



# Appendix J

## Biological Evaluation



June 2021



# BIOLOGICAL EVALUATION

## WITH ADDENDUM

SCDOT PIN: P030450

USFWS LOG NO. 2018-CPA-0085

SERO-2020-02072

Prepared for:



Prepared by:



Version 1 – July 16, 2020

Version 2 – November 3, 2020

Version 3 - February 19, 2021

*This page intentionally left blank.*

## TABLE OF CONTENTS

<b>1.0 Introduction .....</b>	<b>1</b>
1.1 Project Description .....	1
<b>2.0 Agency Consultation History .....</b>	<b>2</b>
<b>3.0 Federally Proposed and Listed Species and Critical Habitat .....</b>	<b>3</b>
3.1 Threatened and Endangered Species Descriptions.....	5
3.2 Amphibians.....	5
3.2.1 Frosted flatwoods salamander ( <i>Ambystoma cingulatum</i> ) – Threatened; Critical Habitat .....	5
3.3 Birds.....	6
3.3.1 American wood stork ( <i>Mycteria americana</i> ) – Threatened .....	6
3.3.2 Bald eagle ( <i>Haliaeetus leucocephalus</i> ) – BGEPA .....	6
3.3.3 Eastern black rail ( <i>Laterallus jamaicensis jamaicensis</i> ) –Threatened .....	7
3.3.4 Piping plover ( <i>Charadrius melodus</i> ) – Threatened; Critical Habitat.....	7
3.3.5 Red-cockaded woodpecker ( <i>Picoides borealis</i> ) – Endangered .....	8
3.3.6 Red knot ( <i>Calidris canutus rufa</i> ) – Threatened .....	8
3.4 Fish .....	9
3.4.1 Atlantic sturgeon ( <i>Acipenser oxyrinchus</i> ) – Endangered; Critical Habitat.....	9
3.4.2 Shortnose sturgeon ( <i>Acipenser brevirostrum</i> ) – Endangered .....	9
3.5 Mammals.....	10
3.5.1 Northern long-eared bat ( <i>Myotis septentrionalis</i> ) – Threatened .....	10
3.5.2 West Indian manatee ( <i>Trichechus manatus</i> ) – Threatened .....	10
3.6 Plants.....	10
3.6.1 American chaffseed ( <i>Schwalbea americana</i> ) – Endangered .....	10
3.6.2 Pondberry ( <i>Lindera melissifolia</i> ) – Endangered .....	11
3.7 Reptiles.....	11
3.7.1 Green sea turtle ( <i>Chelonia mydas</i> ) – Threatened .....	11
3.7.2 Kemp’s ridley sea turtle ( <i>Lepidochelys kempii</i> ) – Endangered .....	11
3.7.3 Loggerhead sea turtle ( <i>Caretta caretta</i> ) – Threatened; Critical Habitat .....	12
<b>4.0 Environmental Baseline .....</b>	<b>13</b>
4.1 Project Study Area.....	13
4.2 Biotic Communities .....	13
4.2.1 Upland Habitats.....	14
4.2.2 Wetland and Open Water Habitats .....	15
4.3 Water Quality .....	16
<b>5.0 Alternatives Analysis .....</b>	<b>17</b>
5.1 No Build Alternative .....	17



5.2 Preliminary Range of Alternatives.....	17
5.3 Reasonable Alternatives.....	17
5.4 RECOMMENDED PREFERRED ALTERNATIVE.....	18
5.4.1 Revisions to the Recommended Preferred Alternative 4A .....	18
<b>6.0 Proposed Action.....</b>	<b>20</b>
6.1 Construction Activities and Potential Impacts or Effects.....	20
6.1.1 Site Preparation.....	20
6.1.2 Borrow Pits and Disposal Areas.....	21
6.1.3 Roadway Construction .....	21
6.1.4 Bridge Construction Access .....	22
6.1.5 Bridge Construction.....	24
6.1.6 Bridge Demolition.....	26
6.1.7 Underwater Construction Noise.....	28
6.2 Bridge Lighting.....	33
6.3 Bridge Fender System .....	33
6.4 Stormwater Runoff.....	33
<b>7.0 Effects Analysis .....</b>	<b>35</b>
7.1 Amphibians.....	35
7.1.1 Frosted flatwoods salamander ( <i>Ambystoma cingulatum</i> ) – Threatened; Critical Habitat .....	35
7.2 Birds.....	35
7.2.1 American wood stork ( <i>Mycteria americana</i> ) – Threatened.....	35
7.2.2 Bald eagle ( <i>Haliaeetus leucocephalus</i> ) – BGEPA.....	36
7.2.3 Eastern black rail ( <i>Laterallus jamaicensis jamaicensis</i> ) – Threatened .....	37
7.2.4 Piping plover ( <i>Charadrius melodus</i> ) – Threatened; Critical Habitat.....	38
7.2.5 Red-cockaded woodpecker ( <i>Picoides borealis</i> ) – Endangered.....	39
7.2.6 Red knot ( <i>Calidris canutus rufa</i> ) – Threatened .....	39
7.3 Fish .....	40
7.3.1 Atlantic sturgeon ( <i>Acipenser oxyrinchus</i> ) – Endangered; Critical Habitat.....	40
7.3.2 Shortnose sturgeon ( <i>Acipenser brevirostrum</i> ) – Endangered .....	40
7.4 Mammals.....	48
7.4.1 Northern long-eared bat ( <i>Myotis septentrionalis</i> ) – Threatened .....	48
7.4.2 West Indian manatee ( <i>Trichechus manatus</i> ) – Threatened .....	49
7.5 Plants.....	51
7.5.1 American chaffseed ( <i>Schwalbea americana</i> ) – Endangered.....	51
7.5.2 Pondberry ( <i>Lindera melissifolia</i> ) – Endangered .....	51
7.6 Reptiles.....	51
7.6.1 Green sea turtle ( <i>Chelonia mydas</i> ) – Threatened .....	51
7.6.2 Kemp’s ridley sea turtle ( <i>Lepidochelys kempii</i> ) – Endangered .....	52
7.6.3 Loggerhead sea turtle ( <i>Caretta caretta</i> ) – Threatened; Critical Habitat .....	52
<b>8.0 Conservation Measures .....</b>	<b>61</b>
8.1 Erosion, Sediment, and Turbidity Control.....	61

8.2 Post Construction Stormwater Treatment.....	61
8.3 Bridge Span Length .....	61
8.4 Underwater Noise Reduction.....	61
8.5 Bridge Lighting.....	62
8.6 Permitting Requirements .....	62
8.7 USFWS and NMFS Construction Conditions.....	62
8.8 Recommended Environmental Commitments.....	62
<b>9.0 Conclusions .....</b>	<b>65</b>
<b>10.0 References .....</b>	<b>67</b>

## LIST OF TABLES

Table 2-1: Section 7 Consultation Summary.....	2
Table 3-1: Federally Protected Species in Beaufort County, South Carolina (as of January 4, 2021) .....	4
Table 4-1: Identified Habitat Types in the Project Study Area .....	14
Table 5-1: Identified Habitat Types within Revised Recommended Preferred Alternative 4A .....	19
Table 6-1: Potential Roadway Fill Impacts to Wetland Habitats .....	22
Table 6-2: Estimated Temporary Work Trestle Impacts to Estuarine Wetland Habitats .....	23
Table 6-3: Bridge Support Structure Types in Wetland Habitats.....	25
Table 6-4: Estimated Permanent Impacts to Wetland Habitats from Bridge Construction .....	26
Table 6-5: Existing In-Water Bridge Support Structures to Be Removed .....	26
Table 6-6: Wetland Habitats Potentially Benefited by Removal of Existing US 278 Bridges.....	28
Table 6-7: Estimated Unattenuated Noise Levels for Impact Pile Driving .....	29
Table 6-8: Estimated Unattenuated Underwater Noise Levels Associated with Vibratory Pile Driving.....	30
Table 6-9: Estimated Unattenuated Underwater Noise Levels Associated with Auger Usage .....	30
Table 6-10: Standard Noise Attenuation Methods.....	31
Table 6-11: Estimated Attenuated Noise Levels for the Installation and Removal of All Bridge Support Structures .....	32
Table 7-1: Estimated Temporary Work Trestle Impacts to Sturgeon Habitats.....	41
Table 7-2: NMFS-SERO Underwater Noise Level Thresholds for Sturgeon .....	42
Table 7-3: Summary of 24-inch Pipe Piles to be Installed by Impact Pile Driving for Sturgeon Effects Analysis .....	43
Table 7-4: Distances for Potential Effects to Sturgeon from Impact Pile Driving .....	43
Table 7-5: Summary of 96-inch Steel Pipe Casings to be Installed by Vibratory Pile Driving for Sturgeon Effects Analysis .....	44
Table 7-6: Distances for Potential Effects to Sturgeon from Vibratory Pile Driving .....	45
Table 7-7: Summary of Auger Use for the Installation of Drilled Shaft Support Structures for Sturgeon Effects Analysis .....	46
Table 7-8: Distances for Potential Effects to Sturgeon from Auger Use.....	46
Table 7-9: Estimated Permanent Impacts to Suitable Habitat for Sturgeon .....	47
Table 7-10: Estimated Temporary Work Trestle Impacts to Sea Turtle Habitats .....	53

Table 7-11: NMFS-SERO Underwater Noise Level Thresholds for Sea Turtles .....	54
Table 7-12: Summary of 24-inch Pipe Piles to be Installed by Impact Pile Driving for Sea Turtle Effects Analysis .....	54
Table 7-13: Distances for Potential Impacts to Sea Turtles from Impact Pile Driving .....	55
Table 7-14: Summary of 96-inch Steel Pipe Casings to be Installed by Vibratory Pile Driving for Sea Turtle Effects Analysis .....	56
Table 7-15: Distances for Potential Impacts to Sea Turtles from Vibratory Pile Driving .....	56
Table 7-16: Summary of Auger Use for the Installation of Drilled Shaft Support Structures for Sea Turtles Effects Analysis .....	57
Table 7-17: Distances for Potential Effects to Sea Turtles from Auger Use.....	58
Table 7-18: Estimated Permanent Impacts to Suitable Habitat for Sea Turtles .....	58
Table 8-1: Recommended Conservation and Effect Minimization Environmental Commitments .....	63
Table 9-1: Beaufort County Protected Species Effect Determinations.....	66

## LIST OF APPENDICES

Appendix A – Project Study Area Maps and Figures

Appendix B – Agency Consultation History

Appendix C – Photographs of Habitats Within the Project Study Area

Appendix D – Proposed Bridge Typical Sections

Appendix E – Existing US 278 Bridges over Mackay Creek and Skull Creek Profiles

Appendix F – NMFS-SERO Pile Driving Calculator Tool Results

Appendix G – IPaC Northern long-eared bat Coordination

Appendix H – USFWS Standard Manatee Conditions for In-Water Work

Appendix I – NMFS Sea Turtle and Smalltooth Sawfish Construction Conditions

# 1.0 INTRODUCTION

---

The proposed US 278 Corridor Improvements Project (project) will result in modifications to the human and natural environment. The Federal Highway Administration (FHWA) and the South Carolina Department of Transportation (SCDOT) are responsible for the Environmental Assessment (EA) according to the provisions of the National Environmental Policy Act (NEPA) and corresponding regulations and guidelines of the FHWA as the lead federal agency (23 Code of Federal Regulations [CFR] 771 and 40 CFR 1500–1508A). As required by the NEPA process, as well as Section 7 of the Endangered Species Act of 1972 as amended, potential effects to federally protected species must be evaluated. The purpose of this Biological Evaluation (BE) is to identify the presence, or potential presence of federally protected species known to occur in Beaufort County, South Carolina, and to document potential project related effects to the protected species within or adjacent to the proposed project action area.

This revised version of the BE with Addendum (Version 3) was prepared to document project changes that have occurred since submittal of the initial BE (Version 1) and the subsequent BE with Addendum (Version 2). The BE Addendum was prepared for National Oceanic and Atmospheric Association (NOAA) National Marine Fisheries Service (NMFS) in response to requests for additional information about the proposed project. Specifically, this document addresses changes resulting from design modifications to the Recommended Preferred Alternative 4A, provides additional information about expected construction methods and potential impacts to habitats identified within the project area, and updates the potential project effects to federally protected species known to occur, or that may potentially occur, in the action area of the proposed project.

## 1.1 PROJECT DESCRIPTION

SCDOT, FHWA, and Beaufort County propose to make improvements to the US 278 corridor between Bluffton and Hilton Head Island in Beaufort County, South Carolina (Figure 1, Appendix A). The project limits extend from Moss Creek Drive to Wild Horse/Spanish Wells Road for approximately 4.11 miles (Figure 2, Appendix A).

The project includes replacement of the eastbound Mackay Creek bridge and replacement of the three other bridges located within the project corridor. The three additional bridges to be replaced include the westbound Mackay Creek, the eastbound Skull Creek, and the westbound Skull Creek bridge. Improved access to the Pinckney Island National Wildlife Refuge (PINWR) and the C.C. Haigh, Jr. boat ramp is also proposed as part of this project. Potential impacts to the environment will include construction of new bridges, the placement of clean fill material for construction and improvements to bridge approaches, new roads, and/or realignment of existing roads for community access, and finally the demolition and removal of the existing bridges.

## 2.0 AGENCY CONSULTATION HISTORY

A Letter of Intent (LOI) was distributed on September 4, 2018 by email to the resource and regulatory agencies to notify them of the initiation of the proposed project. The list of federally protected species that are known to occur in Beaufort County was provided by the USFWS on October 1, 2018 in their response to SCDOT's Letter of Intent (USFWS Log No. 2018-CPA-0085). In March 2019, FHWA sent an invitation to become a Participating Agency to USFWS and NMFS.

Following the LOI, a series of Agency Coordination Effort (ACE) meetings were hosted by SCDOT and FHWA in February, June, and August 2019 and March and May 2020. These meetings were used as coordination points to discuss the Purpose and Need of the project, alternative evaluation criteria, alternative evaluations, and the proposal of a Recommended Preferred Alternative. Representatives from both USFWS and NMFS were present at multiple ACE Meetings.

The initial BE dated July 16, 2020 was submitted to USFWS and NMFS for review and comment following studies to identify the presence of protected species within the Recommended Preferred Alternative project study area (PSA). Concurrence with the findings in the initial BE was received from the USFWS, and three requests for additional information (RAI) were received from NMFS. A subsequent BE Addendum, dated November 3, 2020, was submitted to NMFS addressing only listed species requiring estuarine habitats following their initial RAI.

During the preparation of this revised BE, additional informal coordination was completed with NMFS to discuss the proposed project and potential effects on protected species under the jurisdiction of NMFS. This informal coordination was completed by SCDOT, FHWA, and the project consulting team.

Copies of the letters and other consultation efforts as described above can be found in Appendix B. Table 2-1 provides a summary and timeline of Section 7 consultation with USFWS and NMFS.

**Table 2-1: Section 7 Consultation Summary**

Consultation	Submittal/Receipt Date	Response Date
LOI Submittal	9/4/18 from FHWA/SCDOT	USFWS response 9/26/18 NMFS response 4/24/19
ACE Meeting	2/14/19	N/A
Participating Agency Letter	3/25/19 from FHWA	USFWS response 4/22/19 – Cooperating Agency NMFS response 4/24/19 – Participating Agency
ACE Meeting	6/13/19	N/A
ACE Meeting	8/8/19	N/A
ACE Meeting	3/12/20	N/A
ACE Meeting	5/14/20	N/A
BE submittal to USFWS and NMFS	7/22/20 from DOT	USFWS concurrence 7/28/20
NMFS RAI 1	9/29/20 from NMFS	DOT response 11/5/20
NMFS RAI 2	11/12/20 from NMFS	DOT response 11/10/20
NMFS RAI 3	11/17/20 from NMFS	Team conference call with NMFS 1/7/21
BE with Addendum submitted to USFWS and NMFS	2/19/21	USFWS concurrence 3/3/21 NMFS concurrence 3/22/21



## 3.0 FEDERALLY PROPOSED AND LISTED SPECIES AND CRITICAL HABITAT

---

The list of federally protected species that are known to occur in Beaufort County was provided by the USFWS on October 1, 2018 in their response to SCDOT's LOI. The county list provided by USFWS was dated June 11, 2018. A literature review was completed for each of the listed species to determine their physical description and habitat requirements. The South Carolina Department of Natural Resources (SCDNR) and USFWS species descriptions and articles were referenced extensively.

During the development of the project SCDOT routinely reviewed the list of protected species in Beaufort County for possible updates or changes to species listing status. An updated protected species list, dated May 21, 2020, was downloaded from the USFWS Charleston Field Office website on May 23, 2020 and used in the original BE (July 2020). Since that time, the USFWS updated protected species lists for South Carolina counties twice (September 15, 2020 and January 4, 2021), however there were no changes to the species listings for Beaufort County on the revised lists (USFWS 2021a). The revised list dated January 4, 2021 was used to evaluate potential project effects on the listed species in this BE with Addendum (February 2021). A copy of the list is included in Appendix B.

Threatened and endangered species known to occur in Beaufort County are presented in Table 3-1. Although Section 7 of the Endangered Species Act (ESA) does not provide protections for Candidate/At-Risk species, they are listed in Table 3-1 in the event their status changes prior to completion of the project. Additionally, species that are proposed for listing are not subject to Section 7 compliance until they are formally listed. However, it is usually prudent to assess potential effects to these species with an Interagency Conference under Section 7 of the ESA (50 CFR § 402.10). Bald eagles are protected by the Bald and Golden Eagle Protection Act (BGEPA) and are also addressed in this evaluation. In addition to protection under the ESA, West Indian manatees and listed whale species are also protected under the Marine Mammal Protection Act (MMPA) of 1972.

Table 3-1: Federally Protected Species in Beaufort County, South Carolina (as of January 4, 2021)

Common Name	Scientific Name	Federal Protection Status	Jurisdiction
<b>Amphibian Species</b>			
Frosted flatwoods salamander	<i>Ambystoma cingulatum</i>	Threatened; Critical Habitat	USFWS
<b>Bird Species</b>			
American wood stork	<i>Mycteria americana</i>	Threatened	USFWS
Bald eagle	<i>Haliaeetus leucocephalus</i>	BGEPA	USFWS
Black-capped petrel	<i>Pterodroma hasitata</i>	At-Risk-Species	USFWS
Eastern black rail	<i>Laterallus jamaicensis</i>	Threatened	USFWS
Piping plover	<i>Charadrius melodus</i>	Threatened; Critical Habitat	USFWS
Red-cockaded woodpecker	<i>Picoides borealis</i>	Endangered	USFWS
Red knot	<i>Calidris canutus rufa</i>	Threatened	USFWS
Saltmarsh sparrow	<i>Ammodramus caudatus</i>	At-Risk-Species	USFWS
<b>Fish Species</b>			
Atlantic sturgeon	<i>Acipenser oxyrinchus</i>	Endangered; Critical Habitat	NMFS
Shortnose sturgeon	<i>Acipenser brevirostrum</i>	Endangered	NMFS
<b>Insect Species</b>			
Monarch butterfly	<i>Danaus plexippus</i>	At-Risk-Species	USFWS
<b>Mammal Species</b>			
Finback whale	<i>Balaenoptera physalus</i>	Endangered; MMPA	NMFS
Humpback whale	<i>Megaptera novaengliae</i>	Endangered; MMPA	NMFS
Little brown bat	<i>Myotis lucifugus</i>	At-Risk-Species	USFWS
Northern long-eared bat	<i>Myotis septentrionalis</i>	Threatened	USFWS
Right whale	<i>Balaena glacialis</i>	Endangered; MMPA	NMFS
Sei whale	<i>Balaenoptera borealis</i>	Endangered; MMPA	NMFS
Sperm whale	<i>Physeter macrocephalus</i>	Endangered; MMPA	NMFS
Tri-colored bat	<i>Perimyotis subflavus</i>	At-Risk-Species	USFWS
West Indian manatee	<i>Trichechus manatus</i>	Threatened; MMPA	USFWS
<b>Plant Species</b>			
American chaffseed	<i>Schwalbea americana</i>	Endangered	USFWS
Ciliate-leaf tickseed	<i>Coreopsis integrifolia</i>	At-Risk-Species	USFWS
Pondberry	<i>Lindera melissifolia</i>	Endangered	USFWS
<b>Reptile Species</b>			
Eastern diamondback rattlesnake	<i>Crotalus adamanteus</i>	At-Risk-Species	USFWS
Florida pine snake	<i>Pituophis melanoleucus mugitus</i>	At-Risk-Species	USFWS
Green sea turtle	<i>Chelonia mydas</i>	Threatened	NMFS
Kemp's ridley sea turtle	<i>Lepidochelys kempi</i>	Endangered	NMFS
Leatherback sea turtle	<i>Dermochelys coriacea</i>	Endangered	NMFS
Loggerhead sea turtle	<i>Caretta</i>	Threatened; Critical Habitat	NMFS
Southern hognose snake	<i>Heterodon simus</i>	At-Risk-Species	USFWS
Spotted turtle	<i>Clemmys guttata</i>	At-Risk-Species	USFWS

### 3.1 THREATENED AND ENDANGERED SPECIES DESCRIPTIONS

The initial evaluation for the presence of listed species in the project area and surrounding landscape focused on the presence or absence of species-specific suitable habitat based on SCDNR, NMFS, and USFWS species descriptions and relevant literature. The determination of potential occurrence in the project area were determined through research of online databases such as SCDNR's SC Natural Heritage Species Reviewer (SCDNR 2021a), eBird Mapper Tool (Cornell Lab of Ornithology 2021), Audubon Society reports, SCDNR's bald eagle nest data (SCDNR 2021a), NMFS Critical Habitat maps (NOAA 2019), and USFWS Critical Habitat mapper (2021a).

Based on descriptions of the habitat requirements and life functions of all protected species in Beaufort County it was determined that six of the species listed as threatened or endangered are either restricted to marine habitat, which was not identified within the PSA, or do not have suitable habitat within the PSA. Furthermore, a review of available occurrence records indicated these six species have not been documented within five miles of the PSA. Therefore, they were not included in the protected species analysis. These species are the finback whale, humpback whale, right whale, sei whale, sperm whale, and leatherback sea turtle.

Descriptions of all other threatened and endangered species with suitable habitat in the PSA or known occurrences within a radius of up to five miles of the project area are provided below.

### 3.2 AMPHIBIANS

#### 3.2.1 Frosted flatwoods salamander (*Ambystoma cingulatum*) – Threatened; Critical Habitat

Frosted flatwoods salamander adults are black or dark gray with white or silver reticulations, spots, or stripes covering their bodies. They have a white-speckled dark underside. They are 3.5-5.3 inches long as adults. They have 13-16 costal grooves (Nickle et al. 2017). The adults burrow in wiregrass dominated pine savannahs with mesic soils, which indicate a high water table (Palis et al. 2006). They emerge to migrate up to one mile to breeding ponds from October to November and leave from December to January during rain events or when soils are saturated. Larvae hatch and grow in inundated fire-dependent pine flatwood and pine savannah forest ponds from January to the end of April. Larvae are dark brown, darker on top gradually turning lighter to the underside with a tan to gold lateral stripe down their side. Larvae can take up to two years to reach adulthood. Frosted flatwoods salamanders can tolerate low salt concentrations (Nickle et al. 2017).



*Photo by John Jensen (USFWS)*

### 3.3 BIRDS

#### 3.3.1 American wood stork (*Mycteria americana*) – Threatened

American wood storks are large wading birds standing about 45 inches tall with white plumage except on the black trailing edges of the wings. The head and neck are unfeathered and dark gray. They have a large dark bill that is heavy at the base and decurved and pointed at the tip. They soar on thermals with neck outstretched and a wingspan of 60-65 inches. American wood storks feed by moving the bill through shallow (6-10 inches deep) water slightly open until it touches a small fish when they snap the bill shut. They feed in both freshwater and estuarine waters including marshes, tidal creeks, and swamps especially during periods of falling water levels when prey items in the pools are more concentrated. They build nests in colonies in swamps, primarily using medium to tall trees. American wood storks can be found nesting and feeding in South Carolina from mid-February until September (USFWS 2013).



Photo by Ryan Hagerty  
(USFWS)

American wood stork populations declined due to the loss of wetland habitat and a change in water regimes due to water level controls. This loss of habitat reduced the amount of cypress (*Taxodium distichum* and *T. ascendens*) trees that American wood storks utilize for nesting, which is critical for the growth of the population. The loss of habitat also reduced their foraging areas and food supplies. American wood storks forage in shallow water with little vegetation where the fish can be congregated into dense schools. According to the USFWS “Wood Stork Recovery Plan” (1997), it is recommended that human activity should not occur within 300 feet of foraging habitat to the maximum extent possible.

#### 3.3.2 Bald eagle (*Haliaeetus leucocephalus*) – BGEPA

Bald eagles are large raptors (six-foot wingspan) which are mottled brown and white until they reach maturity at four to five years old when they develop a brown body with a white head and tail. They primarily feed on fish, but also feed on waterfowl, and carrion. When prime food options are absent, they will also eat small terrestrial animals. They hunt by sight and are often seen soaring or perched high in a tree near water. Fresh, brackish and marine habitats provide suitable foraging sites and include open water, marsh and riverine types. Prime habitats are characterized by having shallow, slow moving water with abundant fish and waterfowl (SCDNR 2015a). It nests in canopies of large trees usually within half of a mile from coastlines, rivers, and lakes. Nests are usually around four to six feet across and three feet deep. Nests are constructed out of large limbs and lined with soft plant fibers. They typically return to the same areas each year and reuse the same nest. They can be found nesting and rearing young in South Carolina from October until May (USFWS 2007). Bald eagle nest locations are required to have a buffer zone ranging from 330-660 feet around nests, depending on site-specific conditions (USFWS 2020a).



Photo by Steven Mlodinow  
(Cornell Lab of Ornithology)

Bald eagle populations declined due to a series of human-caused events such as habitat degradation and loss, shooting, and the use of chemical compounds as pesticides (USFWS 1989). Bald eagles were listed in the ESA in 1973 and were delisted in 2007 due to their strong recovery (USFWS 2007). Bald eagles remain under federal protection by the BGEPA which protects eagles from “take.” Take is defined as “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest or disturb” (USFWS 2017a).

### 3.3.3 Eastern black rail (*Laterallus jamaicensis jamaicensis*) – Threatened

Eastern black rails are 4-6 inches in total length, with blackish-gray undersides, a chestnut back with small white spots, pointed black bill, bright red eyes, and long dark gray legs and toes. They live in brackish to fresh marshes that may or may not be tidally influenced. They will also live in impoundments. According to the USFWS (2018), “the birds occupy relatively high elevations along heavily vegetated wetland gradients, with soils that are moist or flooded to a shallow depth.” They require a dense canopy and fine stemmed emergent plants to safely forage for small invertebrates and seeds. Coastal South Carolina was considered a historical stronghold for this subspecies. They nest from March to August in vegetated shallow water or moist soil. They are difficult to detect because of their preference to run or walk through dense vegetation rather than flying (USFWS 2018).



Photo by Christy Hand  
(SCDNR)

When the original BE was completed, the Eastern black rail was listed as Proposed Threatened, however it was treated as if it had Threatened protection status. When the first BE Addendum (November 2020) was prepared, the Eastern black rail’s status had been revised to Threatened by USFWS and was reported as such in the document.

### 3.3.4 Piping plover (*Charadrius melodus*) – Threatened; Critical Habitat

Piping plovers are small (seven inches long) shorebirds that frequent the sparsely vegetated sandy beaches and muddy tidal creek banks for feeding on small invertebrates. They breed and nest on beaches on the northern Atlantic Coast and the Great Lakes. They winter along the South Atlantic, Gulf Coast, and Caribbean beaches and islands. The migration to breeding grounds occurs between February and April. The migration to wintering grounds occurs between July and September. While the color of the birds is generally sandy-gray with a white underside and rump, the breeding plumage adds a black breast band, a black brow band, orange legs, and an orange bill with a black tip. Winter migration causes the orange legs to fade to yellow, changes the bill to solid black, and causes the black breast and brow bands to disappear (Center for Biological Diversity 2020).



Photo by Gene Nieminen  
(USFWS)



The USFWS has established winter critical habitats along the coast associated with beaches, flats, and dune systems as these areas provide the primary biological needs of foraging, sheltering, and roosting habitats (USFWS 2001a). Piping plovers prefer sandy substrates and are much more concentrated along the ocean shoreline (USFWS 2017b).

### 3.3.5 Red-cockaded woodpecker (*Picoides borealis*) – Endangered

Red-cockaded woodpeckers are small (seven inches long) colonially nesting woodpeckers. They are black with white horizontal stripes on the body, a large white cheek patch on the face, and a black cap and nape. The males have a small patch of red feathers (the cockade) which can be found in the upper corner of the cheek patch but are only exposed when agitated. They only nest in cavities of living, mature (at least 70-year-old) pine trees. They prefer long-leaf pines (*Pinus palustris*) that have been maintained by a frequent (less than five year) fire regimen. They nest colonially in clusters of 1-20 nests over 3-60 acres. Maintained, in-use cavity trees are obvious due to sap drips around the cavity hole that turn white when hardened. They forage for insects in the bark of pine trees which at least 30 years old and over 10 inches in diameter at breast height (USFWS 2020b). Threats to red-cockaded woodpeckers are predominantly the suppression of fire which has resulted in the loss of adequate habitat (USFWS 2003).



*Photo by Luke Seitz  
(Cornell Lab of  
Ornithology)*

### 3.3.6 Red knot (*Calidris canutus rufa*) – Threatened

Red knots are a medium-sized shorebird that winter on the beaches and tidal flats of South Carolina. Their nonbreeding/wintering plumage is gray above with whitish undersides. Their black bill is stout with a tapered tip that is a little bit longer than the head length. Their short legs and feet are dark gray. They have a small head, small eyes, and short neck. During breeding season, much of the face, breast, and upper belly are reddish. They feed on invertebrates in sand, gravel, or cobble beaches, tidal mudflats, salt marshes, shallow coastal impoundments and lagoons, and peat banks (USFWS 2014a).



*Photo by Gregory Breese (USFWS)*

## 3.4 FISH

### 3.4.1 Atlantic sturgeon (*Acipenser oxyrinchus*) – Endangered; Critical Habitat

The Atlantic sturgeon is a large (14 foot) fish with five rows of bony plates, called scutes, along the length of their body. They have a bluish black to olive back with a pale belly. They have long snouts with four whisker-like barbels for detecting prey. Their tail fin is longer at the top than at the bottom (NOAA 2021b). Atlantic sturgeon are anadromous fish that spend much of their lives in the saltwater and enter freshwater to spawn. They spawn in flowing water below the fall line of large freshwater rivers with a coastal estuary in the spring (February to March), and again in the fall. Spawning sites must be well-oxygenated, between 55.4- and 78.8-degrees Fahrenheit, more than 4 feet deep, and have rocky substrate. Juveniles grow in transitional salinity zones (salinities of 0.5-5 ppt, 5-18 ppt, and 18-30 ppt) with soft substrate. Once the subadults enter marine waters (salinity greater than 30 ppt), they remain in oceanic and estuarine waters until spawning occurs. Adults mature between 5 and 19 years old. They spawn every one to five years. Atlantic sturgeon are benthic foragers which suck food into their mouths from the bottom of the water column at all stages of life (NOAA 2021b).



Photo by NOAA

Critical habitat for the Atlantic sturgeon in Beaufort County is restricted to the Combahee-Salkehatchie River Units (NOAA 2017).

### 3.4.2 Shortnose sturgeon (*Acipenser brevirostrum*) – Endangered

Shortnose sturgeon are four feet long at maturity with rows of bony plates, called scutes, along the length of their body and have a dark back with a pale belly. They have short, wide, rounded snouts with four whisker-like barbels for detecting prey. Their tail fin is longer at the top than at the bottom. They are benthic feeders using their large mouths to feed on insects, crustaceans, mollusks, and benthic fish by crushing them with their mouth plates. Shortnose sturgeon spawn in freshwater and forage in mesohaline habitat (salinities of 5-18 ppt). They do venture into the ocean to undergo coastal migrations but are typically estuarine. Males mature at two to three years and may spawn annually, while females mature by six years and spawn every three to five years. Spawning occurs in late winter, typically before Atlantic sturgeon, in water temperatures from 46.4-59 degrees Fahrenheit and water velocities 9.4-51.2 inches/second in gravel substrate. They require similar foraging habitat and resources as the Atlantic sturgeon but can be found farther upriver (NOAA 2021c).



Photo by NOAA

## 3.5 MAMMALS

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

The Northern long-eared bat has a body length of 3 to 3.7 inches. Their fur is dark brown on their backs and lighter brown underneath. They have long ears with a pointed triangular tragus. They hibernate in caves, where white-nose syndrome (WNS) is prevalent; however, in regions where no caves are present, they appear to hibernate in tree cavities (USFWS 2019). In summer, they roost in a wide variety of dead trees, under bark, and in caves (USFWS 2015a). Northern long-eared bats also roost in human structures. These bats forage for insects in a wide variety of forest types. Since WNS is the primary cause of species decline, critical habitat is not designated under the ESA (USFWS 2015a).



Photo by Al Hicks  
(USFWS)

### 3.5.2 West Indian manatee (*Trichechus manatus*) – Threatened

West Indian manatees are greyish marine mammals with bulbous bodies and no dorsal fin. They reach lengths over 14 feet long. They reside in shallow marine, brackish, and freshwater systems eating vegetation. They cannot live in temperatures under 68 degrees Fahrenheit, so their range expands and contracts from warmer to cooler months (USFWS 2001b). In South Carolina, they will move far into freshwater rivers until the river becomes too shallow or they encounter an obstruction (Murphy and Griffin, 2012).



Photo by Keith Ramos (USFWS)

According to the online USFWS Critical Area Mapper tool (2021b), designated critical habitat for the West Indian manatee is only located in Florida.

## 3.6 PLANTS

### 3.6.1 American chaffseed (*Schwalbea americana*) – Endangered

American chaffseed is a perennial herb with unbranched stems, purplish and yellow tube-like flowers, and lance-shaped entire leaves that are one to two inches long. The plants are densely hairy throughout. Fruits are long, narrow capsules enclosed in a sac-like structure. It is hemiparasitic, relying on other plants for some nutrients, but not host-specific. It occurs in “open, moist pine flatwoods, fire-maintained savannas, ecotonal areas between peaty wetlands and xeric sandy soils, and other open grass-sedge systems” (USFWS 2017c). It is dependent on disturbance in the form of fire, mowing, or fluctuating water tables to maintain open canopies. The plants bloom from April to June in the south (USFWS 1995). They might be easiest to find by inspecting for dark brown, aging stems after the blooming period (USFWS 1995).



Photo by Robert Sinclair  
(USFWS)

### 3.6.2 Pondberry (*Lindera melissifolia*) – Endangered

Pondberry is a small (one to six feet) deciduous shrub with oval to oblong-shaped, thin, alternate leaves. The tips are more pointed, while the base is more rounded. The leaf margins are entire. The leaf undersides are sparsely to densely covered in fine hairs. The leaf is strongly aromatic when crushed and resembles the smell of sassafras (*Sassafras albidum*). It blooms during February and March, before leaf emergence, with small yellow flowers. They reproduce either through seeds which are a bright red, half-inch long drupe or vegetatively through colonial expansion of numerous stems. In South Carolina, pondberry has been found in Carolina bays, limestone or limesink ponds, sand ponds, and lowland sand prairie depressions (USFWS 2014b).

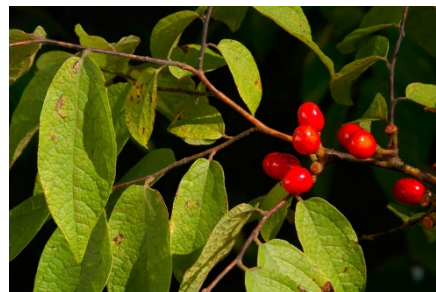


Photo by Carol and Hugh Nourse  
(USFS)

## 3.7 REPTILES

### 3.7.1 Green sea turtle (*Chelonia mydas*) – Threatened

Green sea turtles reach shell lengths of three to four feet. They are easily recognized by the two large scales located between their eyes. They primarily eat vegetation and reside nearshore to feed on seagrass beds (NOAA 2021d). Green sea turtles rarely nest in South Carolina; they nest predominantly on the beaches of Florida (SCDNR 2015b). Juvenile turtles can frequently be found in South Carolina waters (SCDNR 2013a). Green sea turtles utilize inlets and bays that have an abundance of algae and grass (USFWS 2015b).

