearly state all environmental commitments and BMPs to be implemented during and following project construction. The contractor will be required to utilize avoidance and minimization methods and BMPs will be implemented to the greatest extent practicable during the construction of the project.

8. Mitigation

The project will result in unavoidable impacts to EFH. The placement of fill for the bridge approaches and new bridge structure and sub-structure will result in permanent direct impacts to EFH. Shading associated with permanent bridge structures will result in the permanent indirect impacts to EFH. Temporary impacts associated with construction access will result in temporary direct and indirect impacts. The permanent loss of EFH and the temporal lag for restoration to existing conditions from temporary impacts may take months or years. Therefore, mitigation to offset these unavoidable impacts will be required. A final mitigation plan will be developed for the Section 404/401 permits and will include consideration for impacts to EFH as part of that plan. SCDOT/FHWA will develop the mitigation plan in coordination with the appropriate resource agencies. This mitigation plan will be established as part of the Section 404 permitting phase of the project.

9. Conclusions

The proposed project will result in unavoidable impacts to EFH. The placement of fill for the widening of I-526 LCC WEST, bridge approaches, and new bridge structure and sub-structure will result in permanent direct impacts to EFH. Shading associated with permanent bridge structures will result in the permanent indirect impacts to EFH. Temporary impacts associated with construction access will result in temporary direct and indirect impacts. The permanent loss of EFH and the temporal lag for restoration to existing conditions from temporary impacts may take months or years. Therefore, it is the determination of SCDOT that the proposed project would adversely impact the EFH in the project area.

Since there will be impacts to the EFH and possibly aquatic species managed by the SAFMC, an EFH Mitigation Plan will be established. This mitigation plan will be established as part of the Section 404 permitting phase of the project.

The project is expected to be constructed in phases, either via the design-build or design-bid-build process. Final construction and design plans would be determined by the contractor and/or SCDOT and FHWA. As such, SCDOT and FHWA will be responsible for coordinating with NOAA Fisheries regarding design changes that would alter the effects on EFH.

Documentation of all coordination between SCDOT, FHWA, and NOAA Fisheries related to EFH consultation can be found in Appendix B.

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Appendix A
SCDOT EFH Specific Construction Best Management Practices (BMPs)

Essential Fish Habitat-List of Best Management Practices

- - During the course of construction or post-construction, the impairment of the hydrologic flow of any creek system will be minimized to the maximum extent practicable.
- - Construction BMPs must include measures to reduce temporary impacts including turbidity and sedimentation. For example, temporary sediment and runoff control fences (e.g., a silt fence consisting of geotextile fabric installed between supporting posts) should be installed along approaches adjacent to EFH; floating turbidity barriers should be used when activities could result in increased turbidity downstream of work site.
- -To the maximum extent practicable, construction activities impacting EFH should be conducted during low biological use periods (winter months, Nov1- Feb 28).
- - To the maximum extent practicable, plan the stages of development so that only the areas that are actively being developed are exposed. All other areas should have a good cover of either temporary or permanent vegetation.
- -SCDOT must not conduct work in a manner that results in permanent bank erosion or decreased stabilization. Sediment entering the waterway due to equipment presence and operation must be avoided to the maximum extent practicable.
- -Grading should be completed as soon as possible after it has begun.
- -Keep runoff velocities low and retain runoff on the site using sediment and erosion control BMPs to the maximum extent practicable.
- -Any excavated material must not be disposed of in the adjacent waterway or sidecast into adjacent marsh.
- -To the maximum extent practicable, project areas that are excavated adjacent to the marsh must be graded down to adjacent marsh levels.
- -Where necessary, banks should be stabilized with bioengineering material (e.g, biologs, fiber matting, etc.).
- -Raw or live concrete (which is toxic to aquatic life) may not come in contact with the wetlands or open water until the concrete has cured.
- -At the end of the workday, remove debris that may enter EFH by wind, tides, etc.
- -Temporary impacts from work mats should be avoided to the maximum extent practicable. Temporary work trestles or use of existing infrastructure is preferred.
- - Riprap should be minimized to the least amount practicable. Riprap place within tidal wetlands should consist of clean rock or masonry clean of pollutants and debris.
- -Material (e.g., riprap, pilings) may not be placed in waterways such that it impairs the hydrologic flow at mean low tide unless the rip rap is needed to support the integrity of the bridge abutment or roadway that is susceptible to scour.
- -Any impact pile driving shall be conducted out-of-water or at low tide where practicable.

- -Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.
- -All steps necessary must be taken to prevent oil, tar, trash, debris and other pollutants from entering adjacent wetlands and/or waterways.
- -Once initiated, projects must be carried to completion in an expeditious manner in order to minimize the period of disturbance and upon completion, all disturbed areas must be permanently stabilized with vegetative cover and/or rip-rap, as appropriate. Native vegetation and/or native seed mixtures should be utilized.
- -Construction access areas must be clearly identified in the permit application or construction access must consist of minimal clearing for installation of elevated working platform(s), timber mat(s) or barge(s). Impacts will be temporary and minor in nature. There will be no mechanized equipment allowed to operate within jurisdictional areas unless it has been clearly identified and authorized in the approved plans. All impacts for construction access count towards the thresholds allowed under this General Permit.