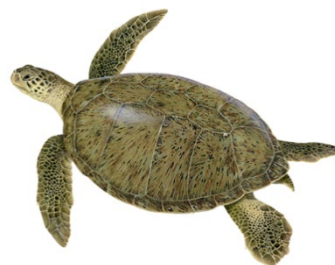


Photo by NOAA

### 3.7.2 Kemp's ridley sea turtle (*Lepidochelys kempii*) – Endangered

Kemp's ridley sea turtle is one of the smallest sea turtles; adults have a straight carapace length of approximately 26 inches and weigh less than 99 pounds. Adults have an almost round carapace that is sometimes wider than it is long (SCDNR 2015b). This species typically nests on beaches in Mexico and Texas, but juveniles can be found in South Carolina coastal waters during the summer months where they feed on blue crabs and other crustaceans (SCDNR, 2013b).



Photo by NOAA

### 3.7.3 Loggerhead sea turtle (*Caretta caretta*) – Threatened; Critical Habitat

Adult Loggerhead sea turtles have a shell that is up to 36.2 inches long and can weigh up to 249 pounds. Loggerhead sea turtles are known to nest on South Carolina beaches from mid-May through mid-August, including the undeveloped beaches of Hilton Head Island. They nest at night, excavating nests between sand dunes, and typically lay 100 to 126 eggs per clutch. A single female can lay multiple clutches of eggs per season (SCDNR 2013c). Juveniles forage in estuarine habitats from April to November (SC SWAP 2015b). Loggerhead turtles feed predominantly on conchs and crabs (SCDNR 2013c).



*Photo by NOAA*



## 4.0 ENVIRONMENTAL BASELINE

### 4.1 PROJECT STUDY AREA

The Project Study Area (PSA) (Figure 2, Appendix A) is approximately 438-acre and was used to assess all Reasonable Alternatives for the project, as well as to establish the five mile radius for the determination potential occurrences of the listed species for Beaufort County. The PSA was established by combining the footprints of all Reasonable Alternatives (see Section 5.3) evaluated in the EA.

Potential habitat communities within the PSA were initially identified by reviewing recent aerial imagery (2018), digital elevation models for Beaufort County (SCDNR 2015c), 2016 National Land Cover Data (NLCD) [Yang et al. 2018]), and USFWS National Wetland Inventory (NWI) mapping (USFWS 2021b) to create a composite map of potential habitats within the cumulative PSA. Habitat types identified utilizing remote sensing data were field reviewed and additional data was collected during site visits and field delineation of waters of the United States (WOTUS), conducted May 20-24, 2019, July 9-11, 2019, January 20-24, 2020, and May 6, 2020. The project biologists used field observations and data collected on site to make corrections to the PSA habitat map.

The PSA is situated in the Sea Islands/Coastal Marsh Level IV ecoregion as defined by the US Environmental Protection Agency (EPA). *“The Sea Islands/Coastal Marsh region contains the lowest elevations in South Carolina and is a highly dynamic environment affected by ocean wave, wind, and river action... The island, marsh, and estuary systems form an interrelated ecological web, with processes and functions valuable to humans, but also sensitive to human alterations and pollution. The coastal marshes, tidal creeks, and estuaries are important nursery areas for fish, crabs, shrimp, and other marine species”* (Griffith et al. 2002). The project is within the Calibogue Sound watershed (Hydrologic Unit Code 10: 0306011003) and Savannah River Basin (SCDHEC 2021).

A portion of the Pinckney Island National Wildlife Refuge (PINWR) falls within the PSA. PINWR is 4,053 acres of salt marshes, tidal creeks, forests, fields, and freshwater ponds owned and operated by the USFWS. The C.C. Haigh, Jr. Boat Landing is located on PINWR. This public boat landing includes a parking lot, two floating docks, and a kayak launch.

Santee Cooper overhead power lines extend through the study area in an easement that parallels US 278. The power lines follow the northside of US 278 in Bluffton, then cross Mackay Creek where the easement splits and parallels the north and south sides of US 278 on PINWR and Hog Island. The south easement reconnects with the north easement on Jenkins Island and the power lines parallel US 278 through the study area on Hilton Head Island.

### 4.2 BIOTIC COMMUNITIES

Biotic communities that were initially identified within the PSA using remote sensing data and then confirmed during the field survey include six basic habitat types. Much of the US 278 corridor contains natural buffers surrounding urban development and residential communities. Wetland habitat types were classified using the Cowardian naming convention (USFWS 1979). Non-wetland habitat types are classified

using the 2016 NLCD (Yang et al. 2018). Habitats found within the PSA and their respective coverage are provided in Table 4-1. Photographs of the identified habitats in the PSA can be found in Appendix C.

**Table 4-1: Identified Habitat Types in the Project Study Area**

Habitat types	Area of coverage (acres)	Percent coverage
Urban development	125	29%
Forested upland	124	28%
Estuarine emergent wetlands	76	17%
Estuarine sub-tidal unconsolidated bottom	73	17%
Estuarine tidal creeks	2	1%
Intertidal non-vegetated flats	24	5%
Palustrine wetlands	14	3%
<b>Total</b>	<b>438 acres</b>	<b>100%</b>

## 4.2.1 Upland Habitats

### Urban Development

Urban development includes residences, commercial buildings, and roadways. These areas typically have very little natural habitat since they are frequently maintained and landscaped. Urban development is categorized by the NLCD as: “Developed, open space/low intensity/medium intensity/high intensity” (Yang et al 2018). These areas do not provide a significant source of food or shelter for wildlife. The unpaved but maintained areas around the pavement and buildings are typically planted in native and exotic grasses, shrubs, and trees.

### Forested uplands

Forested uplands are dominated by evergreen/pine species but have some areas with hardwood/deciduous species. Most of the forested area within the study area is pine forest (evergreen forest [Yang et al 2018]) with a small mixture of deciduous forest habitats. Within the corridor, upland mixed forests frequently border areas of development but are also found on the PINWR. The pines within the PSA are primarily loblolly pine (*Pinus taeda*). The hardwoods include live oak (*Quercus virginiana*), water oak (*Quercus nigra*), sweetgum (*Liquidambar styraciflua*), and red maple (*Acer rubrum*). The understory consists of dwarf palmetto (*Sabal minor*), saw palmetto (*Serenoa repens*), yaupon holly (*Ilex vomitoria*), and grass species.

The pine forest habitat shifts near the brackish or saline areas and becomes a “maritime” forest. Plants in this habitat are tolerant of some saline soil and salt spray. These plants include live oak, yaupon holly, dwarf palmettos, saw palmettos, cabbage palms (*Sabal palmetto*), southern redcedar (*Juniperus virginiana* var. *silicicola*), Spanish moss (*Tillandsia usneoides*), and loblolly pine. Intrusion of marsh plants, such as black needle rush (*Juncus roemerianus*) and sea oxeye daisy (*Borrchia frutescens*), are common in the seaward edges of maritime forests.

Maintained rights-of-way, roadside ditches, and utility lines typically contain species that are known to colonize disturbed areas such as Chinese privet (*Ligustrum sinense*), passion vine (*Passiflora incarnata*), blackberry (*Rubus* spp.), greenbrier (*Smilax* spp.), and St. Augustine grass (*Stenotaphrum secundatum*).

## 4.2.2 Wetland and Open Water Habitats

### Estuarine emergent wetlands

Two types of Estuarine Emergent Wetlands (USFWS 1979) occur within the PSA: low marsh and high marsh. The low marsh wetlands are a single-species community of saltmarsh cordgrass (*Spartina alterniflora*). The high marsh consists of black needle rush, glasswort (*Salicornia depressa*), salt grass (*Distichlis spicata*), and big cordgrass (*Spartina cynosuroides*). These emergent wetlands often have moderately salt-tolerant woody species above the tidal zone such as marsh elder (*Iva imbricata*), groundsel bush (*Baccharis halimifolia*), southern redcedar, and cabbage palms. Intertidal zones may have exposed mud flats or sand at low tide. Hard surfaces such as concrete, metal, and wood in the inter-tidal zone are typically encrusted in both living and deceased arthropods like barnacles and mussels.

### Estuarine sub-tidal unconsolidated bottom

Estuarine sub-tidal unconsolidated bottom habitat (USFWS 1979) 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. There are two types of unconsolidated bottom habitat located within the cumulative PSA: the main channels of Mackay and Skull Creeks and man-made ponded features.

Water level in the creeks fluctuates continuously and is dependent on tide cycles and flow volumes; however, even at low tide, water is always present. Channel depths at mean low tide range from approximately 14 to 20 feet deep in Mackay Creek and approximately 20 to 25 feet deep in Skull Creek (NOAA 2021e). Measurements taken by the project biologists documented salinity between 20-30 parts per thousand throughout much of the PSA. Mollusks grow on most hard surfaces in the estuarine inter-tidal zone, such as bridge piles. Oyster beds are abundant in the shallow sub-tidal areas, often growing on top of each other to form tall pillars and extensive beds. Estuarine fishes, mammals, and sea turtles may utilize these saline waters as foraging areas and travel corridors.

Man-made unconsolidated bottom features found within the cumulative PSA are excavated pond features that do not have obvious surface connectivity to other unconsolidated bottom or tidal creek habitats. These features are surrounded by estuarine emergent wetlands and intertidal non-vegetated flats but are lacking in vegetative cover and maintain a stable depth of saline waters at low tide.

### Estuarine tidal creek

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. Tidal creek habitat within the PSA are tributaries associated with Skull Creek and Jarvis Creek. The depths of these tidal creeks were observed to be less than one foot at low tide. The tidal creeks in the PSA are fully functional in that all ecosystem services essential to fisheries are present. Existing disturbances, such as the existing US 278 structures, have not significantly altered functions of this habitat.

### Intertidal non-vegetated flats

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 within each tide cycle (SAFMC 2020). The intertidal flats can have a much higher salinity than the channels that feed them since evaporation leads to higher salt concentrations (USFWS 1979). 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 inhabited 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 2016).

### Palustrine wetlands

Palustrine forested wetlands (USFWS 1979) are seasonally flooded freshwater forests. Plants within these habitats include a variety of water-tolerant broadleaf trees, loblolly pines, palmettos, shrubs, and sparse herbaceous cover. Areas with long-term flooding are often sparsely vegetated or non-vegetated. The soils and hydrological indicators are used in conjunction with plant species to delineate these areas. Forested freshwater wetlands are found at various elevations. They are frequently found within other habitats, such as uplands, or along the edge of riverine or estuarine habitats.

Palustrine emergent wetlands (USFWS 1979) include non-woody species such as cattail (*Typha* spp.), thin leaf brookweed (*Samolus valerandi*), spikerushes (*Eleocharis* spp.), soft stem rush (*Juncus* spp.), and various sedges (*Carex* spp.). They are often bordered by woody shrubs such as wax myrtle (*Morella cerifera*). Freshwater emergent wetlands are semi-permanently to permanently flooded, may be tidally influenced, and salt encroachment areas are possible. The largest freshwater emergent wetland is on PINWR in a utility corridor that is frequently maintained.

## 4.3 WATER QUALITY

The South Carolina Department of Health and Environmental Control (SCDHEC) develops a priority list of waterbodies that do not currently meet state water quality standards pursuant to Section 303(d) of the Clean Water Act (CWA) and 40 CFR § 130.7. It is commonly referred to as the 303(d) List of Impaired Waters. There are no 303(d) listed waters found within the PSA. SCDHEC also designates suitable Shellfish Harvesting Waters (SFH), determines water quality classifications and standards for the State. Mackay Creek and Skull Creek are both classified by SCDHEC as SFH.

SCDHEC monitors the water quality of Mackay Creek and Skull Creek with ambient water quality monitoring stations. These stations are used for “determining long-term water quality trends, assessing attainment of water quality standards, identifying locations in need of additional attention, and providing background data for planning and evaluating stream classifications and standards” (SCDHEC, 2018). There are two shellfish monitoring stations located within the PSA. Shellfish Harvest station 20-07 monitors Mackay Creek and is located near the existing US 278 bridge adjacent to Buckingham Landing. Station 20-10 monitors Skull Creek and is located near a small tidal creek in the vicinity of the Mariners Cove development. Neither of these stations are currently listed for water quality impairments. Figure 4 (Appendix A) provides a depiction of the SFH water classifications and locations of the water quality monitoring stations.

## 5.0 ALTERNATIVES ANALYSIS

The sections below briefly discuss the No-Build Alternative and the process that resulted in the selection of the Recommended Preferred Alternative 4A. The analysis was conducted in coordination with federal and state regulatory agencies (including USFWS and NMFS), project stakeholders, and public involvement. Chapter 3 of the EA provides a more detailed description of how alternatives were analyzed and evaluated for the project.

### 5.1 NO BUILD ALTERNATIVE

Under the No Build Alternative, the environmental baseline conditions as described in Section 4 would be expected to remain the same. The existing roadway and bridges would remain in place with no additional structures being placed in the different habitats and biotic communities within the PSA. No long-term effects would be expected from the No Build Alternative. However, the No Build Alternative does not meet the purpose and need of the project and was therefore only considered as a baseline for existing conditions during the alternative analysis and evaluation.

### 5.2 PRELIMINARY RANGE OF ALTERNATIVES

A wide range of alternatives were developed and analyzed to determine compatibility with the project's purpose and need to repair the structurally deficient bridge over Mackay Creek. Nineteen preliminary alternatives were developed including:

- No-Build
- Transportation System Management/Transportation Demand Management (TSM/TDM)
- Mass Transit
- Build Alternatives

Of these nineteen alternatives, six were carried forward for further analysis as Reasonable Alternatives. Figures and descriptions of each of the Preliminary Range of Alternatives, as well as the criteria used to assess each preliminary alternative can be found in Chapter 3 of the EA.

### 5.3 REASONABLE ALTERNATIVES

The six alternatives carried forward as Reasonable Alternatives were updated based on input from stakeholders, the public, and regulatory agencies as part of the continued alternatives analysis. Modifications resulted in three additional alternatives for consideration. A total of nine reasonable alternatives were ultimately analyzed to identify the Recommended Preferred Alternative 4A. Additional figures and descriptions of each of the Reasonable Alternatives, as well as the criteria used to assess each alternative can be found in Chapter 3 of the EA.

Based on evaluation of the alternatives, it was determined that Recommended Preferred Alternative 4A, provides maximum improvements to the corridor with minimal impacts to the human and natural environments. A depiction of the Recommended Preferred Alternative 4A is provided in Figure 5 (Appendix A).



## 5.4 RECOMMENDED PREFERRED ALTERNATIVE

The Recommended Preferred Alternative 4A is approximately 4.11 miles long and includes widening the existing US 278 corridor to six lanes from Salt Marsh Drive to Mackay Creek bridge, building a new six-lane structure that bridges both Mackay Creek and Skull Creek south of the existing US 278 alignment and connecting back to the existing US 278 corridor at the end of the existing Skull Creek bridges. The existing Mackay Creek bridges and Skull Creek bridges will be removed once construction is complete. A new right-in/right-out interchange will be constructed at the PINWR and C.C. Haigh, Jr. Boat Landing closer to the existing interchange alignment allowing vehicles to pass underneath the existing bridges to access either side and provide full access to US 278. The existing at-grade intersection on PINWR will be decommissioned.

This alternative relocates the existing Blue Heron Point Drive to the existing US 278 roadbed and improves the intersection with Gateway Drive. This will also include a new bridge over the tidal area between Hog Island and Jenkins Island (see Figure 10 in Appendix A). The new bridge and roadway associated with Hog Island is needed to provide more efficient ingress/egress to properties on Hog Island. In addition, the revised Hog Island access allows for improved maintenance of traffic during construction. The Recommended Preferred Alternative 4A also widens the existing US 278 corridor to six-through lanes through Jenkins Island to Spanish Wells Road. The widening would primarily occur in the median on Jenkins Island and transitions to widen along the north side of US 278 from the eastern side of Jenkins Island to Spanish Wells Road.

The Recommended Preferred Alternative 4A consisted of the least amount of total wetland impacts and lowest impacts to tidal salt marsh/critical area wetlands when compared to the other Reasonable Alternatives. This alternative would also have minimum ROW and relocation impacts in comparison to the other Reasonable Alternatives.

The existing Mackay Creek and Skull Creek bridges do not meet current seismic design standards. The Recommended Preferred Alternative 4A would result in a new 6-lane facility with one new bridge over Mackay and Skull Creeks, as well as one new bridge on a new local connector road between Hog Island and Jenkins Island, that would meet current seismic design standards. These new structures would add longevity and increased safety to this singular link between Beaufort and Hilton Head.

Coordination with USFWS completed on January 30th, 2020 to discuss the reasonable alternatives revealed the Recommended Preferred Alternative was the most consistent with PINWR purposes. USFWS expressed that this alternative was the best alternative for their maintenance and regulatory needs. This alternative also results in fewer impacts on PINWR due to the proposed new facility being elevated.

### 5.4.1 Revisions to the Recommended Preferred Alternative 4A

Following the selection of the Recommended Preferred Alternative 4A, additional analysis was completed to review and determine potential effects to protected species based on the footprint of only the Recommended Preferred Alternative 4A. Since the previous versions of the BE, there have been revisions to the Recommended Preferred Alternative 4A footprint due to design modifications. These design modifications were required to meet SCDOT and FHWA design standards for the proposed bridge and roadway approaches as well as the intersection improvements within the project corridor. **The changes to the design did not change the effects determination reported in the previous versions of the BE.**

The proposed new bridge over Mackay Creek and Skull Creek remains in its initial design alignment but was lengthened, as were the span lengths along the bridge. These modifications resulted in changes to the size of proposed bridge support structures described and quantified in the previous versions of the BE. The roadway design modifications predominantly affected the potential limits of clearing and earthen fill materials placement as quantified in the previous versions of the BE. Modifications to the proposed connector road and bridge between Hog and Jenkins Island were minimal.

The modifications to the Recommended Preferred Alternative 4A also resulted in changes to the refined evaluation area, which led to changes in the previously reported percent coverage of habitat types. Table 5-1 provides an updated total of the habitat types identified within the expanded Recommended Preferred Alternative 4A evaluation area.

**Table 5-1: Identified Habitat Types within Revised Recommended Preferred Alternative 4A**

Habitat types	Area of coverage (acres)	Percent coverage
Urban development	106.6	41%
Forested upland	59.2	23%
Estuarine emergent wetlands	36.5	14%
Estuarine sub-tidal unconsolidated bottom	34.9	13%
Estuarine tidal creeks	0.6	< 1%
Intertidal non-vegetated flats	17.2	7%
Palustrine wetlands	7.5	3%
<b>Total</b>	<b>262.5 acres</b>	<b>100%</b>

## 6.0 PROPOSED ACTION

The purpose of the project is to address structural deficiencies at the existing eastbound Mackay Creek bridge and reduce congestion within the project study area (PSA). While the original purpose of this project was to replace the structurally deficient eastbound Mackay Creek Bridge, the project has expanded to include improvements throughout the corridor between Moss Creek Drive and Wild Horse/Spanish Wells Road. The eastbound Mackay Creek bridge (traveling to Hilton Head Island), which crosses the Intracoastal Waterway, would be replaced as part of SCDOT's bridge replacement program. The other three bridges in the PSA—the westbound bridge over Mackay Creek and the eastbound and westbound bridges over Skull Creek—have also been identified for potential improvements. In addition, the access to Pinckney Island National Wildlife Refuge (PINWR) and the C.C. Haigh, Jr. boat landing have also been considered for possible improvements.

Construction is expected to occur between 2023 and 2026. The following is a discussion of the proposed construction activities associated with the US 278 Corridor Improvement project. Some of the proposed activities may have permanent effects to habitats important for the survival of federally protected species; while others will be temporary in nature but may present a risk for certain species during construction. The proposed construction activities described below are based on conceptual plans and “worst-case” scenarios for fill limits, bridge supports, and temporary construction access techniques. All potential fill impacts to wetland habitats within the project area are based on the conceptual construction limit plus an additional 50-foot buffer to represent a “worst-case” scenario.

Estimated impacts to other environmental factors are addressed in more detail in Chapter 4 of the EA. Impacts to wetlands will be addressed in more detail in the Section 404/401 permit application.

### 6.1 CONSTRUCTION ACTIVITIES AND POTENTIAL IMPACTS OR EFFECTS

#### 6.1.1 Site Preparation

**SCDOT and/or the contractor will develop a Stormwater Pollution Prevention Plan (SWPPP) and obtain both a land disturbance permit and a National Pollutant Discharge Elimination System (NPDES) permit from the SCDHEC before construction can commence. SCDOT will require the contractor to properly install the required erosion, turbidity, and sediment control devices prior to all other construction activities.** The contractor will be required to install these measures around the perimeter of the active construction site, including any off-site staging areas. After the installation of erosion, turbidity and sediment control measures, the contract will begin the project staging area preparation and general site preparation.

To prepare the general project area for construction and establish staging areas, the contractor may need to clear vegetation and remove stumps, roots, or debris. Clearing may occur in uplands, estuarine emergent, palustrine emergent, and forested wetlands in the project area. The contractor may also grade portions of the project area to establish a suitable work environment. Staging areas will be selected by the contractor to establish a construction site office and will also include materials, equipment, and fuel storage. Staging areas are expected to be predominantly located in uplands.

### Potential Habitat Impacts

**The contractor will be required to utilize SCDOT Best Management Practices (BMPs) for soil and erosion control during construction.** Impacts associated with construction site preparation will be temporary in nature. Clearing of vegetation and maintenance of erosion and sediment control devices may temporarily impact suitable foraging habitat for multiple species. Construction site preparation and maintenance will continue during the different phases of construction and may result in permanent impacts to suitable habitat for protected species. Construction site preparation is not expected to result in the mortality of any protected species.

**The clearing, grading, or placement of fill in wetlands will require authorization from the United States Army Corps of Engineers (USACE) and SCDHEC. The limits of any clearing, grading, or fill in wetlands will be delineated and shown on approved permitted plans by the USACE and SCDHEC. SCDOT and the contractor will comply with all applicable permits and permit conditions for the placement of fill in wetlands.**

#### 6.1.2 Borrow Pits and Disposal Areas

The contractor may use areas outside the Action Area for borrow pits or spoil areas. Waste and borrow areas will likely be required to dispose of and obtain materials for earthwork and are also subject to clearing and grubbing.

### Potential Habitat Impacts

If existing permitted borrow sites are not available, **the contractor will be required to follow SCDOT guidance in Engineering Directive Memorandum 30 (ED-30), Borrow Pit Location and Monitoring**, that requires proposed new borrow sites for projects located east of I-95 be screened for wetlands and cultural resources. The screening process includes coordination with the USACE and SCDHEC's Ocean and Coastal Resources Management (OCRM) and once approved, the site is monitored during construction to ensure compliance with applicable environmental laws. **The contractor will be responsible for addressing the potential effects to federally listed threatened and endangered species for any new borrow or disposal sites.**

#### 6.1.3 Roadway Construction

Once the project area has been prepared, the contractor will begin construction of the proposed bridge approaches, roadway widening and associated intersection improvements. Bridge approach, roadway widening, and intersection improvement construction will consist of placing clean fill materials throughout the project area. The fill will then be compacted and formed into the roadway prism and shoulder slopes.

### Potential Habitat Impacts

Permanent impacts to multiple habitat types in the project area, including suitable foraging habitat for protected species, are expected where new fill material is required for proposed bridge approaches, roadway widening and associated intersection improvements. Clean fill material will be placed in estuarine emergent and palustrine wetlands to realign the bridge approach from the mainland and Jenkins Island; on the east side of Hog Island and west side of Jenkins Island to create a new connector road and bridge which will connect to Gateway Drive; and on either side of the US 278 causeway between Jenkins Island and Hilton Head Island. Impacts to palustrine emergent and forested wetlands will be associated with construction of the new bridge approaches and improved access to PINWR.

Table 6-1 provides a summary of potential roadway fill impacts to wetland habitats. All potential roadway fill impacts to wetland habitats within the project area are based on the conceptual construction limit plus an additional 50-foot buffer to represent a “worst-case” scenario. The potential impacts from the placement of fill represents a very small percentage of available habitat in the action area and will ultimately be discountable in the context of the entire ecosystem.

**Table 6-1: Potential Roadway Fill Impacts to Wetland Habitats**

Habitat Type	Estimated Fill Impacts (acres)
Estuarine emergent wetland	12.7
Estuarine sub-tidal unconsolidated bottom	0.1
Estuarine tidal creek	< 0.1
Intertidal non-vegetated flats	6.2
Palustrine wetland	3.8
<b>TOTAL</b>	<b>22.9 acres</b>

**The placement of roadway fill material in wetlands will require authorization from the USACE and SCDHEC. The limits of any clearing, grading, or fill in wetlands will be delineated and shown on approved permitted plans by the USACE and SCDHEC. SCDOT and the contractor will comply with all applicable permits and permit conditions for the placement of fill in wetlands.** Roadway construction is not expected to result in the mortality of any protected species.

#### 6.1.4 Bridge Construction Access

Temporary access for the construction of the bridge supports and superstructure will be required. Bridge construction access may be required throughout the life of the project (approximately three years). There are many ways the contractor could establish temporary access such as the use of temporary causeways made of fill, floating barges, or temporary work trestles. It is possible the contractor may elect to use a different method for bridge construction access, but **any method selected will be required to comply with all applicable permits and/or environmental commitments for the project.**

To evaluate a “worst-case” scenario for potential impacts to protected species, SCDOT is assuming the contractor will utilize temporary trestles to the maximum extent practicable in shallow waters. The contractor will be responsible for the design of the trestle, so all numbers provided are estimates based on a conceptual design. This assessment assumes the contractor would install a 40-foot-wide temporary work trestle in shallow estuarine emergent wetlands. The trestle would parallel the proposed new bridge location and include shorter 30-foot-wide sections (fingers) between the bents to allow full construction access along this portion of the project. It is assumed the trestle could be constructed using a top-down method with minimal need for additional construction access for the installation of the trestle. Figures 6 through 12 (Appendix A) indicate the approximate and conceptual locations of work trestles and the associated pipe piles in each estuarine habitat used for the analysis in this report.

Channel depths at mean low tide range from approximately 14 to 20 feet deep in Mackay Creek and approximately 20 to 25 feet deep in Skull Creek (NOAA 2021e). Survey data and as-built plans of the existing bridges collected during the preliminary engineering indicates Skull Creek depths are approximately 30 to 40 feet deep at the center of the channel. For bridge construction access in these deeper waters of Mackay Creek and Skull Creek, the contractor will likely use work barges anchored in

place by spuds set in the substrate. The total number of required barges would be at the discretion of the contractor and is unknown at this time.

For the secondary connector bridge between Hog Island and Jenkins Island, it is anticipated that construction access would be achieved through adjacent upland habitat, bridge approach fills, and top-down methods as the bridge is built.

### Potential Habitat Impacts

Impacts associated with bridge construction access are expected to be temporary and interspersed throughout the life of the project. The construction of the temporary trestle for construction access may cause a temporary increase in turbidity in Mackay Creek and Skull Creek as mud and silt is disturbed during installation and removal of the trestle support piles. Turbidity is expected to be localized and will dissipate quickly. Protected fish and other aquatic species are likely to swim through the turbid water with no detectable effects (GARFO 2021). **The contractor will be required to utilize all appropriate SCDOT BMPs for soil and erosion control during construction to minimize the potential impacts and effects of turbidity.**

The temporary trestle support piles will impact the surface area of multiple habitat types while they are in use. A summary of potential habitat impacts from bridge construction access is presented in Table 6-2. It should be noted that the temporary trestle is based on a conceptual design. The information provided in the table below represents estimates based on the current conceptual design. Temporary trestle piles located within the conceptual roadway fill limits are not included in the estimated number of piles below since impacts those areas have already been quantified under the roadway fill impacts. The estimated area of all temporary support piles is expected to be less than 0.4 acres. The temporary trestle may also result in approximately 0.7 acre of temporary shade impacts to estuarine emergent wetlands. However, these habitats are all highly abundant in Mackay Creek and Skull Creek. The potential temporary impacts from temporary trestle pile installation and shading represents a very small percentage of available habitat in the action area and will ultimately be discountable in the context of the entire ecosystem.

**Table 6-2: Estimated Temporary Work Trestle Impacts to Estuarine Wetland Habitats**

Estuarine Habitat Type	Number of Piles	Temporary Pile Surface Area (acres)	Temporary Shade Impacts (acres)
Estuarine emergent wetland	269	< 0.1 acre	0.7 acre
Estuarine tidal creek	8	< 0.1 acre	N/A
Estuarine sub-tidal unconsolidated bottom	51	< 0.1 acre	N/A
Intertidal non-vegetated flats	72	< 0.1 acre	N/A
<b>SUM OF PIPE PILES</b>	<b>400</b>		
<b>SUM OF IMPACTS</b>		<b>&lt; 0.4 acre</b>	<b>0.7 acre</b>

Once the contractor has completed construction of bridge support structures, all temporary trestle piles will be removed or cut off two feet below the mudline. If required, any temporary fill materials for bridge construction access will also be removed once the contractor has completed work in those locations. **SCDOT and the contractor will comply with all applicable permits and permit conditions for the placement of fill in wetlands.** Bridge construction access areas will be allowed to return to their natural state when construction is completed.



**The contractor will be also required to maintain navigability during construction will not be allowed to block the respective channels of Mackay or Skull Creeks.**

The installation of the temporary trestles is also expected to cause an increase in underwater noise levels. These potential impacts are discussed in more detail in Section 6.6.

### 6.1.5 Bridge Construction

The proposed project will require construction of two new permanent bridges: one mainline US 278 bridge that will span both Mackay Creek and Skull Creek and one bridge that will connect Hog Island and Jenkins Island as part of a new local connector road. Bridge construction activities are expected to occur throughout the life of the project (approximately three years).

#### New US 278 Bridge over Mackay Creek and Skull Creek

The new mainline US 278 bridge will be a singular structure that will carry six lanes of traffic and a multi-use path from the mainland to Jenkins Island. The proposed typical section for the new US 278 bridge can be found in Appendix D. This new bridge will be 132 feet wide, approximately 6,750 feet long and will span the entire bank to bank channel width of Mackay Creek (2,107 feet) and Skull Creek (763 feet). The new structure will be constructed parallel to and approximately 55 feet southwest of the existing bridge structures. The existing bridges will remain open to traffic until such time traffic can be shifted onto the new structure prior to demolition.

The bridge design has undergone revisions since the analysis completed in July 2020. These revisions include a lengthening of bridge spans from 100 feet to 175 feet long, thereby reducing the number of bents and piles required to support the replacement bridge. Additionally, the bridge has been lengthened on either end which will reduce the earthen fill previously designated in estuarine habitats.

The revised conceptual design for the main bridge over Mackay Creek and Skull Creek proposes three different sized drilled shafts, measuring approximately 72 inches, 96 inches, and 120 inches in diameter, for the permanent bridge support structures. Locations of the proposed drilled shafts are indicated on Figures 6 through 12 (Appendix A). The construction of drilled shaft bridge columns will require the contractor to install a permanent steel casing to ensure the drilled shaft remains open and does not collapse prior to the pouring of concrete. The permanent casing will also act as a concrete form for the shaft. Drilled shafts are expected to be installed by the following process:

1. Install the casing using a vibratory hammer until refusal or a depth specified by Geotechnical Engineer of Record
2. Repeat process to install all required casings for the respective bridge bent
3. Drill/auger inside casing to set final depth (if necessary) and to prepare for rebar cage installation
4. Install rebar cage
5. Pour concrete inside the casing
6. Repeat steps above until the respective bent is complete

#### Connector Bridge between Hog Island and Jenkins Island

The second bridge is proposed as part of a new connector road between Hog Island and Jenkins Island. This second bridge will be approximately 36 feet wide, 300 feet long, and will span the small tidal creek and most of the adjacent estuarine emergent wetlands. The bank to bank width of the cove is 388 feet. The clearance of the connector bridge will be approximately 5 feet at high tide, approximately 9 feet at

mean tide, and approximately 10 feet at low tide. The new connector road bridge will be supported by 24-inch pre-stressed concrete piles. The 24-inch prestressed concrete would be installed by the following process:

1. Install piles and hammer them until they reach a depth specified by Geotechnical Engineer of Record
2. Repeat process to install all required piles for the respective bridge bent

Table 6-3 provides the number and type of bridge support structures that are proposed to be in wetland habitats. Some support structures will be installed within the proposed fill limits required for the construction of the new bridge approaches and therefore are not included in the table below since the predominant habitat impact in those areas will be the placement of fill material. Support structures in uplands were excluded as well because there is no anticipated impact to habitats potentially utilized by protected species as the result of their placement.

**Table 6-3: Bridge Support Structure Types in Wetland Habitats**

Support Type (Location)	Number of Supports
24-inch Pre-Stressed Concrete Pile (Connector Bridge)	30
72-inch Drilled Shaft (Mackay Creek)	24
96-inch Drilled Shaft (Mackay and Skull Creeks)	112
120-inch Drilled Shaft (Skull Creek)	16
<b>TOTAL</b>	<b>168</b>

### Potential Habitat Impacts

Bridge construction may result in both temporary and permanent impacts to suitable foraging habitat for protected species. Temporary impacts may include increased turbidity in the vicinity of construction activities. Turbidity is expected to be localized and will only be increased during the installation of bridge support structures. Protected fish and other aquatic species are likely to swim through the turbid water with no detectable effects (GARFO 2021). **The contractor will be required to utilize all appropriate SCDOT BMPs for soil and erosion control during construction to minimize the potential impacts and effects of turbidity.**

Additional temporary impacts in the form of increased underwater noise are discussed in more detail in Section 6.1.7.

Permanent impacts will result from installing the different types and sizes of support structures for the new bridges. Locations of the proposed bridge support structures are indicated on Figures 6 through 12 (Appendix A). A summary of potential permanent impacts to wetland habitats associated with the construction of the new bridges is presented in Table 6-4. Bridge support structures located within the conceptual fill limits for the bridge approaches are not included in Table 6-4. These supports are excluded because the predominant habitat impact in those areas will be the placement of fill material and those impacts have already been quantified as such. Placement of new bridge support structures will result in approximately 0.4 acres of surface area loss across multiple wetland habitat types. Additionally, the new bridge deck is expected to result in permanent shading impacts of approximately 3 acres of estuarine emergent wetlands. However, the habitats are all highly abundant in Mackay Creek and Skull Creek. The

potential loss of habitat from bridge support placement and bridge deck shading represents a very small percentage of available habitat in the action area and will ultimately be discountable in the context of the entire ecosystem of Mackay Creek and Skull Creek.

**Table 6-4: Estimated Permanent Impacts to Wetland Habitats from Bridge Construction**

Estuarine Habitat Type	Concrete Piles	Drilled Shafts	Estimated Impact Surface Area (acres)	Estimated Shade Impacts (acres)
Estuarine emergent wetland	7	31	< 0.1 acre	3
Estuarine tidal creek	10	1	< 0.1 acre	N/A
Estuarine sub-tidal unconsolidated bottom	0	84	< 0.1 acre	N/A
Intertidal non-vegetated flats	13	28	< 0.1 acre	N/A
<b>TOTAL</b>	<b>30</b>	<b>152</b>	<b>≤ 0.4 acre</b>	<b>3 acres</b>

### 6.1.6 Bridge Demolition

There are currently four bridges in the US 278 corridor: two bridges over Mackay Creek and two bridges over Skull Creek. The existing bridges have separate structures for eastbound and westbound traffic over the respective waterbodies. The existing eastbound bridge over Mackay Creek was originally constructed in 1956. The westbound lane was constructed in 1982. Both existing bridges over Mackay Creek are approximately 2,300 feet long. They are approximately 25 feet above mean high tide. The existing bridges over Skull Creek were constructed in 1982 and 1983 and are both approximately 2,800 feet long. These bridges are approximately 65 feet above mean high tide. All four of the existing bridges are approximately 36 feet wide. A copy of bridge plan profile sheets for the existing bridges are included in Appendix E. **These existing bridges will be removed in their entirety once construction of the new bridge is completed.**

All four bridge decks and superstructures are comprised of mostly concrete. A summary of the in-water bridge support structures to be removed for each of the four bridges is presented in Table 6-5. The Mackay Creek bridges are supported by 18-inch and 20-inch prestressed concrete piles. The Skull Creek bridges are supported by a combination of 18-inch and 20-inch prestressed concrete piles and steel H-piles. H-piles are embedded in large concrete footings below the ground (see Appendix E). The concrete footings will be removed and the H-piles will be cut off just below the mudline.