Appendix B
Agency Coordination and Consultation

From: Cynthia Cooksey - NOAA Federal
To: Belcher, Jeffery - FHWA
Cc: Riddle, Nicole L.; McGoldrick, Will
Subject: Re: EFH Consult
Date: Wednesday, July 8, 2020 10:08:02 AM

I have read over the 526 West LCC EFH Assessment and deem it complete with adequate information to proceed with the consultation.
Thank You,
Cindy

Cynthia Cooksey
Fishery Biologist

NOAA
National Marine Fisheries Service
Southeast Regional Office - Habitat Conservation Division
219 Fort Johnson Road
Charleston, SC 29412
PH: (843) 460-9922
E-Mail: cynthia.cooksey@noaa.gov

On Wed, Jul 1, 2020 at 5:58 PM Belcher, Jeffrey (FHWA) <Jeffrey.Belcher@dot.gov> wrote:

> Cindy,
>
> We are coming upon our permit timetable milestone on July 8 to have our EFH submittal deemed a complete package. Could you give us an update on your review? Hopefully you have what you need to deem the submittal adequate for review.
>
> Much thanks,
>
> J. Shane Belcher
> Lead Environmental Specialist
> Federal Highway Administration
> 1835 Assembly Street, Suite 1270
> Columbia, SC 29201
> Phone: 803-253-3187
> Fax: 803-253-3989
>
> The content of this email is confidential and intended for the recipient specified in message only.
>
> -----Original Message-----
> From: McGoldrick, Will [mailto:McGoldriWR@scdot.org]
> Sent: Monday, June 08, 2020 3:15 PM

To: Cynthia Cooksey <'cynthia.cooksey@noaa.gov'>
Cc: Belcher, Jeffrey (FHWA) <Jeffrey.Belcher@dot.gov>; Riddle, Nicole L. <RiddleNL@scdot.org>
Subject: EFH Consult

Hey Cindy,
Hope you are doing well. I wanted to check in with you since we haven't really connected after our EFH consultation request. I wanted to make sure you had enough information for your review or had some comments we needed to work on for you. I know Shane sent out concurrence letters and thought this would be a good time to touch base on EFH as well. Please let me know if you need anything.

Will McGoldrick | DB Env. Coordinator
SCDOT Environmental Services Office
Mobile Reply

From:	Dale Youngkin - NOAA Federal
To:	Rowe, Anne (FHWA)
Cc:	Helen Chabot - NOAA Federal; Vaughn, Colleen (OST); Pace Wilber - NOAA Federal; Riddle, Nicole L.; Belcher, Jeffery - FHWA; Cynthia Cooksey - NOAA Federal; Noah Silverman - NOAA Federal; Brian Rosegger - NOAA Affiliate; Andrew Herndon - NOAA Federal
Subject:	Fwd: NMFS EFH comments for FHWA/SCDOT I-526 Lowcountry Corridor West
Date:	Wednesday, September 2, 2020 3:41:29 PM
Attachments:	SCDOT-FHWA_526LCCWest_EFHAssesment_FINAL.pdf

Good afternoon

The final EFH milestone for I-526 Lowcountry Corridor can be marked as complete, and the EFH consultation status can be changed from
"In Progress" to "Complete." The action outcome is No Conservation Recommendations Issued.

Please let us know when the updates have been published on the Dashboard.

Thank you
Dale

---------- Forwarded message ---------
From: **Pace Wilber - NOAA Federal** <pace.wilber@noaa.gov>
Date: Wed, Sep 2, 2020 at 3:23 PM
Subject: NMFS EFH comments for FHWA/SCDOT I-526 Lowcountry Corridor West
To: <RiddleNL@scdot.org>
Cc: Jeffrey Belcher <jeffrey.belcher@dot.gov>, Cynthia Cooksey - NOAA Federal <cynthia.cooksey@noaa.gov>, Noah Silverman - NOAA Federal <noah.silverman@noaa.gov>, Brian Rosegger - NOAA Affiliate <brian.rosegger@noaa.gov>, Helen Chabot - NOAA Federal <Helen.Chabot@noaa.gov>, Dale Youngkin - NOAA Federal <dale.youngkin@noaa.gov>, Andrew Herndon - NOAA Federal <andrew.herndon@noaa.gov>

--
Dale Youngkin
Biologist (Endangered Species)
NOAA Fisheries | U.S. Department of Commerce
Office: (301) 427-8426
www.fisheries.noaa.gov

From:	Pace Wilber - NOAA Federal
To:	Riddle, Nicole L.
Cc:	Belcher, Jeffery - FHWA; Cynthia Cooksey - NOAA Federal; Noah Silverman - NOAA Federal; Brian Rosegger - NOAA Affiliate; Helen Chabot - NOAA Federal; Dale Youngkin - NOAA Federal; Andrew Herndon - NOAA Federal
Subject:	NMFS EFH comments for FHWA/SCDOT I-526 Lowcountry Corridor West
Date:	Wednesday, September 2, 2020 3:23:58 PM
Attachments:	SCDOT-FHWA_526LCCWest_EFHAssesment_FINAL.pdf