**Table 6-5: Existing In-Water Bridge Support Structures to Be Removed**

Location	Type	Quantity
Westbound Mackay Creek	18-inch Prestressed Concrete Pile	372
Eastbound Mackay Creek	18-inch Prestressed Concrete Pile	276
Westbound Skull Creek	18-inch Prestressed Concrete Pile	300
	20-inch Prestressed Concrete Pile	190
Eastbound Skull Creek	18-inch Prestressed Concrete Pile	300
	20-inch Prestressed Concrete Pile	190
<b>TOTAL</b>		<b>1,628</b>

It is expected the contractor will implement standard bridge demolition techniques such as the use of concrete saws and jack hammers to dismantle the bridge decks. The demolition of substructure and bridge supports may be removed by direct pull, vibratory hammer, or cutting piles with saws, torches, or other cutting tools. **Non-hazardous demolition debris will be hauled off site and disposed of in accordance SCDOT policy and SCDHEC regulations.**

Final demolition plans are the responsibility of the contractor and therefore are not available for this analysis. Also, because Mackay Creek and Skull Creek are navigable waters, the demolition plan may require additional coordination with the US Coast Guard (USCG). **If explosives are required for demolition, the contractor, SCDOT, and FHWA will initiate additional coordination and consultation with the USFWS and NMFS.**

To evaluate a “worst-case” scenario for potential impacts to protected species, SCDOT is assuming the contractor will utilize vibratory hammers to remove all existing in-water support structures. A general sequence for the demolition work may resemble the following:

1. Remove all super structure
2. Remove bridge span and bent caps to expose support piles
3. Piles are attached to equipment and vibrated/lifted out of place
4. Repeat process to remove each section of bridge

### Potential Habitat Impacts

Impacts from demolition may be temporary and permanent. Temporary impacts include an increase in turbidity in Mackay Creek and Skull Creek during the removal of existing substructures and old causeway. Turbidity is expected to be localized. Protected fish and other aquatic species are likely to swim through the turbid water with no detectable effects (GARFO, 2021). **The contractor will be required to utilize all appropriate SCDOT BMPs for soil and erosion control during construction to minimize the potential impacts and effects of turbidity.**

During demolition, every effort will be made to avoid dropping pieces of existing bridges into waterways. Materials dropped into the waterways should be retrieved if practicable. **SCDOT and the contractor will comply with all applicable permits and permit conditions for the placement of fill, including materials dropped during demolition.**

Additional temporary impacts in the form of increased underwater noise are discussed in more detail in Section 6.1.7.

Permanent impacts from the removal of the existing bridges may include the restoration of wetland habitats. Table 6-6 presents the potential area of wetland habitats that may benefit from the removal of the old US 278 facility. The removal of the old bridge substructure may allow for the previously impacted wetland habitat areas to return to a more natural condition. The removal the existing bridge decks may allow up to 1.6 acres of estuarine emergent wetlands to revegetate under natural processes.

Table 6-6: Wetland Habitats Potentially Benefited by Removal of Existing US 278 Bridges

Habitat Type	Number of Piles Removed	Estimated Area of Removed Piles (acres)	Estimated Area of Removed Shading (acres)
Estuarine emergent wetland	540	0.03 acres	1.6 acres
Estuarine tidal creek	0	0 acres	0 acres
Estuarine sub-tidal unconsolidated bottom	608	0.01 acres	0 acres
Intertidal non-vegetated flats	480	0.02 acres	0 acres
<b>TOTAL</b>	<b>1,628</b>	<b>0.06 acres</b>	<b>1.6 acres</b>

It should be noted that SCDOT does not plan to seek credit for restoration that may result from the removal of the old US 278 structures. SCDOT does not intend to apply the removal of the old structure and/or approach fills as compensatory mitigation for impacts to wetlands or protected species habitats. SCDOT does not guarantee that these areas will revegetate, and no monitoring of these areas is proposed.

### 6.1.7 Underwater Construction Noise

An increase in underwater noise is expected during construction. Construction noise may occur in the form of impulsive or non-impulsive sounds, as defined below.

- Impulsive sounds are transient, brief (less than 1 second), and typically consist of high peak pressure with rapid rise time and rapid decline (ANSI 1986; NIOSH 1998; ANSI 2005).
- Non-impulsive sounds can be brief or prolonged and continuous or intermittent, but typically do not have a high peak pressure with rapid rise time (ANSI 1995; NIOSH 1998).

The sound pressure generated by an impact hammer is classified as an impulsive sound. The sound is generally a short duration per blow, but with a relatively high noise level. Sound pressure from a vibratory hammer is classified as non-impulsive. Vibratory hammers typically produce a continuous sound at a lower level. Vibratory pile installation produces a sound with peak pressures lower than those generated by impact pile driving (Caltrans 2017). Standard metrics used to evaluate construction noise impacts include peak sound level (Peak), cumulative sound exposure level (SEL), and root mean square (RMS) sound pressure levels (Caltrans 2017). The discussion of construction noise in this document is focused on underwater noise that may affect aquatic species.

### Methodology

The NMFS Southeast Regional Office (NMFS-SERO) “Pile Driving Calculator” tool (henceforth referenced as “SERO Tool”) was used to estimate the underwater noise levels produced during construction. Input and output data from the tool are generally discussed in the subsequent sections. Full results from the NMFS-SERO Tool are provided in Appendix F. To assess potential effects of the project, the outputs from the NMFS-SERO Tool were then compared to the predetermined noise level thresholds for protected species that occur in the project area. The specific effects of construction noise are discussed in more detail in Section 7 of this document. Appendix F also depicts the approximate distances from the PSA that can be used as a reference for the potential impact distances as described in Section 7 of this document.

## Impact Pile Driving

The previously documented “worst-case” scenario for the project assumed the contractor would use impact hammers to install the steel construction casings to their final depths after vibratory methods reached refusal. After coordination and consultation with NMFS, **SCDOT will now require the contractor to use only vibratory hammers and augers for the installation of the steel casings for drilled shaft columns. No impact hammers will be used to install the steel casings for drilled shafts.**

The revised “worst-case” scenario for impact pile driving activities now assumes the contractor will install only the temporary work trestle and bridge supports for the secondary connector bridge between Hog Island and Jenkins Island with an impact hammer. As documented in Table 6-2 (Section 6.3) the temporary work trestle is estimated to require 400 24-inch diameter steel pipe piles in wetland habitats. The conceptual design for the permanent connector bridge requires the installation of 30 24-inch prestressed concrete piles in wetland habitats.

The installation of 24-inch concrete piles and 24-inch steel pipe piles are expected to follow a similar workflow. An estimated 800 blows per pile may be required to properly set a single pile. The installation of one pile is expected to take approximately one hour. It is expected four to five piles could be installed during the same day with a break in pile driving as the bent is constructed. Table 6-7 presents the estimated unattenuated sound pressure levels for impact pile driving for the project as determined by the NMFS-SERO Pile Driving Calculator. The pile driving output can be found in Appendix F.

**Table 6-7: Estimated Unattenuated Noise Levels for Impact Pile Driving**

Type	Estimated Strikes Per Pile	Sound Pressure Level (dB)		
		Peak	SEL	RMS
24-inch Prestressed Concrete	800	185 dB	160 dB	170 dB
24-inch Steel Pipe	800	203 dB	178 dB	189 dB

## Vibratory Pile Driving

The revised “worst-case” scenario for vibratory pile driving assumes the installation of the permanent steel casing required for drilled shafts will use a vibratory hammer. When using a vibratory hammer each of the casings could be completed within approximately three hours. As shown in Table 6-3, the conceptual design includes 24 72-inch diameter casings, 112 96-inch diameter casings, and 16 120-inch diameter casings in estuarine habitats. Using the general construction sequence outlined in Section 6.1.5, it is expected a maximum of two casings could be installed per day, with subsequent casings on each bent being installed, and the remainder of drilling and concrete pouring process occurring in the following days.

Vibratory hammers will also likely be used during the demolition and removal of the four existing US 278 bridges over Mackay and Skull Creeks. As shown in Table 6-5 there are 1,248 18-inch concrete piles and 380 20-inch concrete piles that will be removed. It is assumed between four to six concrete piles could be removed per day. Time required for extraction may vary greatly but could require up to 30 minutes per pile. Documented sound values for the removal of concrete piles could not be located, but they are expected to be similar to the levels produced by wooden piles as documented by NMFS-SERO Pile Driving Calculator (NMFS-SERO 2021), as they are similarly sized and nonmetallic.

The NMFS-SERO acoustic tool does not contain noise data for the vibratory installation of 96 or 102-inch steel casings. NMFS-SERO personnel provided guidance in which they developed a ratio approach using



known data for 72-inch steel casings to estimate noise measurements for 96-inch and 120-inch casings (Appendix B and Appendix F). These data were entered into the NMFS-SERO acoustic tool to determine project specific noise levels. Table 6-8 presents the estimated unattenuated sound pressure levels for vibratory pile driving and demolition for the project (refer to Appendix F).

**Table 6-8: Estimated Unattenuated Underwater Noise Levels Associated with Vibratory Pile Driving**

Construction Type	Pile Type	Sound Pressure Level (dB)		
		Peak	SEL	RMS
Installation	72-inch Steel Pipe	195 dB	180 dB	180 dB
	96-inch Steel Pipe	200 dB	192 dB	195 dB
	120-inch Steel Pipe	194 dB	186 dB	192 dB
Demolition/Removal	18-inch Concrete	176 dB	165 dB	165 dB
	20-inch Concrete	176 dB	165 dB	165 dB

### Auger Usage

The use of an auger will be required for the installation of all drilled shafts. Using an auger to remove the soil and rock from within the casings will produce a non-impulsive noise that will contribute to the increased levels of underwater noise during construction. An auger may be used for up to eight hours per day as part of the drilled shaft installation process. A total of 152 drilled shafts will be installed in estuarine habitats.

The best available noise data come from a study of in-water noise produced during the installation of drilled-shaft columns using auger bits in Bechers Bay, Santa Rosa Island, California (Dazey et. al 2012), that found the sound levels at the source ranged from 121-184.5 dB with an average noise level of 154.2 dB.3 The "sea floor" at Bechers Bay consisted of sand, rock, and other geographic features similar to the habitats found in Mackay Creek and Skull Creek. Table 6-9 provides the estimated underwater noise levels associated with the use of an auger.

**Table 6-9: Estimated Unattenuated Underwater Noise Levels Associated with Auger Usage**

Total Number of Drilled Shafts	Estimated Use per Day (hours)	Sound Pressure Level (dB)		
		Peak	SEL	RMS
152	8 hours	185 dB	199 dB	154 dB

### Noise Attenuation Methods

Noise attenuation methods are generally used to reduce noise impacts associated with impact pile driving. The use of vibratory hammers instead of an impact hammer has been shown to have a 10 to 20dB reduction compared to unattenuated impact hammer sound levels (Caltrans 2017). Other standard methods of noise attenuation for impact pile driving include use of bubble curtains, pile caps, or cushion blocks. A method of noise attenuation commonly referred to as "slow starts" do not necessarily have quantifiable metrics that can be used to determine their effectiveness. However, these methods can be used to give any listed animals the opportunity to leave an area prior to full-force pile driving (NMFS-SERO 2018). These methods include:

- "Ramp up" method - pile driving starts at a very low force and gradually builds up to full force
- "Dry firing" method - operating the pile hammer by dropping the hammer with no compression

- “Soft start” method - noise from hammers is initiated for 15 seconds, followed by a 1-minute waiting period – this sequence is repeated multiple times.

Table 6-10 provides a brief description and the effectiveness of standard noise attenuation methods based on Information from the FHWA/NMFS Programmatic Agreement for Projects in NC, SC, and GA (NMFS-NMFS-SERO 2018).

**Table 6-10: Standard Noise Attenuation Methods**

Sound Treatment	Description	Effectiveness	
		Reduction	Metric
Bubble curtain or bubble tree	Air bubbles used to block sound	5-20+ dB	Peak, SEL, RMS
Confined bubble curtain	A fabric, solid, or tubular curtain is used to confine bubbles	9-22 dB	Peak, RMS
Pile caps	Micarta caps used between the impact piling head and the pile to reduce noise	1-8 dB	Peak, SEL, RMS
Wood pile cushions	A block of wood used between the pile head and pile to reduce noise (often used with a pile cap).	11-26 dB	Peak, SEL, RMS

### Potential Species Effects

Physiological and behavioral impacts to aquatic species have been documented due to the sound pressure generated when installing bridge piles utilizing an impact hammer or vibratory hammer (Caltrans 2017). There is a potential of severe effects (e.g. temporary or permanent hearing loss) when animal exposure to a high source level occurs close to the source; however, the magnitude and probability of most effects generally decrease with increasing distance from the source. The potential for impacts may be reduced by implementing active mitigation measures such as noise attenuation (Caltrans 2017).

Underwater noise produced from installation of the temporary work trestle pipe piles, bridge support piles, and permanent steel casings for the drilled shafts may temporarily or permanently affect some protected aquatic species, specifically, during the installation or removal of structures in the main, open water channels (estuarine unconsolidated bottom) of Mackay Creek and Skull Creek. Protected species that may occur and that are known to occur in the project action area are expected to utilize this open-water environment more frequently than the other aquatic habitats.

In an open-water environment like the main channels of Mackay Creek and Skull Creek, protected species would be able to move freely away from the noise without being forced to stay in areas where the noise levels over time could cause injury. It is anticipated that protected species will leave/avoid the construction area during pile/pier installation, especially if methods such as ramp up, dry firing, or soft starts are utilized (DeRuiter and Doukara 2010; McCauley et al. 2000; Krebs et al. 2012).

Table 6-11 presents a summary of the estimated attenuated noise levels resulting from installation and removal of the different temporary and permanent bridge support structures located in the aquatic environment. Varying water depths will occur during tide changes and these noise levels represent a constant water depth and thus the worst-case scenario for potential impacts. The results and data used for these calculations can be found in Appendix F.

**Table 6-11: Estimated Attenuated Noise Levels for the Installation and Removal of All Bridge Support Structures**

Construction Type	Bridge Support Type (Location)	Method	Total Number of Supports Per Habitat Type				Estimated Strikes Per Pile	Estimated Time Per Pile (minutes)	Number Installed or Removed Per Day	Proposed Sound Attenuation Method	Attenuated Sound Pressure Level (dB)		
			Estuarine emergent wetland	Estuarine sub-tidal unconsolidated bottom	Estuarine tidal creek	Intertidal non-vegetated flat					Peak	SEL	RMS
Installation	24-inch Concrete Pile (Connector Bridge)	Impact	7	-	10	13	800	60 min	5	Cushion Blocks, "Slow Start"	185 dB	170 dB	160 dB
	24-inch Steel Pipe (Temporary Trestle)	Impact	269	51	8	72	800	60 min	5	Cushion Blocks, "Slow Start"	203 dB	189 dB	178 dB
	72-inch Steel Pipe (Mackay Creek)	Vibration	15	5	-	4	-	180 min	2	Vibration	195 dB	180 dB	180 dB
	96-inch Steel Pipe (Mackay & Skull Creeks)	Vibration	16	70	1	25	-	180 min	2	Vibration	200 dB	192 dB	195 dB
	120-inch Steel Pipe (Skull Creek)	Vibration	-	16	-	-	-	180 min	2	Vibration	194 dB	186 dB	192 dB
	All Drilled Shafts (Mackay & Skull Creeks)	Auger	31	91	1	29	-	480 min	1	Confined to steel casing	185 dB	199 dB	154 dB
Demolition/ Removal	18-inch Concrete Pile (Mackay & Skull Creeks)	Vibration	400	-	-	13	-	60 min	6	Vibration	176 dB	165 dB	165 dB
	20-inch Concrete Pile (Mackay & Skull Creeks)	Vibration	140	112	-	274	-	60 min	6	Vibration	176 dB	165 dB	165 dB

## 6.2 BRIDGE LIGHTING

The proposed bridge over Mackay and Skull Creeks will require include navigational lights in accordance with 33 CFR § 118 and as approved by the USCG. **The new US 278 bridge will not have permanent roadway lighting. Lighting on the new US 278 bridge will be restricted to the multi-use path which will consist of downward facing lights embedded in the barrier to illuminate the path.**

No lighting is proposed for the small connector bridge between Hog Island and Jenkins Island.

### Potential Species Effects

Lighting can alter the behavior of multiple protected species that may occur within the project area, specifically sea turtles. A detailed discussion on the potential effects to sea turtles is provided in Section 7.6.

## 6.3 BRIDGE FENDER SYSTEM

The proposed US 278 bridge will include a fender system to protect the bridge from damage by watercraft. The new fender system will be designed to accommodate all required uses of the waterway, including recreational watercraft, as well as larger vessels such as commercial fishing boats and tugboats. The fender elements would likely consist of rubber fenders, with a steel panel and polyethylene facing. The installation of prestressed concrete piles or wooden piles will be required to support the new fender systems.

### Potential Habitat Impacts

Temporary impacts may include increased turbidity in the vicinity of construction activities. Turbidity is expected to be localized and will only be increased during the installation of bridge support structures. Protected fish and other aquatic species are likely to swim through the turbid water with no detectable effects (GARFO 2021). **The contractor will be required to utilize all appropriate SCDOT BMPs for soil and erosion control during construction to minimize the potential impacts and effects of turbidity.**

The fender system has not yet been designed so impacts cannot be quantified at this time. However, the installation of additional concrete piles will be required to construct the bridge fender system. Installation of these piles may increase underwater noise in a similar manner as the other prestressed concrete piles described previously in Section 6.1.5. These piles would not be load bearing and therefore are not expected to require extensive pile strikes such as those on the permanent bridge system. It is expected that the installation of the fender system will result in a minimal increase to underwater noise and no additional analysis to include the fender system is proposed.

## 6.4 STORMWATER RUNOFF

The existing bridges over Mackay Creek and Skull Creek currently utilize scuppers that discharge bridge deck runoff directly into the waterbodies below. Mackay Creek and Skull Creek are both classified by SCDHEC as SFH (Figure 4, Appendix A). There are also oyster beds found throughout the estuarine habitats within the PSA. The SCDOT Stormwater Quality Design Manual (2014) requires the treatment of stormwater runoff to avoid or minimize potential impacts to maintain the high water quality levels required for Shellfish Harvesting Waters. A NPDES permit that includes a Stormwater Pollution Prevention Plan (SWPPP) will be required prior to the start of construction

## Potential Impacts

The existing bridges currently discharge directly into the waters of Mackay Creek and Skull Creek, where the stormwater runoff may decrease water quality and ultimately affect protected species. The waters of Mackay Creek and Skull Creek are currently classified as SFH by SCDHEC so bridge deck runoff may have little overall effect on these waterbodies. Nevertheless, to minimize the potential for water quality impacts, **SCDOT proposes to pre-treat future stormwater runoff from the proposed bridge deck prior to discharge into waters below the new US 278 bridge. Stormwater from the widened roadway will not be discharged within 1,000 feet of a shellfish bed and will be pre-treated per the SCDOT Stormwater Quality Design Manual.**

## 7.0 EFFECTS ANALYSIS

The following section contains discussion about potential effects to specific species. The USFWS (1998) defines “take” as: to harass, harm, pursue, hunt, shoot, wound, kill, trap capture, or collect or attempt to engage in any such conduct. [ESA §3(19)] Harm is further defined by USFWS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined by USFWS as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. [50 CFR §17.3]

### 7.1 AMPHIBIANS

#### 7.1.1 Frosted flatwoods salamander (*Ambystoma cingulatum*) – Threatened; Critical Habitat

No suitable habitat for the Frosted flatwoods salamander was observed within the PSA. According to SCDNR’s online SC Natural Heritage Species Reviewer, the closest known occurrence is approximately 13 miles west northwest of the project at the intersection of S-315 and S-46 (SCDNR 2021a). This is also the closest designated critical area for the species.



Photo by John Jensen (USFWS)

##### Effect Determination

It is anticipated that the project will have **no effect** on the Frosted flatwoods salamander. There will be **no effect** on designated critical habitat for the species.

### 7.2 BIRDS

#### 7.2.1 American wood stork (*Mycteria americana*) – Threatened

A review of eBird Mapper Tool (Cornell Lab of Ornithology 2021) and USFWS documentation of wildlife sightings on PINWR (2011) indicate that American wood storks are frequently observed at PINWR and foraging in the marshes within the PSA. The closest breeding location is on PINWR (Audubon 2020), however no suitable breeding habitat was observed within, or adjacent to, the PSA.



Photo by Ryan Hagerty (USFWS)

##### Temporary Effects

##### Temporary Habitat Loss

Temporary foraging habitat impacts associated with construction access areas are anticipated. The area of suitable foraging habitat that may be temporarily impacted by the project represents an extremely small percentage of available habitat for the American wood stork to breed, forage, and/or shelter in and around the PSA. The temporary exclusion from the PSA is



discountable compared to the available areas for American wood storks to forage nearby. Materials and equipment in the construction access areas will be removed at the end of construction which will thereby restore the ability for American wood stork foraging in areas designated as construction access.

## Permanent Effects

### Permanent Habitat Loss

The project is expected to result in the loss of suitable foraging habitat within the PSA. Permanent habitat impacts are expected in areas associated with the placement of fill materials for road widening and approaches for the new bridge structure. Foraging habitat constitutes 14% of the PSA and less than half of that suitable area may be impacted by the project. Furthermore, foraging habitat is abundant within and adjacent to the PSA. The area of suitable foraging habitat that may be impacted by the project represents an extremely small percentage of available habitat available for the American wood stork to forage.

### Effect Determination

Construction of the project is not expected to result in the mortality of any American wood storks. Based on the ability of the species to utilize the surrounding areas for life functions during active construction, and the discountable loss of habitat in the context of the PSA and surrounding ecosystems, it has been determined that the project is **not likely to adversely affect** the American wood stork.

## 7.2.2 Bald eagle (*Haliaeetus leucocephalus*) – BGEPA

The open waters of Mackay and Skull Creeks provide foraging habitat for Bald eagles. Nesting habitat was identified within and adjacent to the PSA, however no nests were observed during the field surveys. According to SCDNR's Bald eagle nesting database (2021a), several nest sites occur within a 5-mile radius of the PSA, with the closest eagle nest located within a residential development approximately 0.5-mile northeast of the western terminus of the project (SCDNR 2021b). Another nest is located near a golf course within a residential development approximately 0.8-mile southeast of the eastern project terminus (SCDNR 2021b). None of the project's proposed improvements are visible from the nests. The loss of potential Bald eagle foraging habitat as the result of the new bridge will be offset by removal of the existing bridge over open water.



*Photo by Steven Mlodinow  
(Cornell Lab of Ornithology)*

### Effect Determination

Effect conclusions for the bald eagle are not required under the ESA. However, the project is not anticipated to result in the mortality of any bald eagles or limit the ability of the species to adequately breed, feed, or shelter.

### 7.2.3 Eastern black rail (*Laterallus jamaicensis jamaicensis*) – Threatened

According to the eBird Mapper Tool (Cornell Lab of Ornithology 2021) and SCDNR's online SC Natural Heritage Species Reviewer (SCDNR 2021a), no Eastern black rails have been reported within three miles of the PSA. Marginally suitable nesting and foraging habitat for eastern black rails in the PSA consists of high marshes that line the banks of Mackay Creek and Skull Creek. Impacts to marginal nesting and foraging habitat would consist of bridge construction activities.



*Photo by Christy Hand  
(SCDNR)*

#### Temporary Effects

##### Temporary Habitat Loss

Temporary foraging habitat impacts associated with construction access areas are anticipated. The area of suitable foraging habitat that may be temporarily impacted by the project represents an extremely small percentage of available habitat for the Eastern black rail to breed, forage, and/or shelter in and around the PSA. The temporary exclusion from the PSA is discountable given the available areas for Eastern black rail to forage or nest. Materials and equipment in the construction access areas will be removed at the end of construction which will thereby restore access to marginally suitable habitat for the Eastern black rail.

#### Permanent Effects

##### Permanent Habitat Loss

The project may result in the loss of suitable foraging and nesting habitat for the Eastern black rail in the PSA. Permanent habitat impacts are expected in areas associated with the placement of fill materials for road widening and approaches for the new bridge structure. Foraging and nesting habitat constitutes a very small percentage of the estuarine emergent wetlands within the PSA. It is estimated that less than half of that suitable area may be impacted by the project. Furthermore, foraging habitat is abundant within and adjacent to the PSA. The area of suitable foraging habitat that may be impacted by the project represents an extremely small percentage of available habitat available for the Eastern black rail to nest or forage nearby.

#### Effects Determination

Construction of the project is not expected to result in the mortality of any Eastern black rails. Furthermore, based on the ability of the species to utilize the surrounding areas for life functions during active construction, and the discountable loss of habitat in the context of the PSA and surrounding ecosystems, it has been determined the project is **not likely to adversely affect** the Eastern black rail.

### 7.2.4 Piping plover (*Charadrius melodus*) – Threatened; Critical Habitat

Suitable migration foraging habitat for the Piping plover, consisting of mudflats and sand flats, are both present. According to SCDNR's online SC Natural Heritage Species Reviewer, designated winter critical habitat is located on a section of beach at the northeast end of Hilton Head Island, approximately 4.5 miles east of the eastern project terminus. A review of the eBird Mapper Tool (Cornell Lab of Ornithology 2021) indicated four sightings were reported from the western edge of Hilton Head Island, as well as within and adjacent to the PSA. These observations range from as early as 1990 to the most recent sighting in 2019 (Cornell Lab of Ornithology 2021). There are no notes as to whether they were foraging or simply flying past these locations.



*Photo by Gene Nieminen  
(USFWS)*

#### Temporary Effects

##### Temporary Habitat Loss

Temporary foraging habitat impacts associated with construction access areas are anticipated. The area of suitable foraging habitat that may be temporarily impacted by the project represents an extremely small percentage of available habitat for the Piping plover to forage in and around the PSA. The temporary exclusion from the PSA is discountable given the available areas for the species to forage. Materials and equipment in the construction access areas will be removed at the end of construction which will thereby restore access for Piping plovers to any suitable habitat temporarily impacted.

#### Permanent Effects

##### Permanent Habitat Loss

The project is expected to result in the loss of suitable foraging habitat within the PSA. Permanent habitat impacts are expected in areas associated with the proposed road widening and approaches for the new bridge structure. Foraging habitat is abundant adjacent to the PSA. Suitable foraging habitat constitutes 7% percent of the PSA and less than half of that area is expected to be impacted by the project. Habitat loss from the proposed project is not anticipated to limit the population's ability to adequately breed, forage, or shelter.

#### Effects Determination

Construction of the project is not expected to result in the mortality of any Piping plovers. Furthermore, based on the ability of the species to utilize the surrounding areas for life functions during active construction, and the discountable loss of habitat in the context of the PSA and surrounding ecosystems, it has been determined the project is **not likely to adversely affect** the Piping plover.

### 7.2.5 Red-cockaded woodpecker (*Picoides borealis*) – Endangered

According to SCDNR's online SC Natural Heritage Species Reviewer, the closest known red-cockaded woodpecker record is approximately 13 miles north northwest of the cumulative PSA (SCDNR 2021a). Residential and commercial development coupled with a lack of burning in pine dominated areas of the PSA have resulted in degradation of potential red-cockaded woodpecker habitat.



*Photo by Luke Seitz  
(Cornell Lab of  
Ornithology)*

#### Effect Determination

While loblolly pines are a dominant species within the PSA, no suitable nesting or foraging habitat was observed during the field surveys. Therefore, the proposed project will have **no effect** on the red-cockaded woodpecker.

### 7.2.6 Red knot (*Calidris canutus rufa*) – Threatened

According to SCDNR's online SC Natural Heritage Species Reviewer (SCDNR 2021a), there are no known occurrences or Red knots within or immediately adjacent to the PSA. Only one observation has been reported on eBird Mapper Tool (Cornell Lab of Ornithology 2021) and that was in 2002 near the Hilton Head Harbor RV Resort and Marina, approximately 0.25-mile from the PSA. Foraging habitat within the PSA is only marginally suitable for Red knots.



*Photo by Gregory Breese (USFWS)*

#### Temporary Effects

##### Temporary Habitat Loss

Impacts to foraging habitat would consist of bridge construction activities. The impacts to foraging habitat will be temporary and unlikely to limit the population's ability to adequately forage. Any Red knots near the project area will be able to forage in the abundant areas adjacent to the PSA. Materials and equipment in the construction access areas will be removed at the end of construction which will thereby restore the ability for Red knot foraging.

#### Permanent Effects

##### Permanent Habitat Loss

Permanent foraging habitat impacts are expected in areas associated with the proposed approaches for the new bridge structure. Suitable foraging habitat constitutes 7% of the PSA and less than half of that area is anticipated to be impacted by the project. Additionally, foraging habitat is abundant adjacent to the PSA and habitat loss from the proposed project is not anticipated to limit the population's ability to adequately breed, feed, or shelter.

## Effects Determination

Based on the ability of the species to utilize the surrounding areas for life functions during active construction and the discountable loss of habitat in the context of the PSA and surrounding ecosystems, the project is **not likely to adversely affect** the Red knot.

## 7.3 FISH

*Due to similarities in habitat requirements and physiology, effects to Atlantic and Shortnose sturgeon have been combined.*

### 7.3.1 Atlantic sturgeon (*Acipenser oxyrinchus*) – Endangered; Critical Habitat

The nearest critical habitat designated for Atlantic sturgeon is the Savannah River, located approximately 15 miles southwest of the PSA. According to the online SC Natural Heritage Species Reviewer, there are no recorded occurrences within the PSA; however, they have been documented in Whale Branch, the Pocotaligo River, and the Coosawhatchie River are located approximately 24, 18, and 22 river miles, respectively, north of Mackay Creek and Skull Creek. Based on a review of aerial photography and mapping, Mackay Creek and Skull Creek provide a link between the Broad River and Calibogue Sound that Atlantic sturgeon could use to access the ocean.



*Photo by NOAA*

The Combahee River, which forms a portion of the Beaufort and Colleton County boundary, is designated as Atlantic sturgeon critical habitat, and is located approximately 25 miles northeast of the PSA. The closest designated critical habitat for the species is the Savannah River located approximately 15 miles southwest of the PSA.

### 7.3.2 Shortnose sturgeon (*Acipenser brevirostrum*) – Endangered

According to the online SC Natural Heritage Species Reviewer, there are no recorded occurrences of Shortnose sturgeon within Mackay Creek or Skull Creek, however, they have been documented in Whale Branch, the Pocotaligo River, and the Coosawhatchie River located approximately 24, 18, and 22 river miles north of Mackay Creek and Skull Creek, respectively. Based on a review of aerial photography and mapping, Mackay Creek and Skull Creek provide a link between the Broad River and Calibogue Sound that Shortnose sturgeon could use to access the ocean.



*Photo by NOAA*

## Temporary Effects

### Turbidity

Temporary effects to sturgeon may occur in the form of siltation and turbidity in during construction. The installation of the temporary work trestle pipe piles, pre-stressed concrete piles, drilled shaft casings, and the placement of fill material may temporarily increase turbidity in the water column. The removal of the work trestle and existing bridge piers and footings may also increase temporary turbidity.

According to NMFS (GARFO 2021), fish eggs and larvae are more susceptible to impacts due to high turbidity (total suspended sediment [TSS]) than adults; in addition, high TSS rates can cause low levels of dissolved oxygen (DO) that can affect sub-adult fish to a greater extent than adult fish. They suggest that 14 or more days of TSS levels of 1,000 milligrams per liter (mg/L) can cause physiological and behavioral affects, specifically to sturgeon, and recommend that TSS levels not exceed 50 mg/L when early life stages are in the area. High TSS may affect movements of adult or subadult sturgeon, however the effects are expected to be insignificant, and the fish are likely to swim through the turbid water with no detectible effects.

In-water installation of piles and drilled shafts will be intermittent construction activities and due to the water high velocity in the open channels as the result of tidal flow, it is anticipated that turbidity would dissipate rapidly. Additionally, **the contractor will be required to utilize all appropriate SCDOT BMPs for soil and erosion control during construction to minimize the potential impacts and effects of turbidity.** Therefore, the temporary impacts to sturgeon resulting from increases in turbidity during construction are expected to be discountable.

### Temporary Habitat Loss

Estuarine habitats will be temporarily displaced by the 400 24-inch steel pipe piles installed for the temporary work trestles. Table 7-1 provides the estimated temporary impacts resulting from the placement of the temporary work trestle. The placement of the temporary trestle piles will result in the temporary reduction of suitable foraging habitat for sturgeon in the PSA.

**Table 7-1: Estimated Temporary Work Trestle Impacts to Sturgeon Habitats**

Estuarine Habitat Type	Number of Piles	Temporary Pile Surface Area (acres)	Temporary Shade Impacts (acres)
Estuarine emergent wetland	269	< 0.1 acre	0.7 acre
Estuarine tidal creek	8	< 0.1 acre	N/A
Estuarine sub-tidal unconsolidated bottom	51	< 0.1 acre	N/A
Intertidal non-vegetated flats	72	< 0.1 acre	N/A
<b>SUM OF PIPE PILES</b>	<b>400</b>		
<b>SUM OF IMPACTS</b>		<b>&lt; 0.4 acre</b>	<b>0.7 acre</b>

However, all the habitats that will be temporarily displaced are highly abundant in the PSA and adjacent waters of Mackay Creek and Skull Creek. The expected displacement is less than one tenth of an acre in each estuarine habitat observed within the PSA. It is estimated the temporary work trestle pipe piles will be in place for less than three years and will be removed once the new bridge is built. Invertebrates on which sturgeon feed are expected to quickly recolonize upon removal of these temporary substructures.



Due to the minimal area being impacted, the abundance of suitable foraging habitat in Mackay and Skull Creeks outside of the PSA, and the ability for sturgeon prey species to recolonize after construction, anticipated effects from temporary foraging habitat displacement on sturgeon are expected to be insignificant.

### Construction Noise Effects

Fish, such as Atlantic and Shortnose sturgeon, experience an auditory injury after a permanent threshold shift in hearing range. This auditory injury is defined as “harm” in the ESA. Noise level thresholds for injury and behavioral changes to sturgeon set by NMFS-SERO are presented in Table 7-2.

**Table 7-2: NMFS-SERO Underwater Noise Level Thresholds for Sturgeon**

Physiological (Injury) and Behavioral Noise Impact Thresholds for Fish				
	Onset of Physical Injury			Behavioral Effects
	Peak	Cumulative SEL (impulsive)	Cumulative SEL (non-impulsive)	RMS
Fish < 102g (~0.25 lbs)	206 dB	183 dB	191 dB	150 dB
Fish > 102g (~0.25 lbs)	206 dB	187 dB	234 dB	150 dB

Based on the noise analysis provided in Section 6.1.7, temporary trestle installation, bridge support structure installation, and the removal of old bridge supports and temporary work trestle pipe piles in open water may affect sturgeon. Loud levels of intermittent or continuous construction noise from have the potential to harm sturgeon if they are close to the noise source for prolonged periods of time. Additionally, the increased underwater noise levels from the project may affect nearby sturgeon behaviors, including the temporary disruption of foraging activities. The effects to sturgeon from impact pile driving, vibratory pile driving and removal, and the use of an auger are broken out in the sub-sections below. Complete results from the NMFS-SERO acoustic tool used in the subsequent analysis are provided in Appendix F.

### Impact Pile Driving

The “worst-case” scenario for underwater noise during impact pile driving is based on the estimated attenuated noise levels from the installation of the proposed 24-inch steel pipe piles required for temporary work trestle. The installation of the 24-inch pipe piles is expected to generate the highest decibel level for impact pile driving during the project. Table 7-3 provides a summary of the location, estimated blow counts, duration, and expected decibel levels for the installation of the 24-inch steel pipe piles.

Table 7-3: Summary of 24-inch Pipe Piles to be Installed by Impact Pile Driving for Sturgeon Effects Analysis

Bridge Support Type (Location)	Total Number of Supports Per Habitat Type				Estimated Strikes Per Pile	Estimated Time Per Pile (minutes)	Number Installed or Removed Per Day	Proposed Sound Attenuation Method	Attenuated Sound Pressure Level (dB)		
	Estuarine emergent wetland	Estuarine sub-tidal unconsolidated bottom	Estuarine tidal creek	Intertidal non-vegetated flat					Peak	SEL	RMS
24-inch Steel Pipe (Temporary Trestle)	269	51	8	72	800	60 min	5	Cushion Blocks, "Slow Start"	203 dB	189 dB	178 dB

It should be noted that more than 50% of the 24-inch temporary pipe piles will be in estuarine emergent wetlands that have vegetative cover. This may make the installation site of these piles less accessible for sturgeon which limits the potential for physical harm for half of the time required to install the temporary trestle. The presence of vegetation also provides an additional reduction of 11 dB to the in-water noise levels (NMFS 2014) which is expected to limit the radius of potential effects to sturgeon from the increased underwater noise levels.

The installation of the 24-inch pipe piles in the open waters and unconsolidated bottom habitats in Mackay and Skull Creeks, where the sound is more likely to travel unimpeded in the open water column than in the vegetated estuarine emergent marsh, pose the highest risk for potential effects from impact pile driving on sturgeon. **To minimize the potential effects on sturgeon, "slow start" methods such as ramp up, dry firing, or soft starts, in combination with cushion blocks, will be used to minimize noise during the installation of piles when using an impact hammer.** Using these attenuation methods results in the approximate values of 203 dB (Peak), 189 dB (SEL), and 178 dB (RMS) during the installation of the temporary piles. The estimated Peak dB level is below the threshold established for sturgeon. However, the SEL and RMS dB levels exceed the accepted thresholds for the species. These values were used as inputs in the NMFS-SERO acoustic tool and the resulting calculations estimate that potential physiological effects to sturgeon may occur within a radius of approximately 45 feet and behavioral impacts may occur within a radius of approximately 241 feet from the pile installation site. The results from the NMFS-SERO tool are provided in Table 7-4. The full results from the tool can be found in Appendix F.

Table 7-4: Distances for Potential Effects to Sturgeon from Impact Pile Driving

Calculated Distances for Impact Pile Driving				
	Onset of Physical Injury			Behavioral Effects
	Peak	Cumulative SEL		RMS
		Fish ≥ 102 g	Fish < 102 g	
Threshold value	206 dB	187 dB	183 dB	150 dB
Distance to threshold (feet)	0 ft	43.3 ft	44.6 ft	241.4 ft

When impact pile driving activities begin, **the contractor will implement "slow starts," in combination with cushion blocks on the pile caps, to minimize potential effects on sturgeon.** Due to the high mobility of sturgeon, they are expected to move away from noise disturbances to similar habitat nearby and

resume normal behaviors (Krebs et. al 2012). This reduces the potential for sturgeon to be within the 45 foot radius where sounds may result in physical injury.

If an individual sturgeon chooses to remain within the behavioral disturbance zone during active impact pile driving, it could be exposed sound levels that may disrupt its normal activities. Yet, due to the high mobility potential of sturgeon, individuals close enough to hear the increased underwater noise levels are expected to move away from the area into similar habitat nearby and resume normal behaviors (Krebs et. al 2012).

Although impact pile driving activities from the project may affect sturgeon, the activities will be relatively intermittent in nature. Following the daily pile installation, a period of no in-water activity will occur while the trestle deck is installed or a bent is constructed. In addition, sturgeon will be able to resume normal activities during quiet periods between pile installations, and **for at least eight hours every night**. Based on the above information, it is anticipated any effects on sturgeon from impact pile driving will be minimal.

### *Vibratory Pile Driving*

The “worst-case” scenario for underwater noise during vibratory pile driving is based on the attenuated noise levels from the installation of the proposed 96-inch steel pipe casing required for drilled shaft construction, which is expected to generate the highest decibel level for vibratory pile driving. The NMFS-SERO acoustic tool did not contain noise data for the vibratory installation of 96-inch- or 120-inch steel casings. NMFS-SERO personnel provided guidance in which they developed a ratio approach using known data for 72-inch steel casings to estimate noise measurements for 96-inch and 120-inch casings (Appendix B and Appendix F). This approach was used to establish the estimated decibel levels for the installation of the 96-inch and 120-inch steel pipe casings associated with the drilled shaft supports for the new US 278 bridge. Table 7-5 provides a summary of the location, estimated duration of installation, and expected decibel levels for the installation of the 96-inch steel pipe casings.

**Table 7-5: Summary of 96-inch Steel Pipe Casings to be Installed by Vibratory Pile Driving for Sturgeon Effects Analysis**

Bridge Support Type (Location)	Total Number of Supports Per Habitat Type				Estimated Strikes Per Pile	Estimated Time Per Pile (minutes)	Number Installed or Removed Per Day	Proposed Sound Attenuation Method	Attenuated Sound Pressure Level (dB)		
	Estuarine emergent wetland	Estuarine sub-tidal unconsolidated bottom	Estuarine tidal creek	Intertidal non- vegetated flat					Peak	SEL	RMS
96-inch Steel Pipe (Mackay & Skull Creeks)	16	70	1	25	-	180 min	2	Vibration	200 dB	192 dB	195 dB

The installation of the 96-inch steel pipe casings in the open waters and unconsolidated bottom habitats of Mackay Creek and Skull Creek, where the sound is more likely to travel unimpeded in the open water column than in the vegetated estuarine emergent marsh, pose the highest risk for potential effects from vibratory pile driving on sturgeon. The estimated sound levels of 200 dB (Peak), 192 dB (SEL), and 195 dB (RMS) are expected during the installation of the 96-inch steel pipe casing. The estimated Peak dB level is below the threshold established for sturgeon, but the SEL and RMS dB levels exceed the accepted thresholds for the species. These values were used as inputs in the NMFS-SERO acoustic tool and the resulting calculations estimate that potential physiological effects to sturgeon may occur within a radius of approximately 4,130 feet and behavioral impacts may occur within a radius of approximately 5,835 feet from the pile installation site. The results from the NMFS-SERO tool for the 96-inch steel pipe casing are

provided in Table 7-6. The full results from the tool and a figure depicting the potential radius of effects from underwater noise can be found in Appendix F.

**Table 7-6: Distances for Potential Effects to Sturgeon from Vibratory Pile Driving**

Calculated Distances for Vibratory Pile Driving				
	Onset of Physical Injury			Behavioral Effects
	Peak	Cumulative SEL		RMS
		Fish $\geq$ 102 g	Fish $<$ 102 g	
Threshold value	206 dB	234 dB	191 dB	150 dB
Distance to threshold (feet)	16.4 ft	38.3 ft	4,130.3 ft	5,834.3 ft

When vibratory pile driving activities begin, **the contractor will implement “slow starts”** in an effort to alert sturgeon within the potential effect radius. Due to the high mobility of sturgeon, they are expected to move away from noise disturbances to similar habitat nearby and resume normal behaviors (Krebs et. al 2012). This reduces the potential for sturgeon to be within the effect radius where sounds may result in physical injury.

If an individual sturgeon chooses to remain within the behavioral disturbance zone during active vibratory pile driving, it could be exposed sound levels that may disrupt its normal activities. However, due to the high mobility potential of sturgeon, individuals close enough to hear the increased underwater noise levels are expected to move away from the area into similar habitat nearby and resume normal behaviors (Krebs et. al 2012).

Although vibratory pile driving activities from the project may affect sturgeon, the activities will be relatively intermittent in nature. Following the installation of casings, a period of no in-water activity will occur while the construction equipment is remobilized or a bent is constructed. In addition, sturgeon will be able to resume normal activities during quiet periods between casing installations, and **for at least eight hours every night**. Based on the above information, it is anticipated any effects on sturgeon from vibratory pile driving will be minimal.

### *Auger Usage*

The use of an auger will be required for all proposed drilled shafts that will support the new US 278 bridge. The NMFS-SERO acoustic tool did not contain noise data for the noise levels from auger use. The best available underwater noise data for augers come from a study of in-water noise produced during the installation of drilled-shaft columns using auger bits in Bechers Bay, Santa Rosa Island, California (Dazey et. al 2012), that found the sound levels at the source ranged from 121-184.5 dB with an average noise level of 154.2 dB.<sup>3</sup> The "sea floor" at Bechers Bay consisted of sand, rock, and other geographic features like the habitats found in Mackay Creek and Skull Creek. Table 7-7 provides a summary of the habitat locations where augers will be used, estimated duration of use, and expected decibel levels during use of the auger.

Table 7-7: Summary of Auger Use for the Installation of Drilled Shaft Support Structures for Sturgeon Effects Analysis

Bridge Support Type (Location)	Total Number of Supports Per Habitat Type				Estimated Strikes Per Pile	Estimated Time Per Pile (minutes)	Number Installed or Removed Per Day	Proposed Sound Attenuation Method	Attenuated Sound Pressure Level (dB)		
	Estuarine emergent wetland	Estuarine sub-tidal unconsolidated bottom	Estuarine tidal creek	Intertidal non- vegetated flat					Peak	SEL	RMS
All Drilled Shafts (Mackay & Skull Creeks)	31	91	1	29	-	480 min	1	Confined to steel casing	185 dB	199 dB	154 dB

Using an auger in the open waters and unconsolidated bottom habitats of Mackay Creek and Skull Creek, where the sound is more likely to travel unimpeded in the water column than in the vegetated estuarine emergent marsh, poses the highest risk for potential effects to sturgeon during the use of the auger. The estimated sound levels of 185 dB (Peak), 199 dB (SEL), and 154 dB (RMS) are expected during the use of the auger. The estimated Peak dB level is well below the threshold established for sturgeon, but the SEL and RMS dB levels slightly exceed the accepted thresholds for the species. These values were used as inputs in the NMFS-SERO acoustic tool and the resulting calculations estimate that potential physiological effects to sturgeon may occur within a radius of approximately 61 feet and behavioral impacts may occur within a radius of approximately 152 feet from the pile installation site. The results from the NMFS-SERO tool for the use of an auger within the steel construction casing for the proposed drilled shafts are provided in Table 7-8. The full results from the tool and a figure depicting the potential radius of effects from underwater noise can be found in Appendix F.

Table 7-8: Distances for Potential Effects to Sturgeon from Auger Use

Calculated Distances for Auger Usage				
	Onset of Physical Injury			Behavioral Effects
	Peak	Cumulative SEL		RMS
		Fish ≥ 102 g	Fish < 102 g	
Threshold value	206 dB	234 dB	191 dB	150 dB
Distance to threshold (feet)	0 ft	0.1 ft	60.6 ft	152.3 ft

Due to the high mobility of sturgeon, they are expected to move away from noise disturbances to similar habitat nearby and resume normal behaviors (Krebs et. al 2012). This reduces the potential for sturgeon to be within the effect radius where sounds may result in physical injury.

If an individual sturgeon chooses to remain within the behavioral disturbance zone during active vibratory pile driving, it could be exposed sound levels that may disrupt its normal activities. However, due to the high mobility of sturgeon, individuals close enough to hear the increased underwater noise levels are expected to move away from the area into similar habitat nearby and resume normal behaviors (Krebs et. al 2012).

Although vibratory pile driving activities from the project may affect sturgeon, the activities will be relatively intermittent in nature. Following the installation of casings, a period of no in-water activity will

occur while the construction equipment is remobilized or a bent is constructed. In addition, sturgeon will be able to resume normal activities during quiet periods between casing installations, and **for at least eight hours every night**. Based on the above information, it is anticipated any effects on sturgeon from the use of an auger within the steel construction casings of the proposed drilled shafts will be minimal.

## Permanent Effects

### Permanent Habitat Loss

The installation of bridge support structures in estuarine habitats will result in the permanent loss of up to 0.4 acre. The estimated impacts to estuarine emergent wetlands from bridge deck shading will be approximately 3 acres. Table 7-9 provides the estimated permanent impacts to sturgeon habitat from the project.

**Table 7-9: Estimated Permanent Impacts to Suitable Habitat for Sturgeon**

Estuarine Habitat Type	Concrete Piles	Drilled Shafts	Estimated Area Impacted by Bridge or Trestle Supports (acres)	Estimated Shade Impacts (acres)
Estuarine emergent wetland	7	31	< 0.1 acre	3
Estuarine tidal creek	10	1	< 0.1 acre	N/A
Estuarine sub-tidal unconsolidated bottom	0	84	< 0.1 acre	N/A
Intertidal non-vegetated flats	13	28	< 0.1 acre	N/A
<b>TOTAL</b>	<b>30</b>	<b>152</b>	<b>≤ 0.4 acre</b>	<b>3 acres</b>

These estuarine habitats all serve as potential habitat for sturgeon or species on which they prey so impacts from the new bridge structures may affect sturgeon. However, all habitat types being impacted are highly abundant in Mackay Creek and Skull Creek both within and adjacent to the PSA. Furthermore, the eventual removal of the obsolete bridge's in-water substructure elements will help offset the permanent loss of sturgeon habitat. It is expected invertebrates on which sturgeon prey will quickly recolonize this estuarine bottom upon removal of these substructures. The permanent effects to sturgeon by the loss of estuarine habitats due to this project will be insignificant in the context of the larger ecosystems of Mackay Creek and Skull Creek.

### Effects Determination

The temporary effects on sturgeon resulting from increases in turbidity during construction are expected to be discountable since increased turbidity will dissipate quickly, and **the contractor will be required to utilize all appropriate SCDOT BMPs for soil and erosion control during construction to minimize the potential impacts and effects of turbidity**. The effects of this temporary impact will be insignificant to sturgeon.

It is estimated the temporary work trestle pipe piles will be in place for less than three years and will be removed once the new bridge is built. Invertebrates will quickly recolonize this estuarine bottom upon removal of these substructures. The anticipated effects on sturgeon caused by the temporary displacement of estuarine habitats from temporary trestles is considered discountable.



Increased underwater noise from the project would be intermittent and relatively short with an estimated maximum of eight hours per day during the use of an auger to construct the drilled shaft supports. **To minimize the potential effects on sturgeon, “slow start” methods such as ramp up, dry firing, or soft starts, in combination with cushion blocks, will be used during the installation of piles when using an impact hammer.** Additionally, **SCDOT will require the contractor to use vibratory hammers and augers for the installation of the steel pipe casings for drilled shaft columns. No impact hammers will be used to install the steel pipe casings for drilled shafts.**

If an individual sturgeon chooses to remain within the behavioral disturbance zone, it could be exposed to behavioral noise effects during pile installation and alter its behavioral pattern. However, due to the mobility of sturgeon, they are expected to move away from noise disturbances to similar habitat nearby and resume normal behaviors (Krebs et. al 2012). In addition, sturgeon will be able to resume normal activities during quiet periods between pile installations, and **for at least eight hours every night.**

The project has adequate avenues for a sturgeon to leave or avoid the project area during construction and increased levels of underwater noise. There is abundant habitat that sturgeon can utilize for foraging or other life functions outside of the PSA during construction. Furthermore, Mackay Creek and Skull Creek do not fall along known migration patterns and they have not been documented as known migration routes for sturgeon.

Based on the information above it is expected **may affect** both the Atlantic sturgeon and Shortnose sturgeon. However, it is expected the proposed project is **not likely to adversely affect** the Atlantic sturgeon and Shortnose sturgeon. There will be **no effect** to critical habitat for the Atlantic sturgeon.

## 7.4 MAMMALS

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

According to SCDNR’s online SC Natural Heritage Species Reviewer, the closest known trapping location of a Northern long-eared bat is approximately 6.5 miles southwest of the PSA at Palmetto Bluff.

#### Effects Determination

According to a letter from USFWS dated May 22, 2020 (IPaC Record Locator: 393-21875499, Appendix G) the proposed project will have **no effect** on the Northern long-eared bat.



*Photo by Al Hicks  
(USFWS)*

### 7.4.2 West Indian manatee (*Trichechus manatus*) – Threatened

Mackay Creek and Skull Creek provide suitable summer habitat within the PSA. West Indian manatees are known to occur in waters adjacent to Pinckney Island National Wildlife refuge near Daws Island and Port Royal Sound (USFWS 2011). According to SCDNR’s online SC Natural Heritage Species Reviewer, a West Indian manatee sighting was recorded approximately two miles northeast of the PSA in Skull Creek, and all open waters in the vicinity of the PSA are designated as potential areas for manatee occurrences (SCDNR 2021a).



*Photo by Keith Ramos (USFWS)*

## Temporary Effects

### Turbidity

Mackay Creek and Skull Creek provide suitable foraging habitat for manatees. Temporary impacts to the foraging habitat could occur in the form of siltation and turbidity during construction. The installation of the temporary work trestle pipe piles, pre-stressed concrete piles, and drilled shaft casings will temporarily increase turbidity in the water column. Removal of temporary work trestle piles and existing bridge supports will increase temporary turbidity. In-water installation of piles and drilled shafts will be intermittent construction activities and due to the water high velocity in the open channels as the result of tidal flow, it is anticipated that turbidity would dissipate rapidly. Additionally, **the contractor will be required to utilize all appropriate SCDOT BMPs for soil and erosion control during construction to minimize the potential impacts and effects of turbidity.** The temporary effects will be minor, and manatees are likely to swim through the turbid water with no detectable effects.

### Construction Noise Effects

No specific impact thresholds for acoustic impacts to manatees have not been developed at this time. However, based on the estimated underwater noise levels for the project (see Section 6.1.7) bridge support pile installations and removal could affect the behavior and disrupt foraging and migrating manatees.

Increased underwater noise from the project would be intermittent and relatively short with an estimated maximum of eight hours per day during the use of an auger to construct the drilled shaft supports. **To minimize the potential effects on manatees, “slow start” methods such as ramp up, dry firing, or soft starts, in combination with cushion blocks, will be used to minimize noise during the installation of piles when using an impact hammer. Additionally, SCDOT will require the contractor to use vibratory hammers and augers for the installation of the steel pipe casings for drilled shaft columns; no impact hammers will be used.**

Appendix F provides a depiction of the approximate distances from the PSA that increased underwater noise may be increased. During the periods of increased underwater noise levels, it is reasonable to assume that manatees, upon detecting the increase, will leave the area; especially if methods such as ramp up, dry firing, or soft starts are utilized for impact pile driving. However, it is impossible to predict or state with certainty that there will be no occurrences of manatees within the estimated distances where noise impacts may affect the species.

Although increased underwater noise levels from the project may affect manatees, the activities will be relatively intermittent in nature. Following the installation of casings, a period of no in-water activity will occur while the construction equipment is remobilized or a bent is constructed. In addition, manatees will be able to resume normal activities during quiet periods between casing installations, and **for at least eight hours every night**. Based on the above information, it is anticipated any effects on manatees resulting from increased underwater noise during construction will be minimal.

### Vessel Strikes

Vessel strikes pose a serious threat to the slow-moving manatee (USFWS 2001b). Manatees that may utilize the waters of Mackay or Skull Creeks would commonly encounter vessel traffic associated with recreational and commercial vessels in an existing no wake zone; therefore, the manatees have likely acclimated to existing levels of vessel activity. The project will require the use of barges and an increase in vessel traffic may be required over the life of the project (approximately three years). **To minimize potential effects to manatees, the USFWS Standard Manatee Conditions for In-Water Work (Appendix H) will be employed during construction. Precautionary measures will be implemented during construction in summer months or early fall, as this is when the waterways would likely support increasing numbers of manatees.**

### Effects Determination

Although increased underwater noise levels from the project may affect manatees, the activities will be relatively intermittent in nature. **To minimize the potential effects on sturgeon, “slow start” methods such as ramp up, dry firing, or soft starts, in combination with cushion blocks, will be used during the installation of piles when using an impact hammer. Additionally, SCDOT will require the contractor to use vibratory hammers and augers for the installation of the steel pipe casings for drilled shaft columns. No impact hammers will be used to install the steel pipe casings for drilled shafts.**

Since manatees are a mobile species, they are expected to move away from noise disturbances to similar habitat nearby and resume normal behaviors. In addition, manatees will be able to resume normal activities during quiet periods between pile installations, and **for at least eight hours every night**. The project has adequate avenues for a manatee to leave or avoid the project area during construction and increased levels of underwater noise. There is abundant habitat that manatees can utilize for foraging or other life functions outside of the PSA during construction.

**To minimize potential effects to manatees, the USFWS Standard Manatee Conditions for In-Water Work (Appendix H) will be employed during construction. Precautionary measures will be implemented during construction in summer months or early fall, as this is when the waterways would likely support increasing numbers of manatees.**

The project is not anticipated to have any permanent effects on the West Indian Manatee. Based on the information above, it is anticipated that the project is **not likely to adversely affect** the West Indian manatee.

## 7.5 PLANTS

### 7.5.1 American chaffseed (*Schwalbea americana*) – Endangered

Suitable habitat was not observed within the PSA for the American chaffseed. According to SCDNR's online SC Natural Heritage Species Reviewer, there are no known occurrences within 10 miles of the PSA.

#### Effects Determination

It is anticipated that project will have **no effect** on American chaffseed.



Photo by Robert Sinclair  
(USFWS)

### 7.5.2 Pondberry (*Lindera melissifolia*) – Endangered

Suitable Pondberry habitat was not observed within the PSA. According to the SC Natural Heritage Species Reviewer, the closest known occurrence is approximately 18 miles northeast of the western project terminus on the Marine Corps Air Station.

#### Effects Determination

The project is anticipated to have **no effect** on Pondberry.



Photo by Carol and Hugh Nourse  
(USFS)

## 7.6 Reptiles

*Due to similarities in habitat requirements and physiology, effects to all sea turtles have been combined below.*

### 7.6.1 Green sea turtle (*Chelonia mydas*) – Threatened

The shallow portions of Mackay Creek and Skull Creek, as well as their associated marshes, may provide suitable foraging habitat for juvenile green sea turtles. In South Carolina, green sea turtles have been trapped by the SCDNR as far as 14 nautical miles inshore in the Wando River (H. Charlotte, personal communication 2020). According to SCDNR's online SC Natural Heritage Species Reviewer (SCDNR 2021b), there are no records of green sea turtles within 20 miles of the project site.

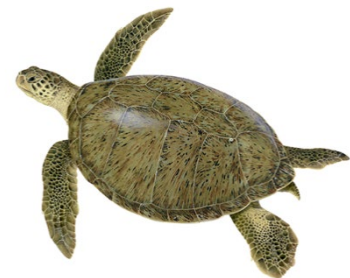


Photo by NOAA

### 7.6.2 Kemp's ridley sea turtle (*Lepidochelys kempii*) – Endangered

Mackay Creek and Skull Creek likely provide suitable foraging habitat for juvenile Kemp's ridley sea turtles. According to SCDNR's online SC Natural Heritage Species Reviewer (SCDNR 2020), the closest record of Kemp's ridley sea turtle to the project is approximately 5.76 miles southeast on the beach at Hilton Head Island.



Photo by NOAA

### 7.6.3 Loggerhead sea turtle (*Caretta caretta*) – Threatened; Critical Habitat

Critical habitat has been designated in South Carolina and the closest is located approximately 7 miles northeast of the PSA on the beaches of Bay Point Island. A review of SCDNR's online SC Natural Heritage Species Reviewer (SCDNR 2020) does not indicate any occurrences of loggerhead turtles in or near the PSA, however Mackay Creek and Skull Creek likely provide suitable foraging habitat for juvenile loggerhead sea turtles.



Photo by NOAA

## Temporary Effects

### Turbidity

Temporary impacts to the foraging habitat could occur in the form of siltation and turbidity during construction. The installation of the temporary work trestle pipe piles, pre-stressed concrete piles, and drilled shaft casings may produce temporary turbidity in the water column. Removal of temporary work trestle piles and existing bridge supports may also increase temporary turbidity. In-water installation of piles and drilled shafts will be intermittent construction activities and due to the water high velocity in the open channels as the result of tidal flow, it is anticipated that turbidity would dissipate rapidly. Additionally, **the contractor will be required to utilize all appropriate SCDOT BMPs for soil and erosion control during construction to minimize the potential impacts and effects of turbidity.** The temporary effects from turbidity are expected to be minor, short in duration, and sea turtles are likely to swim through the turbid water with no detectable effects.

### Temporary Habitat Loss

Estuarine habitats will be temporarily displaced by the 400 24-inch steel pipe piles installed for the temporary work trestles. Table 7-10 provides the estimated temporary impacts resulting from the placement of the temporary work trestle. The placement of the temporary trestle piles will result in the temporary reduction of suitable foraging habitat for sea turtles in the PSA.

Table 7-10: Estimated Temporary Work Trestle Impacts to Sea Turtle Habitats

Estuarine Habitat Type	Number of Piles	Temporary Pile Surface Area (acres)	Temporary Shade Impacts (acres)
Estuarine emergent wetland	269	< 0.1 acre	0.7 acre
Estuarine tidal creek	8	< 0.1 acre	N/A
Estuarine sub-tidal unconsolidated bottom	51	< 0.1 acre	N/A
Intertidal non-vegetated flats	72	< 0.1 acre	N/A
<b>SUM OF PIPE PILES</b>	<b>400</b>		
<b>SUM OF IMPACTS</b>		<b>&lt; 0.4 acre</b>	<b>0.7 acre</b>

However, all the habitats that will be temporarily displaced are highly abundant in the PSA and adjacent waters of Mackay Creek and Skull Creek. The expected displacement is less than one tenth of an acre in each estuarine habitat observed within the PSA. It is estimated the temporary work trestle pipe piles will be in place for less than three years and will be removed once the new bridge is built. Invertebrates on which sea turtles feed are expected to quickly recolonize upon removal of these temporary substructures. Due to the minimal area being impacted, the abundance of suitable foraging habitat in Mackay and Skull Creeks outside of the PSA, and the ability for sea turtle prey species to recolonize after construction, anticipated effects from temporary foraging habitat displacement on sea turtles are expected to be insignificant.

#### Vessel Strikes

Construction vessel traffic may potentially pass near sea turtles on an incidental basis. Construction vessels are expected to operate at low speeds within the relatively limited project area. Short-term behavioral reactions to vessels are not expected to result in long-term impacts to sea turtle populations in waters surrounding the project area. Sea turtles that may utilize the waters of Mackay or Skull Creeks would commonly encounter vessel traffic associated with recreational and commercial vessels; therefore, the turtles have likely acclimated to existing levels of vessel activity. The project will require the use of barges and an increase in vessel traffic may be required over the life of the project (approximately three years). **To minimize potential effects to sea turtles, the NMFS Sea Turtle and Smalltooth Sawfish Construction Conditions will be employed during construction (Appendix I). Precautionary measures will be implemented during construction in summer (May 1 – October 31), as this is when the waterways would be most likely to support increased numbers of sea turtles.**

#### Construction Noise Effects

Sea turtles can experience an auditory injury resulting in permanent loss of hearing or even injury to internal organs when exposed to high sound levels. This injury is defined as “harm” in the ESA. Noise level thresholds for injury and behavioral changes to sea turtles set by NMFS-SERO are presented in Table 7-11.



Table 7-11: NMFS-SERO Underwater Noise Level Thresholds for Sea Turtles

Physiological (Injury) and Behavioral Noise Impact Thresholds for Sea Turtles			
Onset of Physical Injury			Behavioral Effects
Peak	Cumulative SEL (impulsive)	Cumulative SEL (non-impulsive)	RMS
206 dB	187 dB	234 dB	160 dB

Based on the noise analysis provided in Section 6.1.7, temporary trestle installation, bridge support structure installation, and the removal of old bridge supports and temporary work trestle pipe piles in open water may affect sea turtles. Loud levels of intermittent or continuous construction noise from have the potential to harm sea turtles if they are close to the noise source for prolonged periods of time. Additionally, the increased underwater noise levels from the project may affect sea turtle behavior, including the temporary disruption of foraging activities. The effects to sea turtles from impact pile driving, vibratory pile driving and removal, and the use of an auger are broken out in the sub-sections below. Complete results from the NMFS-SERO acoustic tool used in the subsequent analysis are provided in Appendix F.

#### Impact Pile Driving

The “worst-case” scenario for underwater noise during impact pile driving is based on the estimated attenuated noise levels from the installation of the proposed 24-inch steel pipe piles required for temporary work trestle. The installation of the 24-inch pipe piles is expected to generate the highest decibel level for impact pile driving during the project. Table 7-12 provides a summary of the location, estimated blow counts, duration, and expected decibel levels for the installation of the 24-inch steel pipe piles.

Table 7-12: Summary of 24-inch Pipe Piles to be Installed by Impact Pile Driving for Sea Turtle Effects Analysis

Bridge Support Type (Location)	Total Number of Supports Per Habitat Type				Estimated Strikes Per Pile	Estimated Time Per Pile (minutes)	Number Installed or Removed Per Day	Proposed Sound Attenuation Method	Attenuated Sound Pressure Level (dB)		
	Estuarine emergent wetland	Estuarine sub-tidal unconsolidated bottom	Estuarine tidal creek	Intertidal non-vegetated flat					Peak	SEL	RMS
24-inch Steel Pipe (Temporary Trestle)	269	51	8	72	800	60 min	5	Cushion Blocks, “Slow Start”	203 dB	189 dB	178 dB

It should be noted that more than 50% of the 24-inch temporary pipe piles will be in estuarine emergent wetlands that have vegetative cover. This may make the installation site of these piles less accessible for sea turtles which limits the potential for physical harm for half of the time required to install the temporary trestle. The presence of vegetation also provides an additional reduction of 11 dB to the in-water noise levels (NMFS 2014) which is expected to limit the radius of potential effects to sea turtles from the increased underwater noise levels.

The installation of the 24-inch pipe piles in the open waters and unconsolidated bottom habitats in Mackay and Skull Creeks, where the sound is more likely to travel unimpeded in the water column than

in the vegetated estuarine emergent marsh, pose the highest risk for potential effects from impact pile driving on sea turtles. **To minimize the potential effects on sea turtles, “slow start” methods such as ramp up, dry firing, or soft starts, in combination with cushion blocks, will be used to minimize noise during the installation of piles when using an impact hammer.** Using these attenuation methods results in the approximate values of 203 dB (Peak), 189 dB (SEL), and 178 dB (RMS) during the installation of the temporary piles. The estimated Peak and SEL dB levels are below the threshold established for sea turtles, the RMS dB levels exceed the accepted threshold for the species.

These values were used as inputs in the NMFS-SERO acoustic tool and the resulting calculations estimate that potential physiological effects to sea turtles may occur within a radius of approximately 38 feet and behavioral impacts may occur within a radius of approximately 52 feet from the pile installation site. The results from the NMFS-SERO tool are provided in Table 7-13. The full results from the tool can be found in Appendix F.

**Table 7-13: Distances for Potential Impacts to Sea Turtles from Impact Pile Driving**

Calculated Distances for Impact Pile Driving			
	Onset of Physical Injury		Behavioral Effects
	Peak	Cumulative SEL	RMS
Threshold value	206 dB	187 dB	160 dB
Distance to threshold (feet)	0 ft	38.4 ft	52 ft

When impact pile driving activities begin, **the contractor will implement “slow starts,” in combination with cushion blocks on the pile caps, to minimize potential effects on sea turtles.** Due to the high mobility of sea turtles, they are expected to move away from noise disturbances to similar habitat nearby and resume normal behaviors (DeRuiter and Doukara, 2010; McCauley et. al, 2000). This reduces the potential for sea turtles to be within the approximate 38 foot radius where sounds may result in physical injury.

If an individual sea turtle chooses to remain within the behavioral disturbance zone during active impact pile driving, it could be exposed sound levels that may disrupt its normal activities. Yet, due to the high mobility potential of sea turtles, individuals close enough to hear the increased underwater noise levels are expected to move away from the area into similar habitat nearby and resume normal behaviors (DeRuiter and Doukara, 2010; McCauley et. al, 2000).

Although impact pile driving activities from the project may affect sea turtles, the activities will be relatively intermittent in nature. Following the daily pile installation, a period of no in-water activity will occur while the trestle deck is installed or a bent is constructed. In addition, sea turtles will be able to resume normal activities during quiet periods between pile installations, and for at least 8 hours every night. Based on the above information, it is anticipated any effects on sea turtles from impact pile driving will be minimal.

#### ***Vibratory Pile Driving***

The “worst-case” scenario for underwater noise during vibratory pile driving is based on the attenuated noise levels from the installation of the proposed 96-inch steel pipe casing required for drilled shaft construction, which is expected to generate the highest decibel level for vibratory pile driving. The NMFS-SERO acoustic tool did not contain noise data for the vibratory installation of 96inch- or 120-inch steel

casings. NMFS-SERO personnel provided guidance in which they developed a ratio approach using known data for 72-inch steel casings to estimate noise measurements for 96-inch and 120-inch casings (Appendix B and Appendix F). This approach was used to establish the estimated decibel levels for the installation of the 96-inch and 120-inch steel pipe casings associated with the drilled shaft supports for the new US 278 bridge. Table 7-14 provides a summary of the location, estimated duration of installation, and expected decibel levels for the installation of the 96-inch steel pipe casings.

**Table 7-14: Summary of 96-inch Steel Pipe Casings to be Installed by Vibratory Pile Driving for Sea Turtle Effects Analysis**

Bridge Support Type (Location)	Total Number of Supports Per Habitat Type				Estimated Strikes Per Pile	Estimated Time Per Pile (minutes)	Number Installed or Removed Per Day	Proposed Sound Attenuation Method	Attenuated Sound Pressure Level (dB)		
	Estuarine emergent wetland	Estuarine sub-tidal unconsolidated bottom	Estuarine tidal creek	Intertidal non- vegetated flat					Peak	SEL	RMS
96-inch Steel Pipe (Mackay & Skull Creeks)	16	70	1	25	-	180 min	2	Vibration	200 dB	192 dB	195 dB

The installation of the 96-inch steel pipe casings in the open waters and unconsolidated bottom habitats of Mackay Creek and Skull Creek, where the sound is more likely to travel unimpeded in the open water column than in the vegetated estuarine emergent marsh, pose the highest risk for potential effects from vibratory pile driving on sea turtles. The estimated sound levels of 200 dB (Peak), 192 dB (SEL), and 195 dB (RMS) are expected during the installation of the 96-inch steel pipe casing. The estimated Peak and SEL dB levels are expected to fall below the threshold established for sea turtles, but the RMS dB level may exceed the accepted thresholds for the species.

These values were used as inputs in the NMFS-SERO acoustic tool and the resulting calculations estimate that potential physiological effects to sturgeon may occur within a radius of approximately 38 feet and behavioral impacts may occur within a radius of approximately 1,845 feet from the pile installation site. The results from the NMFS-SERO tool for the 96-inch steel pipe casing are provided in Table 7-15. The full results from the tool and a figure depicting the potential radius of effects from underwater noise can be found in Appendix F.

**Table 7-15: Distances for Potential Impacts to Sea Turtles from Vibratory Pile Driving**

Calculated Distances for Vibratory Pile Driving			
	Onset of Physical Injury		Behavioral Effects
	Peak	Cumulative SEL	RMS
Threshold value	206 dB	234 dB	160 dB
Distance to threshold (feet)	16.4 ft	38.3 ft	1845 ft

When vibratory pile driving activities begin, **the contractor will implement “slow starts”** in an effort to alert sea turtles within the potential effect radius. Due to the high mobility of sea turtles, they are expected to move away from noise disturbances to similar habitat nearby and resume normal behaviors (DeRuiter and Doukara, 2010; McCauley et. al, 2000). This reduces the potential for sea turtles to be within the effect radius where sounds may result in physical injury.

If an individual sea turtle chooses to remain within the behavioral disturbance zone during active vibratory pile driving, it could be exposed sound levels that may disrupt its normal activities. However, due to the high mobility potential of sea turtles, individuals close enough to hear the increased underwater noise levels are expected to move away from the area into similar habitat nearby and resume normal behaviors (DeRuiter and Doukara, 2010; McCauley et. al, 2000).