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
https://www.fisheries.noaa.gov/region/southeast

September 2, 2020 F/SER47:CC/pw

(Sent via Electronic Mail)

Nicole Riddle
South Carolina Department of Transportation
Environmental Services Office
955 Park Street
Columbia, SC 29201

Dear Ms. Riddle:

NOAA's National Marine Fisheries Service (NMFS) reviewed the *Essential Fish Habitat Assessment I-526 Lowcountry Corridor West* dated May 8, 2020, prepared on behalf of the Federal Highway Administration (FHWA). The South Carolina Department of Transportation (SCDOT) and FHWA propose improvements to the I-526 Lowcountry Corridor West in Charleston County. FHWA and SCDOT are pursuing the proposed action under the One Federal Decision/FAST Act 41 guidance. The FHWA and SCDOT have determined the proposed action will adversely affect essential fish habitat (EFH) and, therefore, have included measures to avoid and minimize effects on EFH and will establish a plan to mitigate for unavoidable impacts to EFH. As the nation's federal trustee for the conservation and management of marine, estuarine, and anadromous fishery resources, the NMFS provides the following comments and recommendations pursuant to authorities of the Fish and Wildlife Coordination Act and the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

The EFH Assessment describes the proposed action, documents existing EFH conditions within the project area, and provides an analysis of the potential impacts to EFH from the proposed action. The proposed action involves 12.7 miles of improvements along I-526 from Paul Cantrell Boulevard to Virginia Avenue, inclusive of the I-26/I-526 interchange in the greater Charleston Metro Area. The project area includes portions of Ashley River, Filbin Creek, and their associated wetlands. The EFH Assessment outlines environmental protection provisions and best management plans for avoiding and minimizing adverse impacts to natural resources, including seasonal work restrictions; siting shore-side development on existing cleared, developed areas to avoid impacts to wetlands; noise reduction techniques; and pollution and erosion control measures. The proposed action is a design-build project. Accordingly, FHWA and SCDOT have committed to continue to coordinate with the NMFS as project plans further develop.

The EFH Assessment was comprehensive and complete. In addition to reviewing the document, NMFS participated in a site visit on February 6, 2020, a workshop on February 12, 2020, and several meetings of the interagency coordination team. The high level of engagement on this project between the SCDOT, FHWA, and NMFS allowed the EFH Assessment to address fully concerns raised during initial meetings. While the proposed action will result in adverse impacts

to EFH, the FHWA and SCDOT are implementing strategies to avoid and minimize those impacts and to increase the likelihood of recovery at locations not expected to have permanent impacts. These strategies include performing work during periods of low biological activity and using bridges where the highway will cross EFH, rather than lengthy causeways that remove EFH and alter the flows of tidal waters. Of the 216.9 total acres of EFH found within the project area, potentially up to 5.6 acres of EFH will be permanently impacted by fill, 12.9 acres of EFH will permanently impacted via shading, and 2.8 acres of EFH may be temporarily impacted. While the extents of these impacts are significant, FHWA, SCDOT, and NMFS expect the acreages to decrease during the design-build process. The FHWA and SCDOT have committed to working with the NMFS and other resource agencies to develop a mitigation plan to ensure all unavoidable EFH impacts are appropriately mitigated. The EFH mitigation plan may include purchasing mitigation credits from an approved mitigation bank or Permittee Responsible Mitigation (PRM), and the NMFS believes both options are viable for scope and scale of this project's impacts. During mitigation discussions, the NMFS highlighted that bank credits, if used, should come from a mitigation bank of similar salinity to the project area and be proximal to the Charleston Metro Area or that a PRM project be in-kind of the project effects. The NMFS looks forward to continued participation in development of the mitigation plan. Therefore, based on the information provided and the commitments from FHWA and SCDOT to seek opportunities to reduce further the EFH impacts during the design-build process and to develop appropriate compensatory mitigation, the NMFS has no EFH conservation recommendations at this time for the proposed improvements to the I-526 Lowcountry Corridor West.

The NMFS appreciates the opportunity to provide these comments and thanks the FHWA and SCDOT for their efforts in incorporating avoidance and minimization strategies and early engagement on the project. Please direct related correspondence to the attention of Cindy Cooksey at our Charleston Area Office. She may be reached at (843) 460-9922 or by e-mail at Cynthia.Cooksey@noaa.gov.

Sincerely,

WILBER.THOMAS.PAYSON.1365820186
Digitally signed by WILBER.THOMAS.PAYSON.1365820186
Date: 2020.09.02 15:18:10 -04'00'

/for

Virginia M. Fay
Assistant Regional Administrator
Habitat Conservation Division

cc: SCDOT, RiddleNL@scdot.org
FHWA, Jeffrey.Belcher@dot.gov
F/SER, Noah.Silverman@noaa.gov
F/SER47, Cynthia.Cooksey@noaa.gov