Although vibratory pile driving activities from the project may affect sea turtles, the activities will be relatively intermittent in nature. Following the installation of casings, a period of no in-water activity will occur while the construction equipment is remobilized or a bent is constructed. In addition, sea turtles will be able to resume normal activities during quiet periods between casing installations, and for at least 8 hours every night. Based on the above information, it is anticipated any effects on sea turtles from vibratory pile driving will be minimal.

### *Auger Usage*

The use of an auger will be required for all proposed drilled shafts that will support the new US 278 bridge. The NMFS-SERO acoustic tool did not contain noise data for the noise levels from auger use. The best available underwater noise data for augers come from a study of in-water noise produced during the installation of drilled-shaft columns using auger bits in Bechers Bay, Santa Rosa Island, California (Dazey et. al 2012), that found the sound levels at the source ranged from 121-184.5 dB with an average noise level of 154.2 dB.<sup>3</sup> The "sea floor" at Bechers Bay consisted of sand, rock, and other geographic features like the habitats found in Mackay Creek and Skull Creek. Table 7-16 provides a summary of the habitat locations where augers will be used, estimated duration of use, and expected decibel levels during use of the auger.

**Table 7-16: Summary of Auger Use for the Installation of Drilled Shaft Support Structures for Sea Turtles Effects Analysis**

Bridge Support Type (Location)	Total Number of Supports Per Habitat Type				Estimated Strikes Per Pile	Estimated Time Per Pile (minutes)	Number Installed or Removed Per Day	Proposed Sound Attenuation Method	Attenuated Sound Pressure Level (dB)		
	Estuarine emergent wetland	Estuarine sub-tidal unconsolidated bottom	Estuarine tidal creek	Intertidal non- vegetated flat					Peak	SEL	RMS
All Drilled Shafts (Mackay & Skull Creeks)	31	91	1	29	-	480 min	1	Confined to steel casing	185 dB	199 dB	154 dB

Using an auger in the open waters and unconsolidated bottom habitats of Mackay Creek and Skull Creek, where the sound is more likely to travel unimpeded in the water column than in the vegetated estuarine emergent marsh, poses the highest risk for potential effects to sea turtles during the use of the auger. The estimated sound levels of 185 dB (Peak), 199 dB (SEL), and 154 dB (RMS) are expected during the use of the auger. The estimated dB levels for the use of an auger contained within the steel construction casing are expected to stay near or below the noise impact thresholds established for sea turtles.

These values were used as inputs in the NMFS-SERO acoustic tool and the resulting calculations estimate that potential physiological effects to sea turtles may occur within a radius of less than one foot and behavioral effects may occur within a radius of approximately 33 feet from the pile installation site. The results from the NMFS-SERO tool for the use of an auger within the steel construction casing for the proposed drilled shafts are provided in Table 7-17. The full results from the tool and a figure depicting the potential radius of effects from underwater noise can be found in Appendix F.

Table 7-17: Distances for Potential Effects to Sea Turtles from Auger Use

Calculated Distances for Auger Usage			
	Onset of Physical Injury		Behavioral Effects
	Peak	Cumulative SEL	RMS
Threshold value	206 dB	234 dB	160 dB
Distance to threshold (feet)	0 ft	0.1 ft	32.8 ft

Due to the high mobility of sea turtles, they are expected to move away from noise disturbances to similar habitat nearby and resume normal behaviors (DeRuiter and Doukara, 2010; McCauley et. al, 2000). This reduces the potential for sea turtles to be within the effect radius where sounds may result in physical injury.

If a sea turtle chooses to remain within the behavioral disturbance zone during active auger use, it could be exposed sound levels that may disrupt its normal activities. However, due to the high mobility of sea turtles, individuals close enough to hear the increased underwater noise levels are expected to move away from the area into similar habitat nearby and resume normal behaviors (DeRuiter and Doukara, 2010; McCauley et. al, 2000).

Although vibratory pile driving activities from the project may affect sea turtles, the activities will be relatively intermittent in nature. Following the installation of casings, a period of no in-water activity will occur while the construction equipment is remobilized or a bent is constructed. In addition, sea turtles will be able to resume normal activities during quiet periods between casing installations, and for at least 8 hours every night. Based on the above information, it is anticipated any effects on sea turtles from the use of an auger within the steel construction casings for the proposed drilled shafts will be minimal.

## Permanent Effects

### Permanent Habitat Loss

The installation of bridge support structures in estuarine habitats will result in the permanent loss of up to 0.4 acre of suitable sea turtle habitat or habitat for sea turtle prey species. The estimated impacts to estuarine emergent wetlands from bridge deck shading will be approximately 3 acres, which may also affect sea turtle prey species habitat. Table 7-18 provides the estimated permanent impacts to sea turtle habitat from the project.

Table 7-18: Estimated Permanent Impacts to Suitable Habitat for Sea Turtles

Estuarine Habitat Type	Concrete Piles	Drilled Shafts	Estimated Area Impacted by Bridge or Trestle Supports (acres)	Estimated Shade Impacts (acres)
Estuarine emergent wetland	7	31	< 0.1 acre	3
Estuarine tidal creek	10	1	< 0.1 acre	N/A
Estuarine sub-tidal unconsolidated bottom	0	84	< 0.1 acre	N/A
Intertidal non-vegetated flats	13	28	< 0.1 acre	N/A
<b>TOTAL</b>	<b>30</b>	<b>152</b>	<b>≤ 0.4 acre</b>	<b>3 acres</b>

These estuarine habitats all serve as potential habitat for sea turtles or species on which they prey so impacts from the new bridge structures **may affect** sea turtles. However, all habitat types being impacted are highly abundant in Mackay Creek and Skull Creek both within and adjacent to the PSA. Furthermore, the eventual removal of the obsolete bridge's in-water substructure elements will help offset the permanent loss of sea turtle habitat. It is expected invertebrates on which sea turtles prey will quickly recolonize this estuarine bottom upon removal of these substructures. The permanent effects to sea turtles by the loss of estuarine habitats due to this project will be insignificant in the context of the larger ecosystems of Mackay Creek and Skull Creek.

### Bridge Lighting

Excessive artificial lighting in coastal areas is known to interfere with adult and hatchling turtle navigation as they make their way from the beach to the ocean (SCDNR 2015c). The closest turtle nesting beach is 5.5 miles to the east (SCDNR 2021b). It is possible that sea turtles looking to nest could be affected by artificial lighting on the bridge.

The proposed bridge over Mackay and Skull Creeks will require include navigational lights in accordance with 33 CFR § 118 and as approved by the USCG. However, **to avoid potential effects to sea turtles, the new US 278 bridge will not have permanent roadway lighting. Lighting on the new US 278 bridge will be restricted to the multi-use path which will consist of downward facing lights embedded in the barrier to illuminate the path.**

**During construction, the contractor will be required to have lights positioned to focus on the work area to minimize the amount of light on the water surface. To avoid potential effects associated with construction lighting, during the sea turtle nesting season, the contractor will use the minimum number and lowest wattage of lights that are necessary for construction. During the sea turtle nesting season (May 1 through October 31), the contractor will restrict in-water work at night to the maximum extent practicable.**

### Effects Determination

The temporary effects on sea turtles resulting from increases in turbidity during construction are expected to be discountable since increased turbidity will dissipate quickly, and **the contractor will be required to utilize all appropriate SCDOT BMPs for soil and erosion control during construction to minimize the potential impacts and effects of turbidity.** The effects of this temporary impact will be insignificant to sea turtles.

It is estimated the temporary work trestle pipe piles will be in place for less than three years and will be removed once the new bridge is built. Invertebrates on which sea turtles prey will quickly recolonize this estuarine bottom upon removal of these substructures. The anticipated effects on sea turtles caused by the temporary displacement of estuarine habitats from temporary trestles is considered discountable.

Increased underwater noise from the project would be intermittent and relatively short with an estimated maximum of eight hours per day during the use of an auger to construct the drilled shaft supports. **To minimize the potential effects on sea turtles, "slow start" methods such as ramp up, dry firing, or soft starts, in combination with cushion blocks, will be used during the installation of piles when using an impact hammer. Additionally, SCDOT will require the contractor to use vibratory hammers and augers for the installation of the steel pipe casings for drilled shaft columns. No impact hammers will be used to install the steel pipe casings for drilled shafts.**



If an individual sea turtle chooses to remain within the behavioral disturbance zone, it could be exposed to behavioral noise effects during pile installation and alter its behavioral pattern. However, due to the mobility of sea turtles, they are expected to move away from noise disturbances to similar habitat nearby and resume normal behaviors (DeRuiter and Doukara, 2010; McCauley et. al, 2000). In addition, sea turtles will be able to resume normal activities during quiet periods between pile installations, and for at least 8 hours every night.

The project has adequate avenues for a sea turtles to leave or avoid the project area during construction and increased levels of underwater noise. There is abundant habitat that sea turtles can utilize for foraging or other life functions outside of the PSA during construction.

To add an additional layer of avoidance and minimization of potential effects to sea turtles, the **NMFS Sea Turtle and Smalltooth Sawfish Construction Conditions will be employed during construction** (Appendix I). Additionally, **during the sea turtle nesting season (May 1 through October 31), the contractor will restrict in-water work at night to the maximum extent practicable.**

Based on the factors listed above, it is anticipated that the project is **not likely to adversely affect** the Green sea turtle, Kemp's ridley sea turtle, or the Loggerhead sea turtle.

## 8.0 CONSERVATION MEASURES

As coordination with resource and regulatory agencies progresses, Environmental Commitments will be developed and become part of the NEPA record. SCDOT and the contractor will be required to honor/implement SCDOT standard Environmental Commitments and those project specific commitments developed through agency coordination and the permitting process. A list of recommended Environmental Commitments specific to the federally protected species that may be affected by the project can be found at the end of this section.

### 8.1 EROSION, SEDIMENT, AND TURBIDITY CONTROL

**SCDOT and/or the contractor will develop a Stormwater Pollution Prevention Plan (SWPPP) and obtain both a land disturbance permit and a National Pollutant Discharge Elimination System (NPDES) permit from the SCDHEC before construction can commence. Temporary silt/turbidity curtains will be installed prior to commencement of in-water work, where practicable. The contractor will be required to utilize SCDOT Best Management Practices for soil and erosion control during construction.**

Additionally, the limits of clearing, grading, or placement of fill in wetlands will be delineated and shown on approved permitted plans by the USACE and the SCDHEC. SCDOT and the contractor will comply with all applicable permits and permit conditions for the placement of fill in wetlands.

### 8.2 POST CONSTRUCTION STORMWATER TREATMENT

**The final project design will incorporate the conditions of SCDOT's General MS4 permit and Stormwater Quality Design Manual that includes pretreatment of post-construction stormwater runoff prior to discharge into receiving waters classified as SFH.**

**SCDOT proposes to pre-treat future stormwater runoff from the proposed bridge deck prior to discharge into waters below the new US 278 bridge. Stormwater from the widened roadway will not be discharged within 1,000 feet of a shellfish bed and will be pre-treated per the SCDOT Stormwater Quality Design Manual.**

### 8.3 BRIDGE SPAN LENGTH

The US 278 bridge design has undergone revisions since the analysis completed in July 2020. These revisions include a lengthening of bridge spans from 100 feet to 175 feet long, thereby reducing the number of bents and piles required to support the replacement bridge.

### 8.4 UNDERWATER NOISE REDUCTION

Through coordination with NMFS, noise levels associated with project construction indicated potentially severe impacts to protected species. The project team then set out to review alternative construction methods to minimize potential impacts. After coordination with bridge construction contractors and project engineers, it was determined the most likely method of installation of the permanent steel casings is the use of a vibratory hammer and then auger as necessary to set the casing to its final depth, as

discussed in Section 6.1.7. Therefore, **SCDOT will now require the contractor to use vibratory hammers and augers for the installation of the steel construction casings for drilled shaft columns.**

During construction, the potential effect of underwater noise impacts could be minimized by using “slow start” methods such as ramp up, dry firing, or soft starts, as well as cushion blocks, during the installation of piles using an impact hammer. Vibratory hammers for the installation and removal of all bridge support structures should be maximized when practicable.

If explosives are required for demolition, the contractor, SCDOT, and FHWA will be required to initiate additional coordination and consultation with the USFWS and NMFS.

## 8.5 BRIDGE LIGHTING

The new US 278 bridge over Mackay and Skull Creeks will require include navigational lights in accordance with 33 CFR § 118 and as approved by the USCG. **The new US 278 bridge will not have permanent roadway lighting. Lighting on the new US 278 bridge will be restricted to the multi-use path which will consist of downward facing lights embedded in the barrier to illuminate the path.**

During construction, lights will be positioned to focus on the work area to minimize the amount of light on the water surface. To avoid potential impacts associated with construction lighting, during the sea turtle nesting season, the contractor will use the minimum number and lowest wattage of lights that are necessary for construction. During the sea turtle nesting season (May 1 through October 31), the contractor will restrict in-water work at night to the maximum extent practicable.

## 8.6 PERMITTING REQUIREMENTS

**The contractor will be required to adhere to all Special Conditions associated with all federal, state, and local permits required to construct the project.** The expected permits and other authorizations required prior to beginning construction include an Individual USACE Section 404 permit, an Individual SCDHEC Section 401 Water Quality Certification, an Individual SCDHEC-OCRM Critical Area permit, and a USCG bridge permit.

## 8.7 USFWS AND NMFS CONSTRUCTION CONDITIONS

USFWS and NOAA-NMFS standard in-water work conditions will be followed. **The USFWS Standard Manatee Conditions for In-Water Work (Appendix H) and the NMFS Sea Turtle and Smalltooth Sawfish Construction Conditions (Appendix I) will also be employed during construction.**

## 8.8 RECOMMENDED ENVIRONMENTAL COMMITMENTS

Table 8-1 summarizes the effect minimization commitments listed in the previous sections of the document. These commitments are recommended to either avoid or minimize potential effects to federally protected species. For species that may be affected by the project, these measures are intended to prevent the potential to adversely affect the species. **The contractor, SCDOT, and FHWA will be required to stay in compliance with all approved environmental conditions established in the EA as well as any special conditions established in the required permit authorizations.**

Table 8-1: Recommended Conservation and Effect Minimization Environmental Commitments

Recommended Environmental Commitment	Associated Protected Species
<ul style="list-style-type: none"> <li>SCDOT and/or the contractor will develop a Stormwater Pollution Prevention Plan (SWPPP) and obtain both a land disturbance permit and a National Pollutant Discharge Elimination System (NPDES) permit from the SCDHEC before construction can commence.</li> </ul>	All species
<ul style="list-style-type: none"> <li>The contractor will adhere to all SCDOT construction and erosion and sediment control BMPs.</li> </ul>	All species
<ul style="list-style-type: none"> <li>The limits of any clearing, grading, or fill in wetlands will be delineated and shown on approved permitted plans by the USACE and SCDHEC. SCDOT and the contractor will comply with all applicable permits and permit conditions for the placement of fill in wetlands.</li> </ul>	All species
<ul style="list-style-type: none"> <li>If existing permitted borrow sites are not available, the contractor will be required to follow SCDOT guidance in Engineering Directive Memorandum 30 (ED-30), Borrow Pit Location and Monitoring. The contractor will be responsible for addressing the potential effects to federally listed threatened and endangered species for any new borrow or disposal sites.</li> </ul>	All species
<ul style="list-style-type: none"> <li>The contractor will be required to maintain navigability during construction and will not be allowed to block the respective channels of Mackay or Skull Creeks.</li> </ul>	Atlantic sturgeon, Shortnose sturgeon, West Indian Manatee, Green sea turtle, Kemp's ridley sea turtle, Loggerhead sea turtle
<ul style="list-style-type: none"> <li>These existing US 278 bridges will be removed in their entirety once construction of the new bridge is completed.</li> </ul>	All species
<ul style="list-style-type: none"> <li>Non-hazardous demolition debris will be hauled off site and disposed of in accordance SCDOT policy and SCDHEC regulations.</li> </ul>	All species
<ul style="list-style-type: none"> <li>If explosives are required for demolition, the contractor, SCDOT, and FHWA will initiate additional coordination and consultation with the USFWS and NMFS.</li> </ul>	All species
<ul style="list-style-type: none"> <li>SCDOT will now require the contractor to use only vibratory hammers and augers for the installation of the steel casings for drilled shaft columns. No impact hammers will be used to install the steel casings for drilled shafts.</li> </ul>	Atlantic sturgeon, Shortnose sturgeon, West Indian Manatee, Green sea turtle, Kemp's ridley sea turtle, Loggerhead sea turtle
<ul style="list-style-type: none"> <li>The new US 278 bridge will not have permanent roadway lighting. Lighting on the new US 278 bridge will be restricted to the multi-use path which will consist of downward facing lights embedded in the barrier to illuminate the path.</li> </ul>	Green sea turtle, Kemp's ridley sea turtle, Loggerhead sea turtle
<ul style="list-style-type: none"> <li>SCDOT proposes to pre-treat future stormwater runoff from the proposed bridge deck prior to discharge into waters below the new US 278 bridge. Stormwater from the widened roadway will not be discharged within 1,000 feet of a shellfish bed and will be pre-treated per the SCDOT Stormwater Quality Design Manual.</li> </ul>	All species

<ul style="list-style-type: none"> <li>To minimize the potential effects on manatees, sturgeon, and sea turtles, the contractor will use “slow start” methods such as ramp up, dry firing, or soft starts at the beginning of bridge support structure installation activities.</li> </ul>	Atlantic sturgeon, Shortnose sturgeon, West Indian Manatee, Green sea turtle, Kemp’s ridley sea turtle, Loggerhead sea turtle
<ul style="list-style-type: none"> <li>Noise impacts will be attenuated/mitigated by using cushion blocks on pile caps for piles installed by impact pile driving.</li> </ul>	Atlantic sturgeon, Shortnose sturgeon, West Indian Manatee, Green sea turtle, Kemp’s ridley sea turtle, Loggerhead sea turtle
<ul style="list-style-type: none"> <li>The contractor will allow for a minimum of eight hours of “quiet hours” with no in water construction each night for the life of the project.</li> </ul>	Atlantic sturgeon, Shortnose sturgeon, West Indian Manatee, Green sea turtle, Kemp’s ridley sea turtle, Loggerhead sea turtle
<ul style="list-style-type: none"> <li>USFWS Standard Manatee Conditions for In-Water Work (Appendix H) will be employed during all in-water construction. Precautionary measures will be implemented during construction in summer months or early fall when the waterways may support increasing numbers of manatees.</li> </ul>	West Indian Manatee
<ul style="list-style-type: none"> <li>To minimize potential effects to sea turtles, the NMFS Sea Turtle and Smalltooth Sawfish Construction Conditions will be employed during construction (Appendix I). Precautionary measures will be implemented during construction in summer (May 1 – October 31), as this is when the waterways are most likely to support increased numbers of sea turtles.</li> </ul>	Green sea turtle, Kemp’s ridley sea turtle, Loggerhead sea turtle
<ul style="list-style-type: none"> <li>During construction, the contractor will be required to have lights positioned to focus on the work area to minimize the amount of light on the water surface.</li> </ul>	Green sea turtle, Kemp’s ridley sea turtle, Loggerhead sea turtle
<ul style="list-style-type: none"> <li>During the sea turtle nesting season (May 1 through October 31), the contractor will restrict in-water work at night to the maximum extent practicable. To avoid potential effects associated with construction lighting during the sea turtle nesting season, the contractor will use the minimum number and lowest wattage of lights that are necessary for construction.</li> </ul>	Green sea turtle, Kemp’s ridley sea turtle, Loggerhead sea turtle
<ul style="list-style-type: none"> <li>The contractor, SCDOT, and FHWA will be required to stay in compliance with all approved environmental conditions established in the EA as well as any special conditions established in the required permit authorizations.</li> </ul>	All species

## 9.0 CONCLUSIONS

---

After completing a literature search, a field survey, and a habitat assessment, with the inclusion of the proposed effect minimization efforts, SCDOT and FHWA have determined the proposed project will have **no effect** on the Frosted flatwoods salamander, Red-cockaded woodpecker, Northern long-eared bat, American chaffseed, or Pondberry.

The project **may affect** multiple species that are known to occur or that may occur within the project action area or habitat which supports foraging, breeding, or shelter for those species. However, due to the discountable loss of habitat, the abundance of available habitat within or adjacent to the action area, and the ability for the species to leave or avoid the project area during construction it has been determined that the project is **not likely to adversely affect** the the American wood stork, Eastern black rail, Piping plover, Red knot, Atlantic sturgeon, Shortnose sturgeon, West Indian manatee, Green sea turtle, Kemp's ridley sea turtle, and Loggerhead sea turtle.

This report is being submitted to the USFWS and NMFS for their review and concurrence of the determinations made above. Table 9-1 provides a complete list of effect determinations for all federally protected species in Beaufort County based on the completion of the proposed US 278 Corridor Improvements project.



Table 9-1: Beaufort County Protected Species Effect Determinations

Common Name	Scientific Name	Federal Protection Status	Jurisdiction	Habitat Present	Effect Determination
<b>Amphibian Species</b>					
Frosted flatwoods salamander	<i>Ambystoma cingulatum</i>	Threatened; Critical Habitat	USFWS	No	NE
<b>Bird Species</b>					
American wood stork	<i>Mycteria americana</i>	Threatened	USFWS	Yes	NLAA
Bald eagle	<i>Haliaeetus leucocephalus</i>	BGEPA	USFWS	Yes	Not required under Section 7 ESA
Eastern black rail	<i>Laterallus jamaicensis jamaicensis</i>	Threatened	USFWS	Yes	NLAA
Piping plover	<i>Charadrius melodus</i>	Threatened; Critical Habitat	USFWS	Yes	NLAA
Red-cockaded woodpecker	<i>Picoides borealis</i>	Endangered	USFWS	No	NE
Red knot	<i>Calidris canutus rufa</i>	Threatened	USFWS	Yes	NLAA
<b>Fish Species</b>					
Atlantic sturgeon	<i>Acipenser oxyrinchus</i>	Endangered; Critical Habitat	NMFS	Yes	NLAA
Shortnose sturgeon	<i>Acipenser brevirostrum</i>	Endangered	NMFS	Yes	NLAA
<b>Mammal Species</b>					
Finback whale	<i>Balaenoptera physalus</i>	Endangered; MMPA	NMFS	No	NE
Humpback whale	<i>Megaptera novaengliae</i>	Endangered; MMPA	NMFS	No	NE
Northern long-eared bat	<i>Myotis septentrionalis</i>	Threatened	USFWS	No	NE
Right whale	<i>Balaena glacialis</i>	Endangered; MMPA	NMFS	No	NE
Sei whale	<i>Balaenoptera borealis</i>	Endangered; MMPA	NMFS	No	NE
Sperm whale	<i>Physeter macrocephalus</i>	Endangered; MMPA	NMFS	No	NE
West Indian manatee	<i>Trichechus manatus</i>	Threatened; MMPA	USFWS	Yes	NLAA
<b>Plant Species</b>					
American chaffseed	<i>Schwalbea americana</i>	Endangered	USFWS	No	NE
Pondberry	<i>Lindera melissifolia</i>	Endangered	USFWS	No	NE
<b>Reptile Species</b>					
Green sea turtle	<i>Chelonia mydas</i>	Threatened	NFMS	Yes	NLAA
Kemp's ridley sea turtle	<i>Lepidochelys kempii</i>	Endangered	NMFS	Yes	NLAA
Leatherback sea turtle	<i>Dermochelys coriacea</i>	Endangered	NMFS	No	NE
Loggerhead sea turtle	<i>Caretta caretta</i>	Threatened; Critical Habitat	NMFS	Yes	NLAA

NE – No effect; NLAA – Not likely to adversely affect

## 10.0 REFERENCES

- American National Standards Institute (ANSI). 1986. Methods of Measurement for Impulse Noise (ANSI S12.7-1986) New York: Acoustical Society of America.
- American National Standards Institute (ANSI). 1995. Bioacoustical Terminology (ANSI S3.20-1995). New York: Acoustical Society of America.
- American National Standards Institute (ANSI). 2005. Measurement of Sound Pressure Levels in Air (ANSI S1.13-2005) New York: Acoustical Society of America
- Audubon Society. 2020. Important Bird Areas, Pinkney Island National Wildlife Refuge Site Report. <https://netapp.audubon.org/iba/Reports/922>. Accessed January 6, 2021.
- California Department of Transportation (Caltrans). 2017. Hydroacoustic Biological Assessment Guidance. <https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/hydroacoustic-ba-guidance-ally.pdf>. Accessed January 6, 2021.
- Center for Biological Diversity. 2020. Piping Plover. [https://www.biologicaldiversity.org/species/birds/piping\\_plover/index.html](https://www.biologicaldiversity.org/species/birds/piping_plover/index.html). Accessed January 6, 2021.
- Charlotte, H., Wildlife Biologist, SCDNR. January 31, 2020. Personal communication: Email correspondence.
- Dazey, E., McIntosh, B., Brown, S., and Dudzinski, K.M. 2012. Assessment of Underwater Anthropogenic Noise Associated with Construction Activities in Bechers Bay, Santa Rosa Island, California. *Journal of Environmental Protection*. 3: 1286-1294.
- DeRuiter, S. L., and K. D. Doukara. 2010. Loggerhead turtles dive in response to airgun sound exposure. *Journal of the Acoustical Society of America* 127(3 Part 2):1726.
- Greater Atlantic Regional Fisheries Office (GARFO). 2021. Section 7 Effect Analysis: Turbidity in the Greater Atlantic Region. <https://www.fisheries.noaa.gov/new-england-mid-atlantic/consultations/section-7-effect-analysis-turbidity-greater-atlantic-region>. Accessed January 6, 2021.
- Griffith, G., J. Omernik and J. Comstock. 2002. Ecoregions of South Carolina. <https://www.nrc.gov/docs/ML1127/ML112710639.pdf>. Accessed January 6, 2021.
- Krebs, J., F. Jacobs, and A. N. Popper. 2012. Presence of Acoustic-Tagged Atlantic Sturgeon and Potential Avoidance of Pile-Driving Activities During the Pile Installation Demonstration Project (PIDP) for the Tappan Zee Hudson River Crossing Project. AKRF, Inc;
- McCauley, R. D., J. Fewtrell, A. J. Duncan, C. Jenner, M.-N. Jenner, J. D. Penrose, R. I. T. Prince, A. Adhitya, J. Murdoch, and K. McCabe. 2000. Marine seismic surveys: Analysis and propagation of air- gun signals; and effects of air-gun exposure on humpback whales, sea turtles, fishes and squid Curtin University of Technology, Western Australia.

- Murphy, T., and D. Griffin. 2012. Florida Manatee. SCDNR (South Carolina Department of Natural Resources). <http://www.dnr.sc.gov/cwcs/pdf/FloridaManatee.pdf> 6 p. Accessed January 6, 2021.
- National Marine Fisheries Service Southeast Regional Office (NMFS-SERO). 2018. Programmatic Biological Evaluation (NLAA) on the Effects of Transportation Activities and Projects Regularly Undertaken in North Carolina, South Carolina, and Georgia.
- National Marine Fisheries Service Southeast Regional Office (NMFS-SERO). 2021. Section 7 Consultation Guidance. [Section 7 Consultation Guidance | NOAA Fisheries](#). Accessed February 2, 2021.
- National Institute for Occupational Safety and Health. NIOSH. 1909. Criteria for a recommended standard: Occupational noise exposure. Cincinnati, Ohio: United States Department of Health and Human Services.
- National Oceanic and Atmospheric Administration (NOAA). 2017. Designation of Critical Habitat for the Endangered New York Bight, Chesapeake Bay, Carolina and South Atlantic Distinct Population Segments of Atlantic Sturgeon and the Threatened Gulf of Maine Distinct Population Segment of Atlantic Sturgeon. <https://www.federalregister.gov/documents/2017/08/17/2017-17207/endangered-and-threatened-species-designation-of-critical-habitat-for-the-endangered-new-york-bight>. Accessed February 16, 2021.
- National Oceanic and Atmospheric Administration (NOAA). 2021a. Critical Habitat Maps. <https://www.fisheries.noaa.gov/resources/maps>. Accessed January 6, 2021.
- National Oceanic and Atmospheric Administration (NOAA). 2021b. Atlantic Sturgeon Species Directory. <https://www.fisheries.noaa.gov/species/atlantic-sturgeon#overview>. Accessed January 6, 2021.
- National Oceanic and Atmospheric Administration (NOAA). 2021c. Shortnose Sturgeon Species Directory. <https://www.fisheries.noaa.gov/species/shortnose-sturgeon>. Accessed January 6, 2021.
- National Oceanic and Atmospheric Administration (NOAA). 2021d. Green Sea Turtle Species Page. <https://www.fisheries.noaa.gov/species/green-turtle>. Accessed January 6, 2021.
- National Oceanic and Atmospheric Administration (NOAA). 2021e. "Chart 11516." Nautical Charts Online. <https://charts.noaa.gov/PDFs/11516.pdf>. Accessed February 2, 2021.
- Nickle, D., A. Atwood, K. Powers, J. Turner. and T. Dewey. 2017. Ambystoma cingulatum. Animal Diversity Web. [https://animaldiversity.org/accounts/Ambystoma\\_cingulatum/](https://animaldiversity.org/accounts/Ambystoma_cingulatum/) Accessed January 6, 2021.
- Palis, J. G., M. J. Aresco, and S. Kilpatrick. 2006. Breeding Biology of a Florida Population of Ambystoma Cingulatum (Flatwoods Salamander) during a Drought. Southeastern Naturalist Vol. 5, no. 1: 1-8. [www.jstor.org/stable/3877916](http://www.jstor.org/stable/3877916). Accessed January 6, 2021.
- South Atlantic Fishery Management Council (SAFMC). 2016. *Description, distribution, and use of essential fish habitat*. <https://safmc.net/wp-content/uploads/2016/06/HabitatPlan16-144.pdf>. Accessed January 6, 2021.

- South Atlantic Fishery Management Council (SAFMC). 2020. Intertidal Flats Habitat. <https://safmc.net/uncategorized/intertidal-flats-habitat/>. Accessed on January 6, 2021.
- South Carolina Department of Health and Environmental Control (SCDHEC). 2021. SC Watershed Atlas. <https://gis.dhec.sc.gov/watersheds/> Accessed January 6, 2021.
- South Carolina Department of Natural Resources (SCDNR). 2013a. SC Marine Turtle Conservation Program, Atlantic Green sea turtle. <http://www.dnr.sc.gov/marine/turtles/cm.htm>. Accessed on January 6, 2021.
- South Carolina Department of Natural Resources (SCDNR). 2013b. SC Marine Turtle Conservation Program, Kemp's Ridley. <http://www.dnr.sc.gov/marine/turtles/lk.htm>. Accessed January 6, 2021.
- South Carolina Department of Natural Resources (SCDNR). 2013c. SC Marine Turtle Conservation Program, Loggerhead Sea Turtle. <http://www.dnr.sc.gov/marine/turtles/cc.htm>. Accessed January 6, 2021.
- South Carolina Department of Natural Resources (SCDNR). 2015a. South Carolina's Bald Eagles-Biology. <http://dnr.sc.gov/wildlife/baldeagle/biology.html>. Accessed January 6, 2021.
- South Carolina Department of Natural Resources (SCDNR). 2015b. SC State Wildlife Action Plan. <http://dnr.sc.gov/swap/species2015.html>. Accessed January 6, 2021.
- South Carolina Department of Natural Resources (SCDNR). 2015c. South Carolina GIS Data. <https://www.dnr.sc.gov/GIS/gisdownload.html>. Accessed January 6, 2021.
- South Carolina Department of Natural Resources (SCDNR). 2021a. South Carolina's Bald Eagles-Nest Locations. <http://dnr.sc.gov/wildlife/baldeagle/locations.html>. Accessed January 6, 2020.
- South Carolina Department of Natural Resources (SCDNR). 2021b. SC Natural Heritage Species Reviewer. <https://schtportal.dnr.sc.gov/portal/apps/sites/#/natural-heritage-program>. Accessed January 6, 2021.
- The Cornell Lab of Ornithology. 2021. eBird Mapper Tool. <https://ebird.org/home>. Accessed January 6, 2021.
- US Army Corps of Engineers (USACE). 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0). U.S. Army Engineer Research and Development Center. Vicksburg, MS.
- United States Fish and Wildlife Service (USFWS). 1979. Cowardin, L. M., V. Carter, F. C. Golet, E. T. LaRoe. Classification of wetlands and deepwater habitats of the United States. U. S. Department of the Interior, Fish and Wildlife Service, Washington, D.C.
- United States Fish and Wildlife Service (USFWS). 1989. Southeastern States Bald Eagle Recovery Plan. Atlanta, GA. [https://ecos.fws.gov/docs/recovery\\_plan/0604194.pdf](https://ecos.fws.gov/docs/recovery_plan/0604194.pdf). Accessed on January 6, 2021.

- United States Fish and Wildlife Service (USFWS). 1995. American Chaffseed (*Schwalbea americana*) Recovery Plan. [https://ecos.fws.gov/docs/recovery\\_plan/950929c.pdf](https://ecos.fws.gov/docs/recovery_plan/950929c.pdf). Accessed January 6, 2021.
- United States Fish and Wildlife Service (USFWS). 1997. Wood Stork Recovery Plan. [https://www.fws.gov/northflorida/WoodStorks/Documents/19970127\\_rpp\\_Wood-stork-recovery-plan-1997.pdf](https://www.fws.gov/northflorida/WoodStorks/Documents/19970127_rpp_Wood-stork-recovery-plan-1997.pdf). Accessed January 6, 2021.
- United States Fish and Wildlife Service (USFWS). 2001a. Piping Plover Habitat Model. [https://www.fws.gov/r5gomp/gom/habitatstudy/metadata/piping\\_plover\\_model.htm](https://www.fws.gov/r5gomp/gom/habitatstudy/metadata/piping_plover_model.htm). Accessed January 6, 2021.
- United States Fish and Wildlife Service (USFWS). 2001b. Florida Manatee Recovery Plan, (*Trichechus manatus latirostris*), Third Revision. U.S. Fish and Wildlife Service. Atlanta, Georgia. 144 pp.
- United States Fish and Wildlife Service (USFWS). 2003. Red-cockaded Woodpecker Recovery Plan. [https://www.fws.gov/rcwrecovery/recovery\\_plan.html](https://www.fws.gov/rcwrecovery/recovery_plan.html). Accessed January 6, 2021.
- United States Fish and Wildlife Service (USFWS). 2007. National Bald Eagle Management Guidelines. <https://www.fws.gov/migratorybirds/pdf/management/nationalbaldeaglenanagementguidelines.pdf>. Accessed January 6, 2021.
- United States Fish and Wildlife Service (USFWS). 2011. Savannah Coastal National Wildlife Refuge Complex: Comprehensive Conservation Plan. <https://ecos.fws.gov/ServCat/DownloadFile/18942>. Accessed January 6, 2021.
- United States Fish and Wildlife Service (USFWS). 2013. Wood stork (*Mycteria americana*). <https://www.fws.gov/northflorida/Species-Accounts/PDFVersions/Wood-stork-2005.pdf>. Accessed: January 6, 2021.
- United States Fish and Wildlife Service (USFWS). 2014a. Rufa Red-Knot Background Information and Threats Assessment. [https://www.fws.gov/northeast/redknot/pdf/20141125\\_REKN\\_FL\\_supplemental\\_doc\\_FINAL.pdf](https://www.fws.gov/northeast/redknot/pdf/20141125_REKN_FL_supplemental_doc_FINAL.pdf). Accessed January 6, 2021.
- United States Fish and Wildlife Service (USFWS). 2014b. Pondberry (*Lindera melissifolia*) 5-Year Review: Summary and Evaluation. [https://ecos.fws.gov/docs/five\\_year\\_review/doc4358.pdf](https://ecos.fws.gov/docs/five_year_review/doc4358.pdf). Accessed January 6, 2021.
- United States Fish and Wildlife Service (USFWS). 2015a. Northern Long-Eared Bat Fact Sheet. <https://www.fws.gov/Midwest/endangered/mammals/nleb/pdf/NLEBFactSheet01April2015.pdf>. Accessed January 6, 2021.
- United States Fish and Wildlife Service (USFWS). 2015b. Green Sea Turtle Fact Sheet. North Florida FWS– Jacksonville, FL. <https://www.fws.gov/northflorida/SeaTurtles/Turtle%20Factsheets/PDF/Green-Sea-Turtle.pdf>. Accessed January 6, 2021.
- United States Fish and Wildlife Service (USFWS). 2017a. Bald Eagles and Golden Eagles. <https://www.fws.gov/southeast/our-services/permits/eagles/>. Accessed on January 6, 2021.

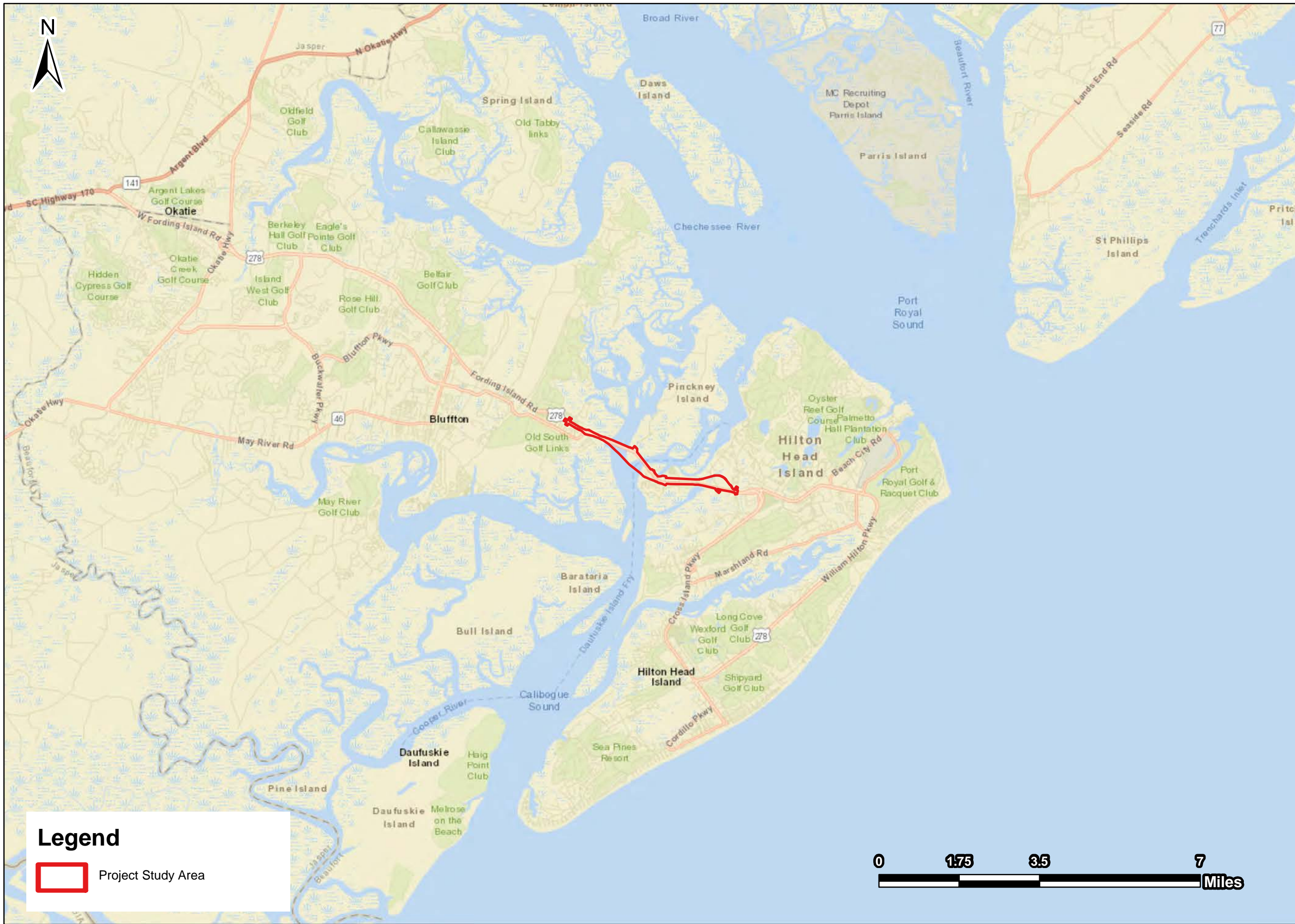
- United States Fish and Wildlife Service (USFWS). 2017b. Status of the Species/ Critical Habitat-piping plover. [https://www.fws.gov/verobeach/StatusoftheSpecies/20170112\\_SOS\\_PipingPlover.pdf](https://www.fws.gov/verobeach/StatusoftheSpecies/20170112_SOS_PipingPlover.pdf). Accessed January 6, 2021.
- United States Fish and Wildlife Service (USFWS). 2017c. American Chaffseed Fact Sheet. [https://www.fws.gov/raleigh/species/es\\_american\\_chaffseed.html](https://www.fws.gov/raleigh/species/es_american_chaffseed.html). Accessed January 6, 2021.
- United States Fish and Wildlife Service (USFWS). 2018. Species Status Assessment Report for the Eastern Black Rail (*Laterallus jamaicensis jamaicensis*), Version 1.2. June 2018. Atlanta, GA. <https://ecos.fws.gov/ServCat/DownloadFile/154242>. Accessed January 6, 2021.
- United States Fish and Wildlife Service (USFWS). 2019. Aiding the northern long-eared bat. <https://www.fws.gov/southeast/articles/aiding-the-northern-long-eared-bat/>. Accessed January 6, 2021.
- United States Fish and Wildlife Service (USFWS). 2020a. Bald Eagle Natural History and Sensitivity to Human Activity Information. <https://www.fws.gov/midwest/eagle/Nhistory/humanact.html>. Accessed January 6, 2021.
- United States Fish and Wildlife Service (USFWS). 2020b. Red-cockaded Woodpecker Ecology. <https://www.fws.gov/rcwrecovery/rcw.html>. Accessed January 6, 2021.
- United States Fish and Wildlife Service (USFWS). 2021a. South Carolina List of At-Risk, Candidate, Endangered, and Threatened Species by County. Charleston, SC. <https://www.fws.gov/southeast/pdf/fact-sheet/south-carolina-species-list-by-county.pdf>. Accessed: January 6, 2021.
- United States Fish and Wildlife Service (USFWS). 2021b. Critical Habitat Mapper. <https://fws.maps.arcgis.com/home/webmap/viewer.html?webmap=9d8de5e265ad4fe09893cf75b8dbfb77>. Accessed: January 6, 2021.
- United States Fish and Wildlife Service (USFWS). 2021b. National Wetland Inventory. <https://www.fws.gov/wetlands/>. Accessed January 6, 2021.
- Yang, L., S. S. Jin, P. Danielson, C. Homer, L. Gass, S.M. Bender, A. Case, C. Costello, J. Dewitz, J. Fry, M. Funk. 2018. A new generation of the United States Nation Land Cover Database: requirements, research priorities, design, and implementation strategies. *Remote sens*, 146, pp. 108-123.



## APPENDIX A

### PROJECT STUDY AREA MAPS AND FIGURES





**Legend**

Project Study Area



Prepared For:

  
South Carolina Department of Transportation

US 278  
Corridor Improvements  
Project

Beaufort County, SC

  
US 278  
CORRIDOR IMPROVEMENTS  
*Cast a Light on the Community's Transportation Future*

Date: January 19, 2021	
Scale: 1 in = 2 miles	
Job No.: 18-002	
Drawn By: WCB	Checked By: AGM


Figure

1





**Legend**

 Project Study Area



Prepared For:



US 278  
Corridor  
Improvements  
Project

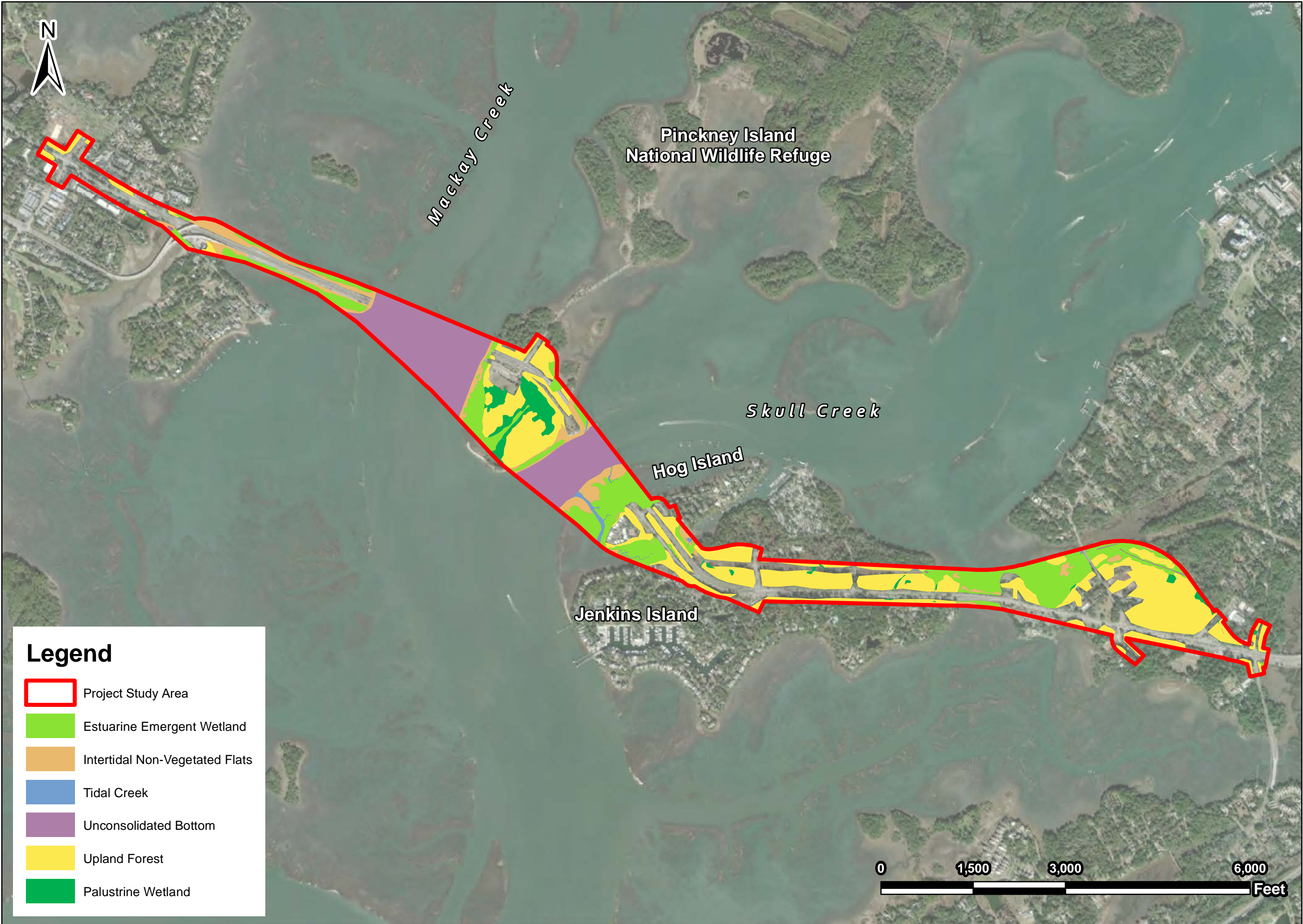
Beaufort County, SC










Date: October 28, 2020	
Scale: 1 inch = 1,500 feet	
Job No.: 18-002	
Drawn By: ZCB	Checked By: AGM

Figure  
**2**





**Legend**

-  Project Study Area
-  Estuarine Emergent Wetland
-  Intertidal Non-Vegetated Flats
-  Tidal Creek
-  Unconsolidated Bottom
-  Upland Forest
-  Palustrine Wetland



Prepared For:



**US 278  
Corridor  
Improvements  
Project**

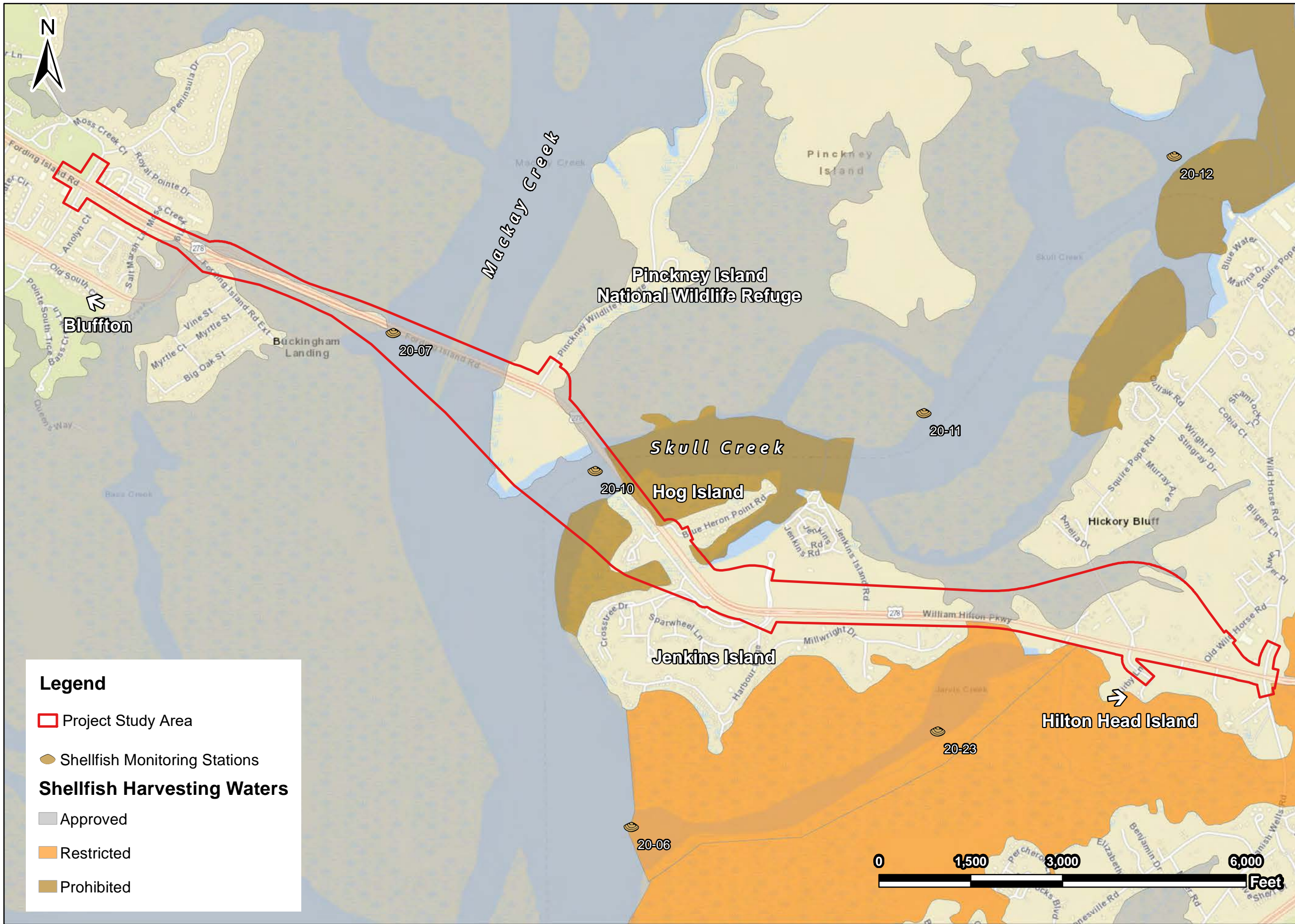
Beaufort County, SC



Date: October 28, 2020	
Scale: 1 inch = 1,500 feet	
Job No.: 18-002	
Drawn By: ZCB	Checked By: AGM

Figure  
**3**





Prepared For:

**US 278  
Corridor  
Improvements  
Project**

Beaufort County, SC



Date: February 5, 2021

Scale: 1 in = 1,500 feet

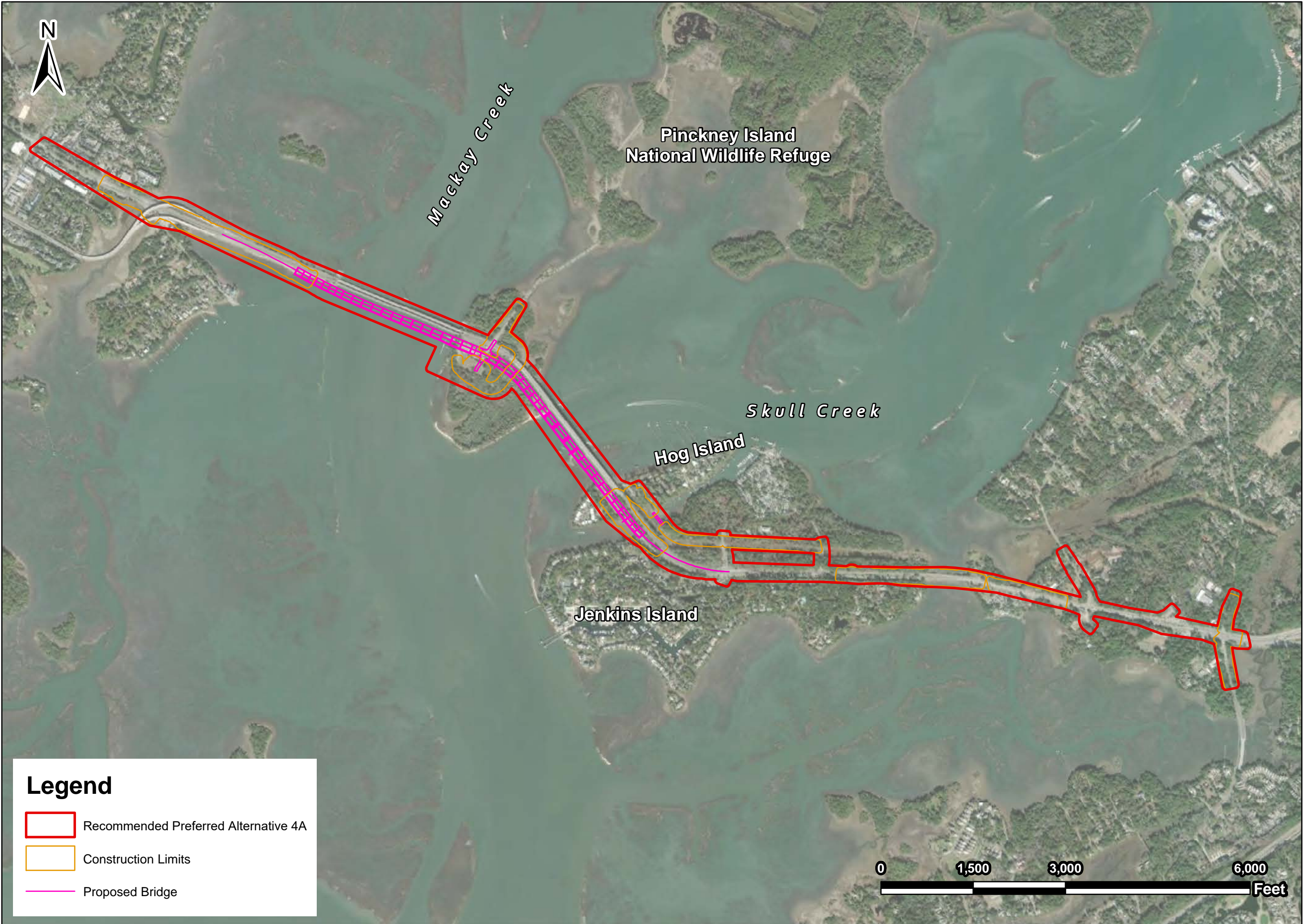
Job No.: 18-002

Drawn By: WCB  
Checked By: AGM




Figure

**4**





**Legend**

-  Recommended Preferred Alternative 4A
-  Construction Limits
-  Proposed Bridge



Prepared For:



**US 278  
Corridor  
Improvements  
Project**

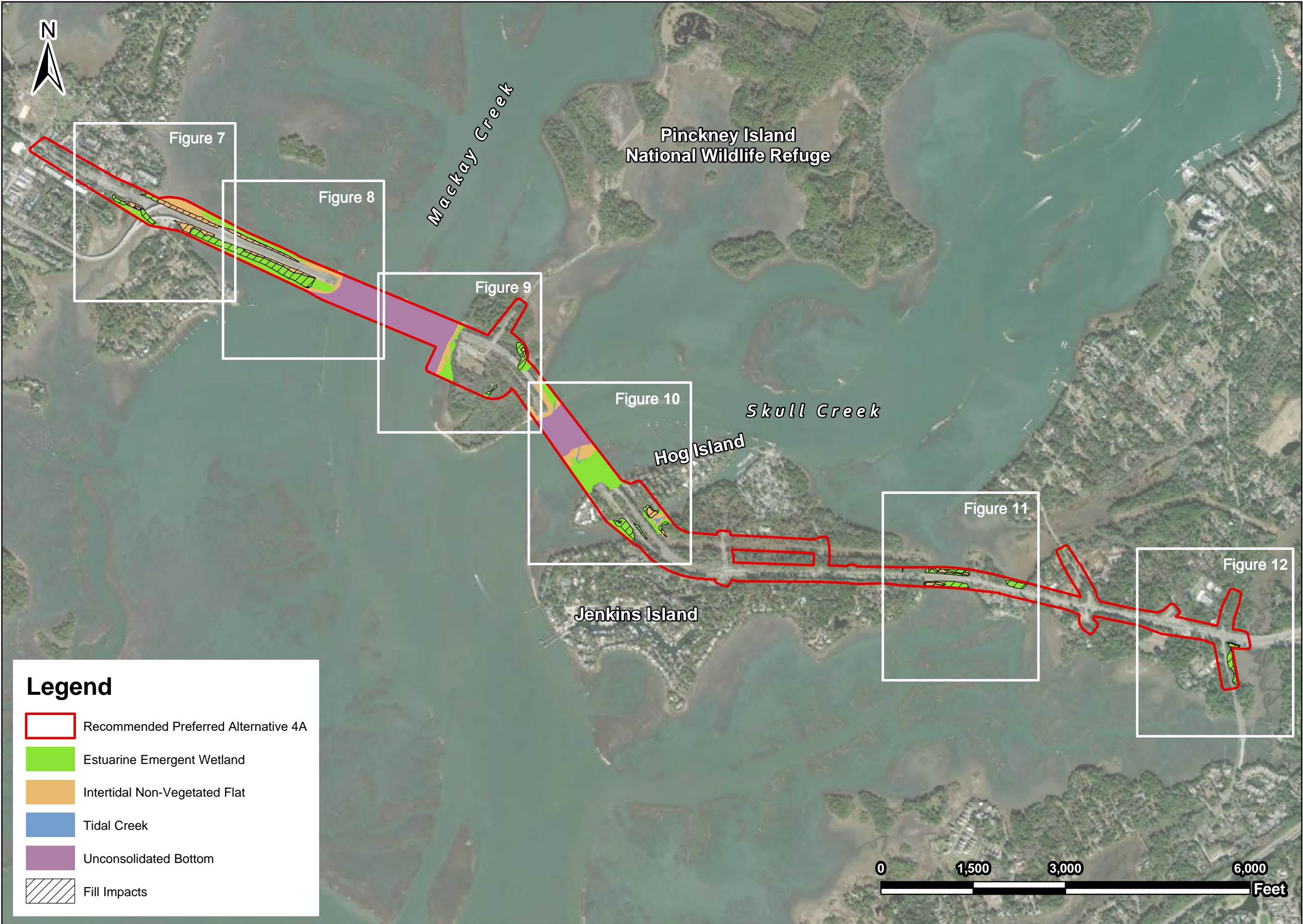
Beaufort County, SC









Date: February 5, 2021	
Scale: 1 inch = 1,500 feet	
Job No.: 18-002	
Drawn By: WCB	Checked By: AGM

Figure  
**5**





**Legend**

-  Recommended Preferred Alternative 4A
-  Estuarine Emergent Wetland
-  Intertidal Non-Vegetated Flat
-  Tidal Creek
-  Unconsolidated Bottom
-  Fill Impacts



Prepared For:



**US 278  
Corridor  
Improvements  
Project**

Beaufort County, SC



Date:  
February 5, 2021

Scale:  
1 inch = 1,500 feet

Job No.:  
18-002

Drawn By: WCB	Checked By: AGM
------------------	--------------------

Figure

6





Prepared For:



US 278  
Corridor  
Improvements  
Project

Beaufort County, SC











Date: February 5, 2021	
Scale: 1 inch = 250 feet	
Job No.: 18-002	
Drawn By: WCB	Checked By: AGM

Figure  
7





### Legend

-  Recommended Preferred Alternative 4A
-  Estuarine Emergent Wetland
-  Intertidal Non-Vegetated Flat
-  Unconsolidated Bottom
-  Construction Limits
-  Potential Fill Impacts
-  Work Trestle & Piles (24" diameter)
-  Proposed Bridge



Prepared For:



### US 278 Corridor Improvements Project

Beaufort County, SC



Date: February 5, 2021

Scale: 1 inch = 250 feet

Job No.: 18-002

Drawn By: WCB	Checked By: AGM
------------------	--------------------




Figure

8





## Legend

-  Recommended Preferred Alternative 4A
-  Estuarine Emergent Wetland
-  Intertidal Non-Vegetated Flat
-  Tidal Creek
-  Unconsolidated Bottom
-  Construction Limits
-  Potential Fill Impacts
-  Work Trestle & Piles (24" diameter)
-  Proposed Bridge



Prepared For:



## US 278 Corridor Improvements Project

Beaufort County, SC



Date: February 5, 2021

Scale: 1 inch = 250 feet

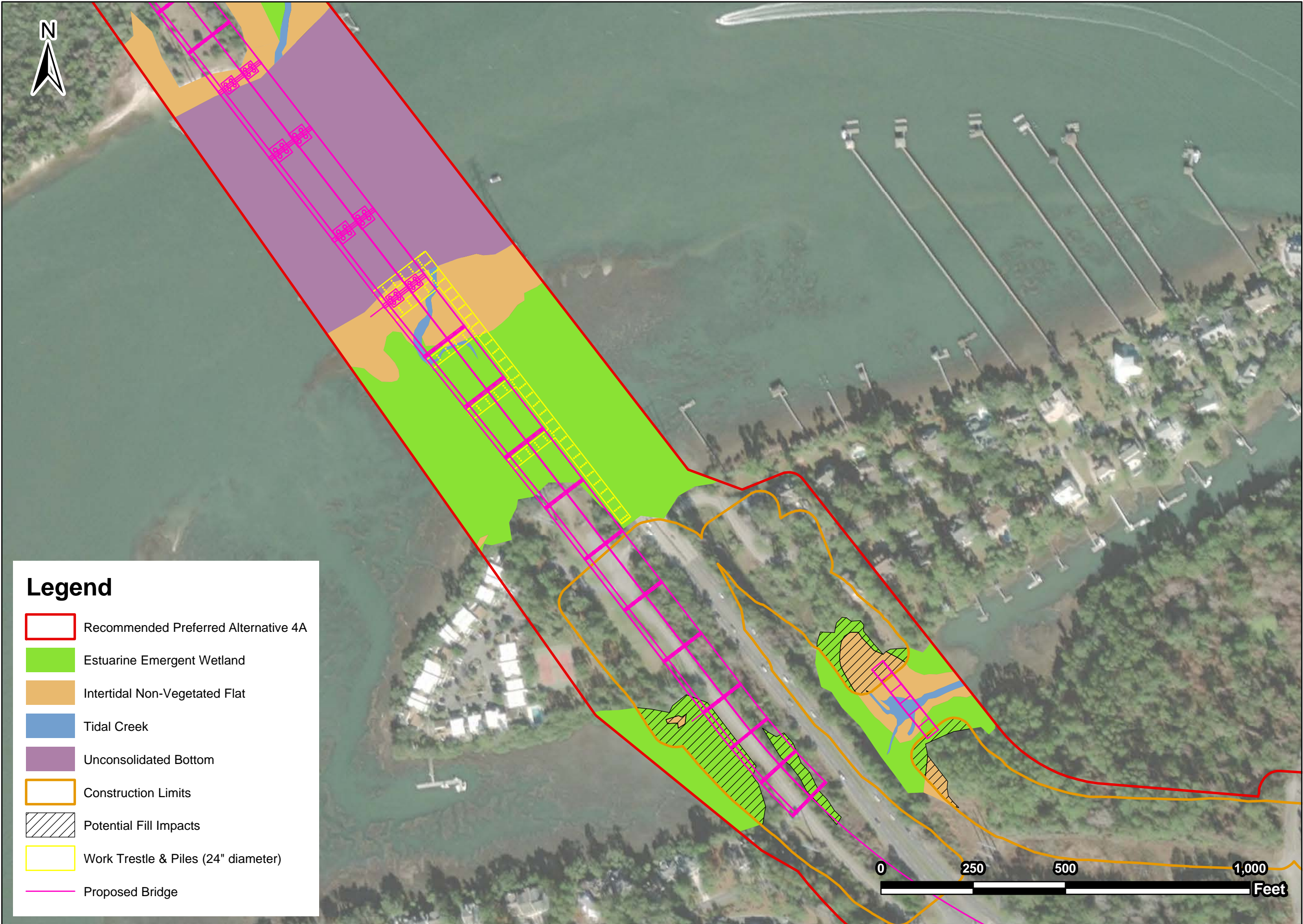
Job No.: 18-002

Drawn By: WCB	Checked By: AGM
------------------	--------------------

Figure

9





Prepared For:



# US 278 Corridor Improvements Project

Beaufort County, SC



Date: February 5, 2021	
Scale: 1 inch = 250 feet	
Job No.: 18-002	
Drawn By: WCB	Checked By: AGM

Figure  
**10**





**Legend**

- Recommended Preferred Alternative 4A
- Estuarine Emergent Wetland
- Intertidal Non-Vegetated Flat
- Construction Limits
- Fill Impacts



Prepared For:



US 278  
Corridor  
Improvements  
Project

Beaufort County, SC








Date: February 5, 2021	
Scale: 1 inch = 200 feet	
Job No.: 18-002	
Drawn By: WCB	Checked By: AGM

Figure  
**11**





**Legend**

-  Recommended Preferred Alternative 4A
-  Estuarine Emergent Wetland
-  Tidal Creek
-  Construction Limits
-  Fill Impacts



Prepared For:



US 278  
Corridor  
Improvements  
Project

Beaufort County, SC



Date: February 5, 2021	
Scale: 1 inch = 200 feet	
Job No.: 18-002	
Drawn By: WCB	Checked By: AGM

Figure  
**12**





## APPENDIX B

### AGENCY CONSULTATION HISTORY



U.S. Department  
of Transportation  
**Federal Highway  
Administration**

South Carolina

March 28, 2019

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

In Reply Refer To:  
HDA-SC

Ms. Holly Gaboriault  
Project Leader  
Savannah Coastal Refuges Complex  
694 Beech Lane  
Hardeeville, SC 29927

Subject: Invitation to Become a Participating Agency for the Preparation of an  
Environmental Assessment (EA) for the Proposed US 278 Corridor  
Improvements Project in Beaufort County, South Carolina;  
Federal Project Number P030450

Dear Ms. Gaboriault:

The Federal Highway Administration (FHWA), in cooperation with the South Carolina Department of Transportation (SCDOT), is preparing an Environmental Assessment (EA) for the US 278 Corridor Improvements Project. The proposed project would make improvements to the US 278 corridor between Bluffton and Hilton Head Islands. The purpose of the proposed project is to increase capacity and reduce congestion along the U.S. 278 corridor from Moss Creek Drive to Squire Pope Road. The eastbound Mackay Creek Bridge, which crosses the Intracoastal Waterway, is structurally deficient and is scheduled to be replaced. Access to Pinckney Island National Wildlife Refuge and the C.C. Haigh, Jr. boat ramp would be improved as well (see attached study area map). A website for the project has been established and can be viewed at <https://www.scdot278corridor.com>.

Pursuant to Section 6002 of SAFETEA-LU, as amended by Section 1304 of the Fixing America's Surface Transportation (FAST) Act, participating agencies are responsible for identifying, as early as possible, any issues of concern regarding the project's potential environmental, social, or economic impacts. Section 6002 is intended to assure that agencies are fully engaged in the scoping of the project and the decisions regarding alternatives to be evaluated in detail in the NEPA analysis. In accordance with the SAFETEA-LU Section 6002, FHWA is in the process of identifying local, state, and federal agencies that may have an interest in the project.

The FHWA and SCDOT would like to take this opportunity to formally invite your agency to become a participating agency in the development of the EA. Areas of concern to be emphasized in the EA will include potential environmental impacts upon existing ecological resources, wetlands, water resources, historic and archaeological resources, parks and recreation facilities, noise and air, social and community character, hazardous/contaminated materials, cumulative and indirect impacts, and potential impacts due to project construction. **Along with requesting your**



agency's participation as a Participating Agency, FHWA is also asking for any comments you may have on the Draft Purpose and Need statement, which is to "Improve Capacity and Reduce Congestion Along the U.S. 278 Corridor" and Draft Agency Coordination Plan (enclosure).

Your agency's involvement in the proposed project would entail those areas under its jurisdiction. No direct writing or analysis by your agency will be necessary for this document unless you request to do so. We suggest that your agency's role in the development of the above project should include the following as they relate to your area of expertise:

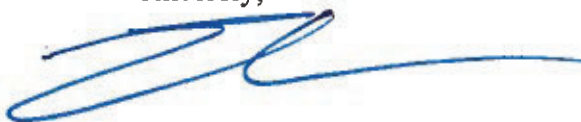
1. Participate in coordination meetings as appropriate.
2. Consultation on any relevant technical studies that may be required for the project.
3. Timely review and comment on the environment document to reflect the views and concerns of your agency on the adequacy of the document, alternatives considered, and the anticipated impacts and mitigation.

**To become a Participating Agency with the FHWA, please respond to this office in writing with an acceptance or denial of the invitation within 30 days.** If you accept, please identify the appropriate contact person within your organization for coordination. If your agency declines, please provide a written response that states your reason for declining the invitation, such as:

- Has no jurisdiction or authority with respect to the project;
- Has no expertise or information relevant to the project;
- Does not intend to submit comments on the project.

If you have any questions or would like to discuss in more detail the project or each agency's respective roles and responsibilities during the preparation of the EA, please contact Mr. J. Shane Belcher at 803-253-3187 or by e-mail at [jeffrey.belcher@dot.gov](mailto:jeffrey.belcher@dot.gov).

Sincerely,



Emily O. Lawton  
Division Administrator

Enclosures

ec: Mr. Tom McCoy, USFWS Field Supervisor Charleston  
Mr. Russell Webb, Pinckney Island NWR Manager  
Mr. Mark Caldwell, USFWS Regulatory Team Leader Charleston  
Mr. Chad Long, SCDOT Environmental Division Manager  
Mr. David Kelly, SCDOT RPG 1 NEPA Coordinator  
Mr. Craig Winn, SCDOT Program Manager



U.S. Department  
of Transportation  
**Federal Highway  
Administration**

**South Carolina**

March 25, 2019

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

In Reply Refer To:  
HDA-SC

Dr. Roy E. Crabtree  
Regional Administrator SE Regional Office  
NOAA Fisheries  
Attn: Kelly Shotts  
263 13<sup>th</sup> Avenue South  
St. Petersburg, FL 33701

Subject: Invitation to Become a Participating Agency for the Preparation of an  
Environmental Assessment (EA) for the Proposed US 278 Corridor  
Improvements Project in Beaufort County, South Carolina;  
Federal Project Number P030450

Dear Dr. Crabtree:

The Federal Highway Administration (FHWA), in cooperation with the South Carolina Department of Transportation (SCDOT), is preparing an Environmental Assessment (EA) for the US 278 Corridor Improvements Project. The proposed project would make improvements to the US 278 corridor between Bluffton and Hilton Head Islands. The purpose of the proposed project is to increase capacity and reduce congestion along the U.S. 278 corridor from Moss Creek Drive to Squire Pope Road. The eastbound Mackay Creek Bridge, which crosses the Intracoastal Waterway, is structurally deficient and is scheduled to be replaced. Access to Pinckney Island National Wildlife Refuge and the C.C. Haigh, Jr. boat ramp would be improved as well (see attached study area map). A website for the project has been established and can be viewed at <https://www.scdot278corridor.com>.

Pursuant to Section 6002 of SAFETEA-LU, as amended by Section 1304 of the Fixing America's Surface Transportation (FAST) Act, participating agencies are responsible for identifying, as early as possible, any issues of concern regarding the project's potential environmental, social, or economic impacts. Section 6002 is intended to assure that agencies are fully engaged in the scoping of the project and the decisions regarding alternatives to be evaluated in detail in the NEPA analysis. In accordance with the SAFETEA-LU Section 6002, FHWA is in the process of identifying local, state, and federal agencies that may have an interest in the project.

The FHWA and SCDOT would like to take this opportunity to formally invite your agency to become a participating agency in the development of the EA. Areas of concern to be emphasized in the EA will include potential environmental impacts upon existing ecological resources, wetlands, water resources, historic and archaeological resources, parks and recreation facilities, noise and air, social and community character, hazardous/contaminated materials, cumulative and

indirect impacts, and potential impacts due to project construction. Along with requesting your agency's participation as a Participating Agency, FHWA is also asking for any comments you may have on the Draft Purpose and Need statement, which is to "Improve Capacity and Reduce Congestion Along the U.S. 278 Corridor" and Draft Agency Coordination Plan (enclosure).

Your agency's involvement in the proposed project would entail those areas under its jurisdiction. No direct writing or analysis by your agency will be necessary for this document unless you request to do so. We suggest that your agency's role in the development of the above project should include the following as they relate to your area of expertise:

1. Participate in coordination meetings as appropriate.
2. Consultation on any relevant technical studies that may be required for the project.
3. Timely review and comment on the environment document to reflect the views and concerns of your agency on the adequacy of the document, alternatives considered, and the anticipated impacts and mitigation.

**To become a Participating Agency with the FHWA, please respond to this office in writing with an acceptance or denial of the invitation within 30 days.** If you accept, please identify the appropriate contact person within your organization for coordination. If your agency declines, please provide a written response that states your reason for declining the invitation, such as:

- Has no jurisdiction or authority with respect to the project;
- Has no expertise or information relevant to the project;
- Does not intend to submit comments on the project.

If you have any questions or would like to discuss in more detail the project or each agency's respective roles and responsibilities during the preparation of the EA, please contact Mr. J. Shane Belcher at 803-253-3187 or by e-mail at [jeffrey.belcher@dot.gov](mailto:jeffrey.belcher@dot.gov).

Sincerely,



Emily O. Lawton  
Division Administrator

Enclosures

ec: Ms. Kelly Shotts, NOAA Fisheries  
Mr. Chad Long, SCDOT Environmental Division Manager  
Mr. David Kelly, SCDOT RPG 1 NEPA Coordinator  
Mr. Craig Winn, SCDOT Program Manager



U.S. Department  
of Transportation  
**Federal Highway  
Administration**

South Carolina

March 25, 2019

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

In Reply Refer To:  
HDA-SC

Mr. Pace Wilber  
South Atlantic Branch Supervisor  
NOAA Fisheries  
331 Fort Johnson Road  
Charleston, SC 29412

Subject: Invitation to Become a Participating Agency for the Preparation of an  
Environmental Assessment (EA) for the Proposed US 278 Corridor  
Improvements Project in Beaufort County, South Carolina;  
Federal Project Number P030450

Dear Mr. Wilber:

The Federal Highway Administration (FHWA), in cooperation with the South Carolina Department of Transportation (SCDOT), is preparing an Environmental Assessment (EA) for the US 278 Corridor Improvements Project. The proposed project would make improvements to the US 278 corridor between Bluffton and Hilton Head Islands. The purpose of the proposed project is to increase capacity and reduce congestion along the U.S. 278 corridor from Moss Creek Drive to Squire Pope Road. The eastbound Mackay Creek Bridge, which crosses the Intracoastal Waterway, is structurally deficient and is scheduled to be replaced. Access to Pinckney Island National Wildlife Refuge and the C.C. Haigh, Jr. boat ramp would be improved as well (see attached study area map). A website for the project has been established and can be viewed at <https://www.scdot278corridor.com>.

Pursuant to Section 6002 of SAFETEA-LU, as amended by Section 1304 of the Fixing America's Surface Transportation (FAST) Act, participating agencies are responsible for identifying, as early as possible, any issues of concern regarding the project's potential environmental, social, or economic impacts. Section 6002 is intended to assure that agencies are fully engaged in the scoping of the project and the decisions regarding alternatives to be evaluated in detail in the NEPA analysis. In accordance with the SAFETEA-LU Section 6002, FHWA is in the process of identifying local, state, and federal agencies that may have an interest in the project.

The FHWA and SCDOT would like to take this opportunity to formally invite your agency to become a participating agency in the development of the EA. Areas of concern to be emphasized in the EA will include potential environmental impacts upon existing ecological resources, wetlands, water resources, historic and archaeological resources, parks and recreation facilities, noise and air, social and community character, hazardous/contaminated materials, cumulative and indirect impacts, and potential impacts due to project construction. **Along with requesting your**

agency's participation as a Participating Agency, FHWA is also asking for any comments you may have on the Draft Purpose and Need statement, which is to "Improve Capacity and Reduce Congestion Along the U.S. 278 Corridor" and Draft Agency Coordination Plan (enclosure).

Your agency's involvement in the proposed project would entail those areas under its jurisdiction. No direct writing or analysis by your agency will be necessary for this document unless you request to do so. We suggest that your agency's role in the development of the above project should include the following as they relate to your area of expertise:

1. Participate in coordination meetings as appropriate.
2. Consultation on any relevant technical studies that may be required for the project.
3. Timely review and comment on the environment document to reflect the views and concerns of your agency on the adequacy of the document, alternatives considered, and the anticipated impacts and mitigation.

**To become a Participating Agency with the FHWA, please respond to this office in writing with an acceptance or denial of the invitation within 30 days.** If you accept, please identify the appropriate contact person within your organization for coordination. If your agency declines, please provide a written response that states your reason for declining the invitation, such as:

- Has no jurisdiction or authority with respect to the project;
- Has no expertise or information relevant to the project;
- Does not intend to submit comments on the project.

If you have any questions or would like to discuss in more detail the project or each agency's respective roles and responsibilities during the preparation of the EA, please contact Mr. J. Shane Belcher at 803-253-3187 or by e-mail at [jeffrey.belcher@dot.gov](mailto:jeffrey.belcher@dot.gov).

Sincerely,



Emily O. Lawton  
Division Administrator

Enclosures

ec: Ms. Cynthia Cooksey, NOAA Fisheries  
Mr. Chad Long, SCDOT Environmental Division Manager  
Mr. David Kelly, SCDOT RPG 1 NEPA Coordinator  
Mr. Craig Winn, SCDOT Program Manager





## United States Department of the Interior



### FISH AND WILDLIFE SERVICE

176 Croghan Spur Road, Suite 200

Charleston, South Carolina 29407

September 26, 2018

Mr. Henry Phillips  
Project Manager  
South Carolina Department of Transportation  
P.O. Box 191  
Columbia, SC 29202-0191

Re: Notice of Intent, US 278 Improvements, Beaufort County, SC  
FWS Log No. 2018-CPA-0085

Dear Mr. Phillips:

The U.S. Fish and Wildlife Service (Service) has received the South Carolina Department of Transportation's (SCDOT) September 4, 2018, Notice of Intent (LOI) for the proposed US 278 corridor improvements in Beaufort County, South Carolina. The SCDOT is soliciting comments for consideration and incorporation into an Environmental Assessment (EA) which is being prepared pursuant to the National Environmental Policy Act of 1969, as amended (43 U.S.C. 4321 *et seq.*) (NEPA).

The SCDOT proposes improvements to a small section of the US 278 corridor leading to Hilton Head Island, Beaufort County, South Carolina. The project corridor is between US 278 intersections with Moss Creek Drive and Squire Pope Road, approximately 3.7 miles in length. There are four bridges along this corridor, two of which cross the Atlantic Intracoastal Waterway (AIWW). The east bound bridge over the AIWW is to be replaced. Access to the Pinckney Island National Wildlife Refuge (Refuge) and a public boat ramp is to be improved. The overall purpose of the project is to improve safety as well as increase capacity to improve mobility and reduce congestion.

The Service, in coordination with Beaufort County and the Federal Highways Administration since 2008, completed a Road Safety Audit and a Transportation Study Report for the Refuge. The reports highlighted the need for safer alternatives and improved access at the entrance of the Refuge off US 278 due to large traffic volumes and congestion accessing Hilton Head Island, South Carolina. The Refuge hosts more than 250,000 visitors annually and expects that easier and safer access will only support the ability for more visitors to use and enjoy the Refuge.

The Beaufort County Comprehensive Transportation Plan also identified plans to upgrade this section of US 278 from a four-lane to a six-lane section as part of planned safety improvements needed at this location. Upgrading the road section adjacent to the Refuge would benefit not only economic growth in Beaufort County but also the conservation efforts that are necessary for the sustainability of the Refuge.

RECEIVED  
OCT 1 2018  
Environmental Management  
SCDOT  
RECEIVED  
OCT 1 2018  
Environmental Management  
SCDOT



Without specific plans, the Service cannot provide a thorough review of the potential impacts resulting from the demolition and subsequent reconstruction of the east bound bridge or of the planned improvements. In general however, we recommend the new bridge structure be placed on the same alignment. All mechanical equipment must be prohibited from entering the adjacent waterways and wetlands at any time and best management practices (BMP) should be employed and maintained throughout the construction activities to prevent demolition debris or other petroleum based contaminants from entering Mackay Creek. Under bridge netting to capture falling debris and double row silt fencing along the upland edge to collect erosional sediment should also be incorporated into the bridge plans.

The Service recommends that SCDOT consider beneficial reuse of the demolished bridge concrete and reinforcement steel. One possible beneficial use would be to use the debris to create new artificial reefs, or supplement existing reefs, in South Carolina's coastal nearshore waters. The SCDOT should coordinate with the SC Department of Natural Resources, Marine Resources Division Artificial Reef Program prior to the bridge's demolition to assess the possibility and logistics of reusing the material.

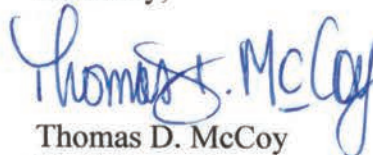
The Service recommends that SCDOT schedule a multi-agency pre-construction meeting at the project site. This site visit should be conducted early in the planning phases of this project to aid in identifying alternatives and appropriate BMPs that may be used to avoid potential impacts to the surrounding salt marsh habitat as well as the Pinckney NWR. It is imperative that SCDOT coordinate closely with the Savannah NWR staff throughout the planning phases to ensure access to the refuge is not impeded during construction.

For SCDOT's convenience, the Service has included a list of species that are currently protected under the Endangered Species Act of 1973 (ESA). This list includes species that are considered as a candidate for listing under the ESA and those that have been petitioned for listing under the ESA. Appropriate survey timeframes or windows for each species are included in the list. The species which have been petitioned for listing are considered "At-Risk Species" (ARS) and may occur in Beaufort County, South Carolina. Although there are no Federal protections afforded to ARS, please consider including ARS in your survey efforts. Incorporating proactive measures to avoid or minimize harm to ARS may improve their status and assist with precluding the need to list these species. Additional information on ARS can be found at:

<http://www.fws.gov/southeast/candidateconservation>.

The Service appreciates the opportunity to provide input at this early stage of the project's development. If you have any questions, please contact Mr. Mark Caldwell at (843) 727-4707 ext. 215, and reference FWS Log No. 2018-CPA-0085.

Sincerely,

A handwritten signature in blue ink that reads "Thomas D. McCoy". The signature is stylized with a large, looped "T" and "M".

Thomas D. McCoy  
Field Supervisor

cc: Ms. Holly Gaboriault, Refuge Manager, Savannah Coastal Refuges Complex, SC

TDM/MAC



# South Carolina List of At-Risk, Candidate, Endangered, and Threatened Species - Beaufort County

CATEGORY	COMMON NAME/STATUS	SCIENTIFIC NAME	SURVEY WINDOW/ TIME PERIOD	COMMENTS
Amphibian	Frosted flatwoods salamander (T, CH)	<i>Ambystoma cingulatum</i>	January 1-April 30	Larvae present in breeding ponds
	American wood stork (T)	<i>Mycteria americana</i>	February 15-September 1	Nesting season
	Bald eagle (BGEPA)	<i>Haliaeetus leucocephalus</i>	October 1-May 15	Nesting season
	Black-capped petrel (ARS)	<i>Pterodroma hasitata</i>	April-October	offshore water primarily
Bird	Eastern black rail (ARS)	<i>Laterallus jamaicensis</i>	May-July	
	Macgillivray's seaside sparrow (ARS)	<i>Ammodramus maritimus macgillivrayi</i>	May-June	
	Piping plover (T, CH)	<i>Charadrius melodus</i>	July 15-May 1	Migration and wintering
	Red-cockaded woodpecker (E)	<i>Picoides borealis</i>	April 1-July 31	Nesting season
	Red knot (T)	<i>Calidris canutus rufa</i>	August 1-May 31	Migration and wintering
Crustacean	None Found			
Fish	Atlantic sturgeon* (E)	<i>Acipenser oxyrinchus*</i>	February 1-April 30	Spawning migration
	Blueback herring* (ARS)	<i>Alosa aestivalis*</i>	Mid-January-mid May	Peak: March-April
	Shortnose sturgeon* (E)	<i>Acipenser brevirostrum*</i>	February 1-April 30	Spawning migration
Insect	Monarch butterfly (ARS)	<i>Danaus plexippus</i>	August-December	Overwinter population departs: March-April
Mammal	Finback whale* (E)	<i>Balaenoptera physalus*</i>	November 1-April 30	Off the coast
	Humpback whale* (E)	<i>Megaptera novengliae</i>	January 1-March 31	Migration off the coast
	Northern long-eared bat (T)	<i>Myotis septentrionalis</i>	Year round	Winter surveys not as successful
	Right whale* (E)	<i>Balaena glacialis</i>	November 1-April 30	Off the coast
	Tri-colored bat (ARS)	<i>Perimyotis subflavus</i>	Year round	Found in mines and caves in the winter
	West Indian manatee (T)	<i>Trichechus manatus</i>	May 15-October 15	In coastal waters
Mollusk	None Found			
Plant	Canby's dropwort (E)	<i>Oxypolis canbyi</i>	Mid-July-September	
	Ciliate-leaf tickseed (ARS)	<i>Coreopsis integrifolia</i>	August-November	
	Pondberry (E)	<i>Lindera melissifolia</i>	February-March	
	Raven's seedbox (ARS)	<i>Ludwigia ravenii</i>	June-October	
Reptile	Eastern diamondback rattlesnake (ARS)	<i>Crotalus adamanteus</i>	Most of the year	Peak: April-November
	Green sea turtle** (T)	<i>Chelonia mydas**</i>	May 1-October 31	Nesting and hatching
	Florida pine snake (ARS)	<i>Pituophis melanoleucus mugitus</i>	Most of year	
	Kemp's ridley sea turtle** (E)	<i>Lepidochelys kempii**</i>	May 1-October 31	In coastal waters
	Leatherback sea turtle** (E)	<i>Dermochelys coriacea**</i>	May 1-October 31	Nesting and hatching
	Loggerhead sea turtle** (T, CH)	<i>Caretta caretta**</i>	May 1-October 31	Nesting and hatching
	Southern hognose snake (ARS)	<i>Heterodon simus</i>	Most of the year	
	Spotted turtle (ARS)	<i>Clemmys guttata</i>	February-mid April	

## South Carolina List of At-Risk, Candidate, Endangered, and Threatened Species - Beaufort County

*	Contact National Marine Fisheries Service (NMFS) for more information on this species
**	The U.S. Fish and Wildlife Service (FWS) and NMFS share jurisdiction of this species
ARS	Species that the FWS has been petitioned to list and for which a positive 90-day finding has been issued (listing may be warranted); information is provided only for conservation actions as no Federal protections currently exist.
ARS*	Species that are either former Candidate Species or are emerging conservation priority species
BGEPA	Federally protected under the Bald and Golden Eagle Protection Act
C	FWS or NMFS has on file sufficient information on biological vulnerability and threat(s) to support proposals to list these species
CH	Critical Habitat
E	Federally Endangered
P or P - CH	Proposed for listing or critical habitat in the Federal Register
S/A	Federally protected due to similarity of appearance to a listed species
T	Federally Threatened

These lists should be used only as a guideline, not as the final authority. The lists include known occurrences and areas where the species has a high possibility of occurring. Records are updated as deemed necessary and may differ from earlier lists.

For a list of State endangered, threatened, and species of concern, please visit <https://www.dnr.sc.gov/species/index.html>.



# ACE Meeting Notes – June 13, 2019

---

## Attendees:

FHWA	Shane Belcher
NOAA	Cindy Cooksey (on phone)
USACE	Laura Boos Steve Brumagin Ivan Fannin
USEPA	
USFWS	Mark Caldwell (on phone) Russ Webb (on phone)
SCDAH	Elizabeth Johnson (on phone)
SCDHEC	Chuck Hightower
SCDHEC-OCRM	Josh Hoke (on phone) Chris Stout (on phone)
SCDNR	Tom Daniel Susan Davis (on phone) Greg Mixon
SCDOT	Chris Beckham Sean Connolly Siobhan Gordon Henry Phillips (on phone) Craig Winn
KCI	Phil Leazer
Three Oaks Engineering	Russell Chandler Heather Robbins Geni Theriot

## Purpose of the Meeting:

Purpose was to present and discuss the alternative evaluation criteria, range of alternatives, and provide a coordination point for agencies as required by the 6002 EA process.

## Change in project termini, has now extended from Squire Pope Road to Spanish Wells Road.

The intersection at Spanish Wells Road has already been improved which will allow for more logical tie-in to occur without additional intersection improvements. Traffic studies already extended to Spanish Wells Road. The change in termini was determined through coordination with SCDOT and FHWA.





### Preliminary Alternative Evaluation Criteria:

The alternative evaluation criteria and the range of Alternatives is a coordination point for agencies. Preliminary range of alternatives was developed based on public comments from the September 2018 Public Meeting and additional stakeholder input. Some of the alternatives do not tie in at Spanish Wells Road but at other termini.

Purpose and Need is to address deficiency at Mackay Creek as well as increase capacity and reduce congestion.

TSM/TDM and Mass Transit will be considered as standalone but can be incorporated into the alternatives if they cannot move forward on their own.

First level of evaluation criteria:

- Wetlands – GIS layer – NWI, soils, topo, DEM, existing JD on Jenkins Island
- Protected lands – USGS PADUS, National Conservation Easement Database
- ROW – number of impacted parcels/properties, total acres outside existing R/W
- Neighborhoods – how the individual parcels are grouped together and “self-identify” as groups

Analyze alternatives based on the above criteria. For August ACE meeting the team will be able to explain which alternatives will be kept and which ones will be eliminated based on the criteria. The team plans to



present Reasonable Alternatives to the public in the Fall of 2019 following agency coordination. Currently there are seventeen (17) preliminary alternatives.

**Reasonable Alternative Evaluation Criteria:**

NOAA-NMFS requested to add habitat areas of particular concern (oyster and shellfish habitat) to the second level of evaluation criteria. NOAA also asked about utility impacts. Project Team explained that exact impacts are currently unknown. There are overhead power lines on both sides of the existing bridges over Mackay Creek, a large water line that feeds all of Hilton Head Island, and other known utilities. Discussions and coordination with utility companies have been started. Utility impacts will be further evaluated under the reasonable range of alternatives.

USACE recommended including a discussion of the practicability of alternatives. Document all decisions thoroughly. Project is an EA but follows the SAFETEA-LU 6002 Process and could easily be elevated to EIS if required. As portions of the document are available, they will be shared with cooperating and participating agencies. USACE asked if the route was a hurricane evacuation route. Project Team explained that SCDOT will require four lanes of traffic be open at all times during construction.

USFWS requested to include compatibility with the Pinckney Island National Wildlife Refuge (NWR) as an evaluation criterion. Pinckney Island National Wildlife Refuge prefers any new alignments considered stay south of existing roadway. This would be compatible with their future plans for additional access and parking. USFWS stated that there are no records of T&E on Pinckney Island NWR. Compatibility with NWR plans will be added to reasonable criteria or preliminary criteria.

SCDAH had no comments or concerns at this time.

SCDOT asked why the P&N was not in preliminary evaluation criteria. It was assumed that all preliminary alternatives meet P&N. Traffic studies will be completed on reasonable alternatives and is component of P&N. Use driving environmental factors as first level of evaluation criteria such as wetlands, National Wildlife Refuge and Environmental Justice communities. The USFWS' archaeologist has been contacted, but the team has not received a reply. The team is aware that the Pinckney Island NWR archaeologist needs to be involved in discussions. Will bring this up during meeting scheduled with NWR staff on June 25<sup>th</sup>.

SCDHEC & SCDHEC-OCRM requested the team include restrictive covenants on properties as an evaluation criterion. Inclusion of shellfish harvesting waters. OCRM areas of concern include archaeology, geographic area of particular concern (GAPC), EJ, and critical area. Shellfish harvesting leaseholders need to be informed. OCRM and SCDNR typically handle this as part of the Public Notice process for Critical Area permits.



SCDNR asked about the proposed corridor width. Project Team explained that it is currently four lanes, but the preliminary traffic numbers show that it needs to be six lanes. Different typical sections will be reviewed to avoid and minimize impacts in the reasonable/preferred alternative selections. SCDNR asked if Only the alternatives with new alignments would extend to Cross Island Parkway. Any work on Cross Island Parkway would be limited to tie-ins for those alternatives. Cross Island Parkway does not provide access on or off the island and traffic diverges at the expressway.

**Next Steps:**

- The following items will be added to the 2<sup>nd</sup> Evaluation Criteria:
  - Habitat Areas of Particular Concern
  - Compatibility with USFWS Refuge
  - Restrictive Covenants
- Alternative Matrix to explain alternatives eliminated from proposed reasonable alternatives to proposed preferred alternatives. Plan to present at August 2019 ACE meeting.
- Mitigation needs assessment to be conducted once reasonable alternatives identified and agency concurrence point completed.



**Draft Schedule:**

Milestones	Date
<b>2019</b>	
<i>Agency Project Kickoff and Scoping Meeting</i>	<i>February 14, 2019</i>
Send Letters Inviting Cooperating and Participating Agencies	March 25, 2019
Agencies review draft Purpose and Need Statement & Agency Coordination Plan	April-May 2019
<b>Coordination Point for Agency Coordination Plan and Purpose and Need Statement</b>	<b>May 2019</b>
<i>Agency Meeting to discuss the alternative evaluation criteria, alternatives analysis process, and Preliminary Range of Alternatives</i>	<i>June 13, 2019</i>
Agencies Review the Preliminary Range of Alternatives for Coordination	June/July 2019
<b>Coordination Point for Preliminary Range of Alternatives/Alternatives Carried Forward by Agencies</b>	<b>Summer 2019</b>
Public Information Meeting	Fall 2019
Continued Coordination with Agencies on specific resources (i.e. Permitting, EFH, Section 106, Section 7, etc.)	Fall-Winter 2019
<b>2020</b>	
<i>Agency Meeting to discuss Reasonable Alternatives and Preferred Alternative</i>	<i>Spring 2020</i>
<b>Agency Meeting and Coordination Point for Preferred Alternative by Agencies</b>	<b>Spring 2020</b>
Submit Preliminary Jurisdictional Determination to USACE & Critical Area to SCDHEC-OCRM	Summer 2020
Pre-Application Meeting with USACE and SCDHEC	Summer/Fall 2020
Draft EA issued; Joint USACE Individual Permit and USCG Public Notices	Fall 2020
Public Hearing	Fall/Winter 2020
<b>2021</b>	
Prepare Final NEPA Decision	Early 2021
FHWA Issues Final NEPA Decision	Early 2021
USACE and USCG Issue Permit Decisions	Early 2021





# ACE Meeting Notes – August 8, 2019

---

**Attendees:**

FHWA	Shane Belcher
NOAA	Cindy Cooksey (on phone)
USACE	Christopher Mims Ivan Fannin
USEPA	
USFWS	Megan Cook (on phone)
SCDAH	Joe Wilkinson
SCDHEC	Logan Ress (on phone) Chuck Hightower (on phone)
SCDHEC-OCRM	
SCDNR	Tom Daniels (on phone)
SLCOG	Kyle Kelly (on phone) Jake Whitmire
SCDOT	Sean Connolly Siobhan Gordon Micky Queen Vince McCarron Megan Groves David Kelly
KCI	Phil Leazer Eric Burgess
Three Oaks Engineering	Russell Chandler Heather Robbins Geni Theriot

**Purpose of the Meeting:**

Purpose was to present and discuss the full range of preliminary alternatives, the evaluation criteria and present the proposed reasonable alternatives. The evaluation criteria used to get from preliminary to reasonable alternatives was reviewed. These criteria include:

- Purpose & Need
  - Structural Deficiency



- GIS Wetlands
- Right-of-Way
- Neighborhoods
- Protected Lands
- Consistent with Pinckney Island National Wildlife Refuge (PINWR) purposes

The meeting continued with a brief explanation of the materials sent to the agencies and printed for those in attendance which included the alternatives matrix, the alternatives development flowchart, the project handout as well as a alternatives matrix summary developed and provided to those in the room. The matrix summary will be provided to those on the call with the meeting summary. Please note on the matrix summary document, the alternatives that are proposed to be eliminated are in grey.

#### **Preliminary Range of Alternatives to Proposed Reasonable Alternatives**

The Preliminary Range of Alternatives were discussed by using a KML (Google Earth) file for a visual representation of each alternative. Each alternative was outlined by the Preliminary Range of Alternatives Summary Sheet (attached) and any additional notes are recorded below.

##### **Alternative 1:**

- Reminder that the original purpose of the project was to replace the structurally deficient eastbound Mackay Creek bridge. The project has grown to include the full corridor between Moss Creek and Spanish Wells.
- If funding falls through, the eastbound Mackay Creek bridge will still be replaced.
- FHWA (Shane) noted one of the reasons access improvements at Pinckney Island are because SCDOT is trying to incorporate improvements for the access/egress issues on Pinckney Island. The County has a plan to apply for a grant to improve access to Pinckney Island and this is an opportunity to tie the two projects together and incorporate the long-range plans of the refuge.
- Beaufort County plans to submit for a FLAP grant to improve access to Pinckney Island.
- SCDOT (Sean) asked if the justification provided was enough to eliminate according to USACE and the other agencies in attendance.
- USACE (Chris) did indicate the provided justification was adequate.

##### **Alternative 2:**

- A reminder that USFWS has indicated they prefer the alternatives that remain close to existing alignment.
- No comments received during the discussion of this alternative.

Alternative 3a: No comments received during the discussion of this alternative.



#### Alternative 3b:

- This alternative was eliminated because it had a bigger footprint and the potential impacts were greater than 3a.
- SCDOT (Sean) states he thinks the elimination justification is pretty self-explanatory and asked if it was enough for eliminating for permit application?
- USACE (Chris) responded that it was hard to get too specific on each alternative right now because the level of review is still so broad.
- FHWA (Shane) Some of the bigger issues on the Spanish Wells end is the Environmental Justice impacts are bigger.
- SCDOT (Sean) asked if at this time if anyone saw any red flags in terms of process.
- USACE (Chris) agrees that based on what he sees now he does not see any red flags.
- SCDOT (Sean) stated he just wants to make sure everyone is comfortable with the justification for removing the ones we think are not practical.
- Three Oaks (Heather) reviewed the evaluation criteria again and pointed out the additional criteria that was added after the June ACE Meeting.
  - Consistency with PINWR Purposes was added to the Preliminary Alternatives Evaluation Criteria.
  - Shellfish Harvesting Waters and Essential Fish Habitat have been added to the Evaluation Criteria for the Reasonable Alternatives.
- SCDOT (Sean) asks that if there are things you were good with in June but you aren't anymore let us know.
- Three Oaks (Russell) asks USACE if they would like to see the Alternatives Matrix as a separate appendix to the permit document. The NEPA document is a standard appendix but the matrix could be a standalone appendix for ease of reference.
- USACE (Chris) responded that the NEPA document will discuss the elimination in detail and if they had questions, they could reference the matrix.
- SCDOT (Sean) asked USACE to make sure the chart had everything they need in it if they plan to use it for reference.

Three Oaks (Heather) specified we want everyone to agree on what is being carried forward, so we do want feedback.

#### Alternative 4a:

- Pinckney Island access is a little different in this alternative.
- It was also noted that there is a slightly different configuration by Windmill Harbor.
- No comments received during the discussion of this alternative.

#### Alternative 4b:

- This alternative tried to keep the existing boat ramp on Pinckney Island



- It was noted that USFWS expressed concern with getting farther away from existing alignment.
- No comments received during the discussion of this alternative.

Alternative 4c:

- USFWS concerns regarding future infrastructure maintenance and safety with this alternative being too far south.
- No comments received during the discussion of this alternative.

Alternative 4d:

- SCDOT (Sean) asks for clarification on the USFWS concerns in regards to infrastructure and financial responsibility.
- Three Oaks (Heather) explains that everything at grade will be the responsibility of USFWS to maintain in the future.
- SCDOT (Sean) asked if we had documentation of USFWS concerns for justification of elimination of these alternatives.
- Three Oaks (Heather) stated we had the concerns documented in the summaries from these meetings. The federal land transfer process was briefly discussed. USFWS also advised it would be easier to get a compatibility determination for the NEPA document the closer to existing alignment the project stays.

Alternative 4e: No comments received during the discussion of this alternative.

Alternative 4f:

- This alternative avoids Pinckney Island but eliminated because 4d improves Pinckney Island access.
- No comments received during the discussion of this alternative.

Alternative 5a:

- This alignment goes the farthest north of all alternatives.
- USFWS does not want Pinckney Island bisected to the north
- This alternative also has impacts to SCDNR's Victoria Bluff Heritage Preserve
- No comments received during the discussion of this alternative.

Alternative 5b:

- FHWA (Shane) pointed out that the reason we are looking at these off the wall alternatives is because SCDOT and the consultants were charged with looking at alternatives to address the county/town concerns.

Alternative 6a: No comments received during the discussion of this alternative.



#### Alternative 6b:

- The public wanted tie into the Bluffton Parkway
- No comments received during the discussion of this alternative.

#### Alternative 6c:

- The only change between 6b and 6c is that the curves were buttoned up a little more with this alternative.
- No comments received during the discussion of this alternative.

Alternative 6d: No comments received during the discussion of this alternative.

Alternative 6e: No comments received during the discussion of this alternative.

#### Alternative 7:

- This alternative is similar to Alternative 4a until it reaches Jenkins Island. The town wanted us to look at using the existing transmission line easement at the Jenkins Island tie in.
- Three Oaks (Heather) points out that if we move it there it avoids some of the Environmental Justice impacts and could tie into the proposed Jenkins Island improvements.
- NOAA (Cindy) asks where the transmission lines would go?
- Three Oaks (Heather) explains we need farther evaluation to determine if it will be eliminated or carried forward. Utilities are included in the next level of evaluation criteria and a detailed utilities and cost analysis will occur.

#### Alternative 8:

- This alternative still uses the transmission line but connects to the alignment of Alternative 4d.
- SCDOT (Sean) points out that 7 & 8 take from 4a & 4d until transmission lines. He asks if there is any way to tie back down before the hump?
- KCI (Eric) and Three Oaks (Heather) respond that this would cause greater impacts to the EJ communities.
- USACE (Ivan) asked if the owners of the marsh land have commented on this yet?
- Three Oaks (Heather) answered that they will see it at the PIM. Ivan explained that there was history here where these property owners have been told they couldn't touch this land because it is marsh and points out they may have an issue with being told a highway is now going to be built there.

#### General Discussion

- Three Oaks (Heather):
  - If we have agreement on reasonables we propose to rename them for the PIM so they are sequential (RA1-RA6).



- We will use the new names moving forward in all discussions.
- At the PIM we will show the spaghetti map and the 6 reasonable alternatives.
- We will plan to return in the spring of 2020 to walk through the detailed analysis and propose a preferred alternative.
- In the Spring of 2020, we will have more details on when PJD will be submitted to USACE.
- Draft EA is anticipated to be submitted in Fall of 2020.
- SCDOT (Sean) asks if USFWS expressed anything about purchasing additional land?
- Three Oaks (Heather) responded that this had not been mentioned in our discussions with them. They had mentioned future improvements such as a visitor's center and additional parking.
- FHWA (Shane) also confirmed no discussion of expansion had occurred.
- Sean asked USFWS (Megan) to confirm and she did through email.
- FHWA (Shane) states that USFWS is a cooperating agency. The compatibility determination for the NEPA document is needed for the Federal Land access program. The goal is to write the NEPA document to meet the needs of USFWS, USACE and USCG.
- USFWS (Megan) expressed some confusion on the final determination on if they were a participating or cooperating agency.
- FHWA (Shane) stated USFWS was confirmed as a cooperating agency by Holly. Megan will let Shane know if she needs any additional documentation.
- SCDOT (Sean) asked USACE if the update for the SOP for mitigation was complete?
- USACE (Chris) stated it was still going through QA/QC.
- SCDOT (Sean) asked if we anticipated impacts to be fill, shading or clearing?
- Three Oaks (Russell) answered that the impacts have not been quantified to that level at this time.
- SCDOT (Sean) asked USACE if they still had to wait on OCRM to bless the PJD before they could approve it?
- USACE (Chris) stated the process has been modified to allow the PJD to move forward without OCRM approval.
- Three Oaks (Russell) noted the plan was to submit the PJD with maps, then to a site visit followed by the generation of the plat.
- SCDNR will consider any impacts to SCDNR properties.
- SCDNR is checking to see if they have any properties they are interested in acquiring within the area
- SHPO will wait to see the report to determine what is present.





# ACE Meeting Notes – March 12, 2020

---

**Attendees:**

FHWA	Shane Belcher
NOAA	Cindy Cooksey (on phone)
USACE	Christopher Mims (on phone) Steve Brumagin (on phone)
USEPA	Alya Singh-White (on phone)
USFWS	Mark Caldwell (on phone)
SCDAH	Joe Wilkinson
SCDHEC	
SCDHEC-OCRM (CZC)	Chris Stout (on phone)
SCDNR	Susan Davis
SCDOT	Craig Winn Chris Beckham David Ed Frierson Jackie Galloway Kelly
KCI	Phil Leazer
Three Oaks Engineering	Russell Chandler Heather Robbins Geni Theriot

**Purpose of the Meeting:**

Purpose was to present a project update, discuss the reasonable alternatives and revisions since the last agency meeting, discuss preliminary EFH assessment and future mitigation planning.

**Old Business**

Agencies were asked if they had any questions/concerns with Carolina Crossroad 404 (b) 1 responses progressing

USACE stated once final mitigation plan is received a 15-day review will occur.

No other questions/concerns were voiced.



## **US 278 Corridor Improvements**

### Alternatives Analysis

- Project recap/update was provided
- Agencies were provided the presentation seen today prior to the meeting
- In August we showed the reasonable alternatives, the project team is currently evaluating these alternatives and plan to have analysis complete by summer.
- 17 preliminary alternatives were developed originally and were narrowed down to 6 reasonable alternatives
- Public input led to revisions to the alternatives resulting in 9 reasonable alternatives
  - RA 4 modified to 4a with closer interchange to existing Pickney based on previous coordination with USFWS and coordination call with Waccamaw
  - RA 5 & 6 modified to pull off utility easement to minimize potential high costs of impacting utilities resulting in 5a and 6a
  - Hog Island Connector was added to all alternatives to facilitate more efficient ingress/egress during construction
- Preliminary impact calculations show RA 2, RA 3 and RA 4a are rising to the top. Impacts are still being evaluated so all 9 reasonable alternatives are still under analysis.
- NOAA-NMFS and USFWS expressed concern with the impacts expected from adding the Hog Island connector and expansion of project outside of existing right-of-way in this area.
- USFWS and NOAA-NMFS expressed concern with portions of the loop on Pinckney Island with proposed impacts to saltmarsh. NOAA needs justification for any proposed new causeway.
- Agencies asked if this loop over the saltmarsh could be a flyover but it was explained that due to elevations this was not constructible
- USFWS asked if existing US 278 could be used instead of the proposed loop concept was not constructible due to elevation constraints.

### Essential Fish Habitat

NOAA-NMFS has no comments/questions and offers a site visit

### Mitigation Needs Assessment

- Looking at existing landscape
- The range of credit needs was developed based on lowest level of impacts and highest level of impacts for all 9 reasonable alternatives
  - 23-62 freshwater credits
  - 203-396 tidal credits
- The agencies were asked if they knew of any on-site mitigation opportunities.
  - SCDNR does not have any on-site mitigation opportunities
  - SCDNR & USFWS expressed concern with the number of tidal credits



- SCDNR, NMFS, USFWS and USACE like onsite restoration
  - USACE reminds to avoid & minimize and does not consider removal of causeway as mitigation without including a restoration component
- SCDOT is not sure they would propose onsite mitigation for all of mitigation
- The mitigation needs assessment is a snapshot of where we are in the design concept, efforts to avoid an minimize will be incorporated into the preferred alternatives. At this stage, the #'s are representative of all 9 reasonable alternatives and include both permanent and temporary impacts.
  - Credit range is conservative and may get smaller as alternatives are refined.
- USACE states they see a benefit of PRM for this project versus wiping out the available credits
- During the May ACE meeting, we plan to provide the full matrix of impacts for review

#### **Action Items**

- Provide justification to NMFS and USFWS for the following
  - Hog Island Connector and why it isn't shifting south of utility easement vs the northern alignment the project team is currently proposing
  - Why the Hog Island Connector is part of the US 278 project
- Continue refining alternatives analysis matrix to define preferred alternative
- Begin investigation of potential mitigation opportunities within the project watershed

**From:** [Beckham, Chris](#)  
**To:** ["charleston\\_regulatory@fws.gov"](mailto:charleston_regulatory@fws.gov)  
**Cc:** [Kelly, David P.](#)  
**Subject:** US 278 Corridor Improvement Project  
**Attachments:** [US 278 Biological Evaluation Final Draft 071620.pdf](#)

---

To whom it may concern,

The South Carolina Department of Transportation (SCDOT) on behalf of the Federal Highway Administration (FHWA), is requesting consultation with USFWS for species under their jurisdiction in compliance with Section 7 of the Endangered Species Act (ESA) for the above referenced project. Please find the attached copy of the Biological Assessment with Appendices. If you have any questions or need any additional information about this project, please let me know.

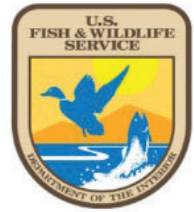
Thanks,

Chris Beckham  
SCDOT  
Environmental Services Office  
Office: (803) 737-1332  
Mobile: (803) 609-9464



# United States Department of the Interior

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



July 28, 2020

Mr. Chris Beckham  
Environmental Services  
S.C. Department of Transportation  
P.O. Box 191  
Columbia, SC 29202-0191

Re: S.C. Department of Transportation, Biological Evaluation, US-278 Corridor  
Improvements, Beaufort County, FWS Log # 2018-CPA-0085

Dear Mr. Beckham:

The South Carolina Ecological Services Field Office for the U.S. Fish and Wildlife Service (Service) received the South Carolina Department of Transportation's (SCDOT) Biological Evaluation (BE) for the US-278 Corridor Improvements in Beaufort County, SC. The BE has evaluated potential impacts to threatened and endangered (T&E) species protected under the Endangered Species Act of 1973 (ESA). The SCDOT is seeking our review of the BE and its findings for inclusion into an Environmental Impact Statement (EIS) being developed for I-526 West project the pursuant to the National Environmental Policy Act of 1969.

The project includes replacement of the eastbound Mackay Creek Bridge and replacement of the three other bridges located within the PSA. The three additional bridges to be replaced include the westbound Mackay Creek, the eastbound Skull Creek, and the westbound Skull Creek bridge. Improved access to the Pinckney Island National Wildlife Refuge and the C.C. Haigh, Jr. boat ramp is also proposed as part of this project. Potential impacts to the environment will include construction of new bridges, the placement of clean fill material for construction and improvements to bridge approach, new roads, and/or realignment of existing roads for community access, and finally the demolition of the existing bridges.

The BE provided a list of all 16 T&E species known to occur in Beaufort County. A more in depth review was afforded to T&E species that may occur in project area based upon the presence of potentially suitable habitat. The SCDOT identified 11 species under the jurisdiction of the Service that may occur in the project area; the red knot, piping plover, eastern black rail, Atlantic sturgeon, shortnose sturgeon, West Indian manatee, American wood stork, and four species of sea turtles. Field reconnaissance by SCDOT personnel did not find any T&E species in the corridor but did find suitable habitat for the eight species. Therefore, a determination of "may effect, not likely to adversely affect" was made for all 11 T&E species that may occur in the project area. The Service recommends that SCDOT contact the National Oceanic and Atmospheric Administration regarding consultation requirements for the Atlantic and shortnose sturgeon.

Upon review of your information the Service concurs with SCDOT's determination regarding the species under our jurisdiction. For those species in which SCDOT determined the project would have, "no effect" consultation is not required. Please note that obligations under the ESA must be reconsidered if: (1) new information reveals impacts of this identified action may affect any federally listed species or critical habitat in a manner not previously considered; (2) this action is subsequently modified in a manner, which was not considered in this assessment; or (3) a new species is listed or critical habitat is designated that may be affected by the identified action.

Please visit our Web site: <https://www.fws.gov/southeast/pdf/fact-sheet/south-carolina-species-list-by-county.pdf> for a list of species that have been petitioned for listing under the ESA, as well as Candidate Species or collectively referred to as "At-Risk Species" (ARS) for South Carolina. Although there are no Federal protections afforded to ARS, please consider including them in your project planning. Incorporating proactive measures to avoid or minimize harm to ARS may improve their status and assist with precluding the need to list these species. Additional information on ARS can be found at:

<http://www.fws.gov/southeast/candidateconservation>

The Service appreciates the opportunity to provide input at this early stage of the US 278 project development. If you have any questions regarding our comments, please do not hesitate to contact Mr. Mark Caldwell of the South Carolina Ecological Services Field Office at [mark\\_caldwell@fws.gov](mailto:mark_caldwell@fws.gov) or (843) 727-4707 ext. 215 and reference FWS Log# 2018-CPA-0085.

Sincerely,

A handwritten signature in blue ink that reads "Thomas D. McCoy". The signature is written in a cursive, flowing style.

Thomas D. McCoy  
Field Supervisor

TDM/MAC



## NMFS RAI 1

**From:** [Russell Chandler](#)  
**To:** [Gordon Murphy](#); [Wade Biltoft](#)  
**Cc:** [Mark Mohr](#); [Karen Taylor](#); [Shelby Moody](#)  
**Subject:** FW: SERO-2020-02072 US 278 Corridor Improvements, SCDOT PIN# P030450  
**Date:** Tuesday, September 29, 2020 8:46:42 AM  
**Importance:** High

---

Gordon/Wade,

Please see below regarding the NOAA Section 7 coordination and their request for additional information (highlighted). We need to address their comments and provide responses to SCDOT within the next 30 days. We only have 45 days to get these responses back to NOAA.

Let's plan to get together either later this afternoon or early tomorrow morning to get a game plan together. Specifically identifying the points of contact to get some of the info required to address these comments.

Thanks,  
Russell  
803.360.5197  
**Three Oaks Engineering**

---

**From:** Belcher, Jeffrey (FHWA) <Jeffrey.Belcher@dot.gov>  
**Sent:** Tuesday, September 29, 2020 7:37 AM  
**To:** Beckham, Chris <BeckhamJC@scdot.org>  
**Cc:** Riddle, Nicole L. <RiddleNL@scdot.org>; Russell Chandler <russell.chandler@threeoaksengineering.com>; Mark Mohr <mark.mohr@threeoaksengineering.com>  
**Subject:** FW: SERO-2020-02072 US 278 Corridor Improvements, SCDOT PIN# P030450  
**Importance:** High

Sorry Nicole, I forgot Chris submitted this one. See comments below from NOAA. Looking back at this one looks like just submitted a checklist for minor coastal projects on this one. Not sure this project would be considered minor. I'm guessing that's why all these comments have come back. **Note the 45 day response timeframe.** Some of these questions we are not going to be able to fully address such as the demo question.

Much thanks,

*J. Shane Belcher*  
*Lead Environmental Specialist*  
*Federal Highway Administration*  
*1835 Assembly Street, Suite 1270*

*Columbia, SC 29201*  
*Phone: 803-253-3187*

*The content of this email is confidential and intended for the recipient specified in message only.*

---

**From:** Belcher, Jeffrey (FHWA)  
**Sent:** Tuesday, September 29, 2020 7:23 AM  
**To:** 'Sarah Garvin - NOAA Affiliate' <[sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)>  
**Cc:** Karla Reece - NOAA Federal <[karla.reece@noaa.gov](mailto:karla.reece@noaa.gov)>; Riddle, Nicole L. <[RiddleNL@scdot.org](mailto:RiddleNL@scdot.org)>  
**Subject:** RE: SERO-2020-02072 US 278 Corridor Improvements, SCDOT PIN# P030450

Sarah,

FHWA will work with the SCDOT to provide responses to your questions. We are at the NEPA stage for this project and final design will not occur until after that is complete, so some of the responses to your questions cannot be fully made at this time. The demolition methodology would be not be known until a selected contractor is made. We will make sure to provide follow-up information prior to the 45 day deadline.

Much thanks,

*J. Shane Belcher*  
*Lead Environmental Specialist*  
*Federal Highway Administration*  
*1835 Assembly Street, Suite 1270*  
*Columbia, SC 29201*  
*Phone: 803-253-3187*

*The content of this email is confidential and intended for the recipient specified in message only.*

---

**From:** Sarah Garvin - NOAA Affiliate <[sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)>  
**Sent:** Monday, September 28, 2020 10:05 PM  
**To:** Belcher, Jeffrey (FHWA) <[Jeffrey.Belcher@dot.gov](mailto:Jeffrey.Belcher@dot.gov)>  
**Cc:** Karla Reece - NOAA Federal <[karla.reece@noaa.gov](mailto:karla.reece@noaa.gov)>  
**Subject:** SERO-2020-02072 US 278 Corridor Improvements, SCDOT PIN# P030450

**CAUTION:** This email originated from outside of the Department of Transportation (DOT). Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Good Morning, Jeffrey --

I am the NMFS biologist assigned to your request for consultation under Section 7 of the ESA for the subject project. Before I can proceed with my review and analysis, we need the following information.

1. Please provide a complete description of the Preferred Alternative, referenced in the Biological Evaluation submitted with your request for consultation, including the construction methodology and equipment to be used.

2. Please provide the dimensions of the proposed work trestles and how many metal pipe piles will be required for their construction.

3. Please provide a complete description of the proposed demolition methods for removing the existing bridges.

4. Please provide a complete description of the existing proposed project site.

5. Please provide a project plan drawing for the proposed bridges, including whether the new bridges will use any/some of the existing bridge approaches. Please also show where all work will occur within the project area (i.e., where piles will be installed, where the approaches will be, where work trestles will be installed, etc.).

6. Please describe the rationale for not choosing to use any sort of noise abatement measures. My initial noise impact calculations are not matching the values reported in the Biological Evaluation provided with your request for consultation, and I will likely need to recommend that some sort of abatement measures (e.g., cushion block, air bubble curtain, or cofferdams) be employed to minimize noise impacts from the proposed project. This preliminary analysis, however, will be aided when a complete description of the materials to be used for the proposed project are provided.

If no response to this request for additional information is received within 45 days, we will assume the consultation is no longer active. We will then close out the consultation request. Please note this 45-day period has been established as a national policy.

Once we have the response to the above questions, I will be able to move forward with this consultation.

Thank you and be well,

Sarah

--

Sarah Garvin  
Section 7 Biologist  
Interagency Cooperation Branch  
National Marine Fisheries Service  
Southeast Regional Office  
Protected Resources  
phone: 727/631-7657  
email: [sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)

**[Section 7 Guidance Webpage - UPDATED URL](#)**

**[Action Agencies, want your consultations quicker? Check out the Expedited process!](#)**





**From:** [Beckham, Chris](#)  
**To:** [sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)  
**Cc:** [karla.reece@noaa.gov](mailto:karla.reece@noaa.gov); [Belcher, Jeffery - FHWA](#); [Gordon Murphy](#)  
**Subject:** SERO-2020-02072 US 278 Corridor Improvements  
**Date:** Thursday, November 5, 2020 7:43:54 AM  
**Attachments:** [US 278 Biological Evaluation Addendum .pdf](#)

---

Hello Sarah,

Please find the attached addendum to the biological evaluation for the US 278 Corridor Improvements project in Beaufort County. This addendum includes updates to the previously submitted biological evaluation and contains the information requested in your email sent to us on September 28, 2020. If you need any additional information or have any further questions about the project, let me know.

Thanks,

Chris Beckham  
SCDOT  
Environmental Services Office  
Office: (803) 737-1332  
Mobile: (803) 609-9464

## NMFS RAI 2

**From:** [Beckham, Chris](#)  
**To:** [Gordon Murphy](#)  
**Subject:** FW: SERO-2020-02072 US 278 Corridor Improvements  
**Date:** Thursday, November 12, 2020 7:21:46 AM

---

Here are two additional questions from Sarah.

---

**From:** Sarah Garvin - NOAA Affiliate <[sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)>  
**Sent:** Wednesday, November 11, 2020 2:11 PM  
**To:** Beckham, Chris <[BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)>  
**Subject:** Re: SERO-2020-02072 US 278 Corridor Improvements

\*\*\* This is an EXTERNAL email. Please do not click on a link or open any attachments unless you are confident it is from a trusted source. \*\*\*

Hi Chris --

This is great info. Thank you. A few more quick questions.

1. What is the bank-to-bank distance across MacKay Creek, Skull Creek, and the cove over which the Connector Bridge will be constructed?
3. What is the overwater clearance of the proposed new connector bridge between Jenkins and Hog Islands?

These final details will help me complete my analysis.

Thank you!

Sarah

On Tue, Nov 10, 2020 at 11:28 AM Beckham, Chris <[BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)> wrote:

Hey Sarah,

I reached out to our consultants and design engineers to get some additional information about the project. The attached pdf document contains answers to the questions in your email. I also attached the bridge plan and profile sheets for the existing bridges over Mackay Creek and Skull Creek. If you need anything else to complete your review, let me know.

Thanks,  
Chris

---

**From:** Sarah Garvin - NOAA Affiliate <[sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)>  
**Sent:** Thursday, November 5, 2020 12:12 PM  
**To:** Beckham, Chris <[BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)>  
**Subject:** Re: SERO-2020-02072 US 278 Corridor Improvements

\*\*\* This is an EXTERNAL email. Please do not click on a link or open any attachments unless you are confident it is from a trusted source. \*\*\*

Good Morning, Chris --

Thank you for this. After reviewing the information you provided, I am still looking for more specifics concerning the following.

1. Please provide a complete description of the existing proposed project site.

a. What are the size and dimensions of the existing bridges to be removed?

b. Out of what materials are the existing bridges constructed?

c. How many piles and bents support each structure proposed for removal?

d. How old are the existing structures?

e. What is the over water area of the existing bridges?

f. What height over the water are the existing bridges?

\*\*\*\*Basically, I need to be able to compare the proposed new structures to the existing structures to evaluate impacts.

2. It is very unclear from all of the information provided which piles and how many of each will be used for which portion of the proposed bridge replacement. From what I can gather, below is how I would summarize that information for each proposed section of the project.

a. Temporary work trestles, 24" steel pipe piles, 712 total to be installed (see Section 7 checklist)

b. MacKay/Skull Creek Segments, 72-in and/or 96-in diameter drilled shafts/steel casings, estimated total of 126 and 238 of each size, respectively

c. Connector Bridge, 24-in prestressed concrete piles, 80 total piles to be installed

\*\*\*\*Please review this for accuracy and provide any corrections.

3. What is the offset of the new bridges from the existing bridges? E.g., "The new bridges will be constructed in a roadway alignment 50-ft-downstream (south) of the existing bridges. The replacement bridges will be built parallel to the existing bridges prior to demolition activities to maintain traffic flow during this project."

Once we have the response to the above questions, I will be able to move forward with this consultation.

Thank you and be well,  
Sarah

On Thu, Nov 5, 2020 at 7:45 AM Beckham, Chris <[BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)> wrote:

Hello Sarah,

Please find the attached addendum to the biological evaluation for the US 278 Corridor Improvements project in Beaufort County. This addendum includes updates to the previously submitted biological evaluation and contains the information requested in your email sent to us on September 28, 2020. If you need any additional information or have any further questions about the project, let me know.

Thanks,



Chris Beckham  
SCDOT  
Environmental Services Office  
Office: (803) 737-1332  
Mobile: (803) 609-9464

--

Sarah Garvin  
Section 7 Biologist  
Interagency Cooperation Branch  
National Marine Fisheries Service  
Southeast Regional Office  
Protected Resources  
phone: 727/631-7657  
email: [sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)

**[Section 7 Guidance Webpage - UPDATED URL](#)**

**[Action Agencies, want your consultations quicker? Check out the Expedited process!](#)**



This is a U.S. government email account. Your emails to this address may be reviewed or archived.  
Please do not send inappropriate material. Thank you.

--

Sarah Garvin  
Section 7 Biologist  
Interagency Cooperation Branch  
National Marine Fisheries Service  
Southeast Regional Office  
Protected Resources  
phone: 727/631-7657  
email: [sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)

**[Section 7 Guidance Webpage - UPDATED URL](#)**

**[Action Agencies, want your consultations quicker? Check out the Expedited process!](#)**



This is a U.S. government email account. Your emails to this address may be reviewed or archived.  
Please do not send inappropriate material. Thank you.

**From:** [Beckham, Chris](#)  
**To:** [Sarah Garvin - NOAA Affiliate](#)  
**Subject:** RE: SERO-2020-02072 US 278 Corridor Improvements  
**Attachments:** [11-12-20 NMFS Response.docx](#)

---

Good morning Sarah,

The attached document has the answers to your questions.

Chris

---

**From:** Sarah Garvin - NOAA Affiliate <sarah.garvin@noaa.gov>  
**Sent:** Wednesday, November 11, 2020 2:11 PM  
**To:** Beckham, Chris <BeckhamJC@scdot.org>  
**Subject:** Re: SERO-2020-02072 US 278 Corridor Improvements

\*\*\* This is an EXTERNAL email. Please do not click on a link or open any attachments unless you are confident it is from a trusted source. \*\*\*

Hi Chris --

This is great info. Thank you. A few more quick questions.

1. What is the bank-to-bank distance across MacKay Creek, Skull Creek, and the cove over which the Connector Bridge will be constructed?
3. What is the overwater clearance of the proposed new connector bridge between Jenkins and Hog Islands?

These final details will help me complete my analysis.  
Thank you!  
Sarah

On Tue, Nov 10, 2020 at 11:28 AM Beckham, Chris <[BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)> wrote:

Hey Sarah,

I reached out to our consultants and design engineers to get some additional information about the project. The attached pdf document contains answers to the questions in your email. I also attached the bridge plan and profile sheets for the existing bridges over Mackay Creek and Skull Creek. If you need anything else to complete your review, let me know.

Thanks,  
Chris

---

**From:** Sarah Garvin - NOAA Affiliate <[sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)>

**Sent:** Thursday, November 5, 2020 12:12 PM

**To:** Beckham, Chris <[BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)>

**Subject:** Re: SERO-2020-02072 US 278 Corridor Improvements

\*\*\* This is an EXTERNAL email. Please do not click on a link or open any attachments unless you are confident it is from a trusted source. \*\*\*

Good Morning, Chris --

Thank you for this. After reviewing the information you provided, I am still looking for more specifics concerning the following.

1. Please provide a complete description of the existing proposed project site.

a. What are the size and dimensions of the existing bridges to be removed?

b. Out of what materials are the existing bridges constructed?

c. How many piles and bents support each structure proposed for removal?

d. How old are the existing structures?

e. What is the over water area of the existing bridges?

f. What height over the water are the existing bridges?

\*\*\*\*Basically, I need to be able to compare the proposed new structures to the existing structures to evaluate impacts.

2. It is very unclear from all of the information provided which piles and how many of each will be used for which portion of the proposed bridge replacement. From what I can gather, below is how I would summarize that information for each proposed section of the project.

a. Temporary work trestles, 24" steel pipe piles, 712 total to be installed (see Section 7 checklist)

b. MacKay/Skull Creek Segments, 72-in and/or 96-in diameter drilled shafts/steel casings, estimated total of 126 and 238 of each size, respectively

c. Connector Bridge, 24-in prestressed concrete piles, 80 total piles to be installed

\*\*\*\*Please review this for accuracy and provide any corrections.

3. What is the offset of the new bridges from the existing bridges? E.g., "The new bridges will be constructed in a roadway alignment 50-ft-downstream (south) of the existing bridges. The replacement bridges will be built parallel to the existing bridges prior to demolition activities to maintain traffic flow during this project."

Once we have the response to the above questions, I will be able to move forward with this consultation.

Thank you and be well,  
Sarah

On Thu, Nov 5, 2020 at 7:45 AM Beckham, Chris <[BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)> wrote:

Hello Sarah,

Please find the attached addendum to the biological evaluation for the US 278 Corridor Improvements project in Beaufort County. This addendum includes updates to the previously submitted biological evaluation and contains the information requested in your

email sent to us on September 28, 2020. If you need any additional information or have any further questions about the project, let me know.

Thanks,

Chris Beckham  
SCDOT  
Environmental Services Office  
Office: (803) 737-1332  
Mobile: (803) 609-9464

--

Sarah Garvin  
Section 7 Biologist  
Interagency Cooperation Branch  
National Marine Fisheries Service  
Southeast Regional Office  
Protected Resources  
phone: 727/631-7657  
email: [sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)

**[Section 7 Guidance Webpage - UPDATED URL](#)**

**[Action Agencies, want your consultations quicker? Check out the Expedited process!](#)**



This is a U.S. government email account. Your emails to this address may be reviewed or archived. Please do not send inappropriate material. Thank you.

--

Sarah Garvin  
Section 7 Biologist  
Interagency Cooperation Branch  
National Marine Fisheries Service  
Southeast Regional Office  
Protected Resources  
phone: 727/631-7657  
email: [sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)

**[Section 7 Guidance Webpage - UPDATED URL](#)**

**[Action Agencies, want your consultations quicker? Check out the Expedited process!](#)**





1. What is the bank-to-bank distance across MacKay Creek, Skull Creek, and the cove over which the Connector Bridge will be constructed?
  - Mackay Creek: 2,107 feet
  - Skull Creek: 763 feet
  - Cove: 388 feet
2. What is the overwater clearance of the proposed new connector bridge between Jenkins and Hog Islands?
  - At high tide the clearance will be approximately 5 feet
  - At mean high tide the clearance will be approximately 9 feet
  - At low tide no water is present and the clearance above the ground will be approximately 10 feet

## NMFS RAI 3

**From:** [Beckham, Chris](#)  
**To:** [Gordon Murphy](#)  
**Cc:** [Belcher, Jeffery - FHWA](#)  
**Subject:** Fwd: SERO-2020-02072 US 278 Corridor Improvements  
**Date:** Thursday, November 5, 2020 12:59:26 PM

---

FYI... additional info requested from NMFS. Gordon, I'll give you a call to discuss on Monday.

Sent from my iPhone

Begin forwarded message:

**From:** Sarah Garvin - NOAA Affiliate <sarah.garvin@noaa.gov>  
**Date:** November 5, 2020 at 12:12:04 PM EST  
**To:** "Beckham, Chris" <BeckhamJC@scdot.org>  
**Subject:** Re: SERO-2020-02072 US 278 Corridor Improvements

\*\*\* This is an EXTERNAL email. Please do not click on a link or open any attachments unless you are confident it is from a trusted source. \*\*\*

Good Morning, Chris --

Thank you for this. After reviewing the information you provided, I am still looking for more specifics concerning the following.

1. Please provide a complete description of the existing proposed project site.
  - a. What are the size and dimensions of the existing bridges to be removed?
  - b. Out of what materials are the existing bridges constructed?
  - c. How many piles and bents support each structure proposed for removal?
  - d. How old are the existing structures?
  - e. What is the over water area of the existing bridges?
  - f. What height over the water are the existing bridges?

\*\*\*\*Basically, I need to be able to compare the proposed new structures to the existing structures to evaluate impacts.

2. It is very unclear from all of the information provided which piles and how many of each will be used for which portion of the proposed bridge replacement. From what I can gather, below is how I would summarize that information for each proposed section of the project.

- a. Temporary work trestles, 24" steel pipe piles, 712 total to be installed (see Section 7 checklist)
- b. MacKay/Skull Creek Segments, 72-in and/or 96-in diameter drilled shafts/steel casings, estimated total of 126 and 238 of each size, respectively
- c. Connector Bridge, 24-in prestressed concrete piles, 80 total piles to be installed

\*\*\*\*Please review this for accuracy and provide any corrections.

3. What is the offset of the new bridges from the existing bridges? E.g., "The new bridges will be constructed in a roadway alignment 50-ft-downstream (south) of the existing bridges. The replacement bridges will be built parallel to the existing bridges prior to demolition activities to maintain traffic flow during this project."

Once we have the response to the above questions, I will be able to move forward with this consultation.

Thank you and be well,  
Sarah

On Thu, Nov 5, 2020 at 7:45 AM Beckham, Chris <[BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)> wrote:

Hello Sarah,

Please find the attached addendum to the biological evaluation for the US 278 Corridor Improvements project in Beaufort County. This addendum includes updates to the previously submitted biological evaluation and contains the information requested in your email sent to us on September 28, 2020. If you need any additional information or have any further questions about the project, let me know.

Thanks,

Chris Beckham

SCDOT

Environmental Services Office

Office: (803) 737-1332

Mobile: (803) 609-9464

--

Sarah Garvin  
Section 7 Biologist  
Interagency Cooperation Branch  
National Marine Fisheries Service  
Southeast Regional Office  
Protected Resources



phone: 727/631-7657  
email: [sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)

**[Section 7 Guidance Webpage - UPDATED URL](#)**

**[Action Agencies, want your consultations quicker? Check out the Expedited process!](#)**



This is a U.S. government email account. Your emails to this address may be reviewed or archived. Please do not send inappropriate material. Thank you.

**From:** [Beckham, Chris](#)  
**To:** [Sarah Garvin - NOAA Affiliate](#)  
**Subject:** RE: SERO-2020-02072 US 278 Corridor Improvements  
**Attachments:** [Specific NMFS questions.pdf](#)  
[Mackay Creek Bridge Plan & Profile 1981.pdf](#)  
[Skull Creek Bridge Plan & Profile 1981.pdf](#)

---

Hey Sarah,

I reached out to our consultants and design engineers to get some additional information about the project. The attached pdf document contains answers to the questions in your email. I also attached the bridge plan and profile sheets for the existing bridges over Mackay Creek and Skull Creek. If you need anything else to complete your review, let me know.

Thanks,  
Chris

---

**From:** Sarah Garvin - NOAA Affiliate <sarah.garvin@noaa.gov>  
**Sent:** Thursday, November 5, 2020 12:12 PM  
**To:** Beckham, Chris <BeckhamJC@scdot.org>  
**Subject:** Re: SERO-2020-02072 US 278 Corridor Improvements

\*\*\* This is an EXTERNAL email. Please do not click on a link or open any attachments unless you are confident it is from a trusted source. \*\*\*

Good Morning, Chris --

Thank you for this. After reviewing the information you provided, I am still looking for more specifics concerning the following.

1. Please provide a complete description of the existing proposed project site.
  - a. What are the size and dimensions of the existing bridges to be removed?
  - b. Out of what materials are the existing bridges constructed?
  - c. How many piles and bents support each structure proposed for removal?
  - d. How old are the existing structures?
  - e. What is the over water area of the existing bridges?
  - f. What height over the water are the existing bridges?

\*\*\*\*Basically, I need to be able to compare the proposed new structures to the existing structures to evaluate impacts.

2. It is very unclear from all of the information provided which piles and how many of each will be used for which portion of the proposed bridge replacement. From what I can gather, below is how I would summarize that information for each proposed section of the project.
  - a. Temporary work trestles, 24" steel pipe piles, 712 total to be installed (see Section 7 checklist)
  - b. MacKay/Skull Creek Segments, 72-in and/or 96-in diameter drilled shafts/steel casings, estimated total of 126 and 238 of each size, respectively

c. Connector Bridge, 24-in prestressed concrete piles, 80 total piles to be installed  
\*\*\*\*Please review this for accuracy and provide any corrections.

3. What is the offset of the new bridges from the existing bridges? E.g., "The new bridges will be constructed in a roadway alignment 50-ft-downstream (south) of the existing bridges. The replacement bridges will be built parallel to the existing bridges prior to demolition activities to maintain traffic flow during this project."

Once we have the response to the above questions, I will be able to move forward with this consultation.

Thank you and be well,  
Sarah

On Thu, Nov 5, 2020 at 7:45 AM Beckham, Chris <[BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)> wrote:

Hello Sarah,

Please find the attached addendum to the biological evaluation for the US 278 Corridor Improvements project in Beaufort County. This addendum includes updates to the previously submitted biological evaluation and contains the information requested in your email sent to us on September 28, 2020. If you need any additional information or have any further questions about the project, let me know.

Thanks,

Chris Beckham  
SCDOT  
Environmental Services Office  
Office: (803) 737-1332  
Mobile: (803) 609-9464

--

Sarah Garvin  
Section 7 Biologist  
Interagency Cooperation Branch  
National Marine Fisheries Service  
Southeast Regional Office  
Protected Resources  
phone: 727/631-7657  
email: [sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)

**[Section 7 Guidance Webpage - UPDATED URL](#)**

**[Action Agencies, want your consultations quicker? Check out the Expedited process!](#)**



This is a U.S. government email account. Your emails to this address may be reviewed or archived. Please do not send inappropriate material. Thank you.

**1. Please provide a complete description of the existing proposed project site.**

**a. What are the size and dimensions of the existing bridges to be removed?**

- *Eastbound Mackay Creek bridge 2,190 feet long; 36.1 feet wide*
- *Westbound Mackay Creek bridge 2,231 feet long; 36.1 feet wide*
- *Eastbound Skull Creek bridge 2,821.9 feet long; 36.1 feet wide*
- *Westbound Skull Creek bridge 2,821.9 feet long; 36.1 feet wide*

**b. Out of what materials are the existing bridges constructed?**

- *Mackay Creek bridges are concrete*
- *Skull Creek bridges are concrete with steel girders*

**c. How many piles and bents support each structure proposed for removal?**

<b>Westbound Mackay Creek</b>		
Type	Quantity	Bents
18" PSC Square Piles	372	51
<b>Eastbound Mackay Creek</b>		
Type	Quantity	Bents
18" PSC Square Piles	276	51
<b>Westbound Skull Creek</b>		
Type	Quantity	Bents
18" PSC Square Piles	300	12
20" PSC Square Piles	190	6
HP 10x42	248	4
<b>Eastbound Skull Creek</b>		
Type	Quantity	Bents
18" PSC Square Piles	300	12
20" PSC Square Piles	190	6
HP 10x42	248	4

**d. How old are the existing structures?**

- *Eastbound Mackay Creek bridge built in 1956*
- *Westbound Mackay Creek bridge built in 1983*
- *East and westbound Skull Creek bridges built in 1982*

**e. What is the over water area of the existing bridges?**

- *Mackay Creek bridge is approximately 3.5 acres at high tide*
- *Skull Creek bridge is approximately 3.3 acres at high tide*



**f. What height over the water are the existing bridges?**

- Mackay Creek bridge substructure is approximately 25 feet above mean high tide (see attached plan and profile)
- Skull Creek bridge substructure is approximately 65 feet above mean high tide (see attached plan and profile)

**2. It is very unclear from all of the information provided which piles and how many of each will be used for which portion of the proposed bridge replacement. From what I can gather, below is how I would summarize that information for each proposed section of the project.**

**a. Temporary work trestles, 24" steel pipe piles, 712 total to be installed (see Section 7 checklist)**

- 506 total 24" pipe piles (see Table 5-1, page 6 of the BE Addendum)

**b. MacKay/Skull Creek Segments, 72-in and/or 96-in diameter drilled shafts/steel casings, estimated total of 126 and 238 of each size, respectively**

*The bridge design has undergone revisions in recent weeks. These revisions include a lengthening of spans from 100 feet to 175 feet long, thereby reducing the number of bents and piles required to support the replacement bridge, and the bridge has been lengthened on either end which will reduce the earthen fill previously designated in estuarine habitats (see Figure 6 of the BE Addendum). As a result of the design modifications, 120-inch drilled shaft/casing will be required in Skull Creek. Following are the updated drilled shaft/steel casings for estuarine habitats.*

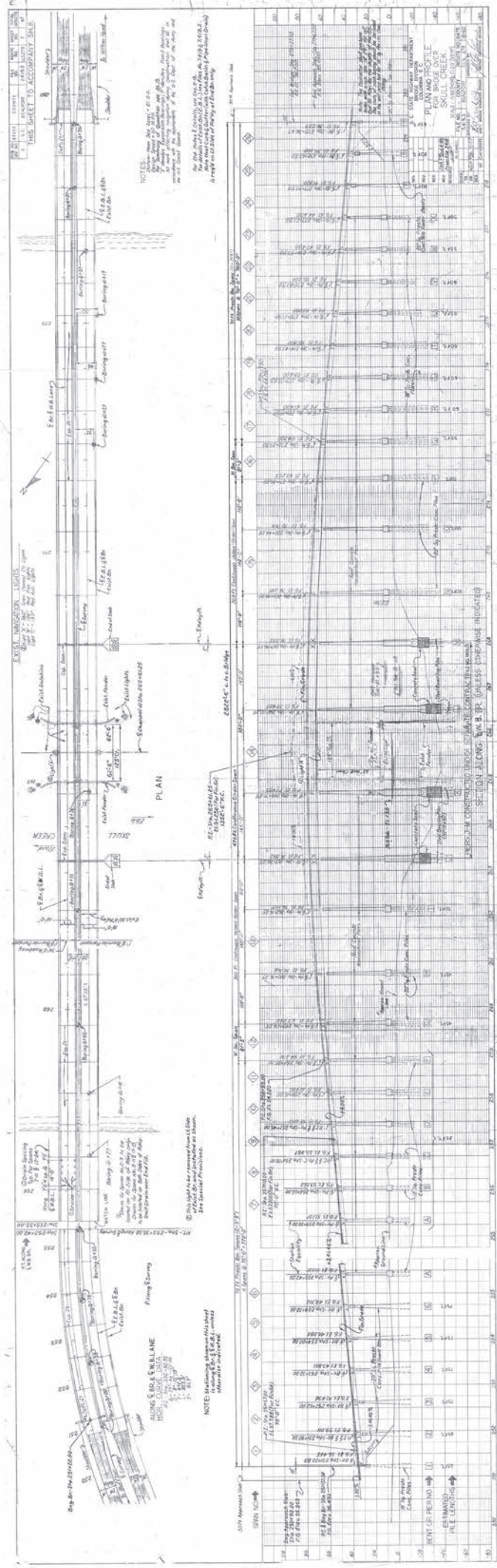
DS Casing	Habitat	Quantity	Location
72"	Emergent Estuarine	8	Between Hog and Jenkins Islands
72"	Emergent Estuarine	27	Adjacent to Mackay Creek
72"	Mackay Creek	42	
96"	Mackay Creek	36	
96"	Emergent Estuarine	26	Adjacent to Skull Creek
120"	Skull Creek	24	

**c. Connector Bridge, 24-in prestressed concrete piles, 80 total piles to be installed**

- This is correct.

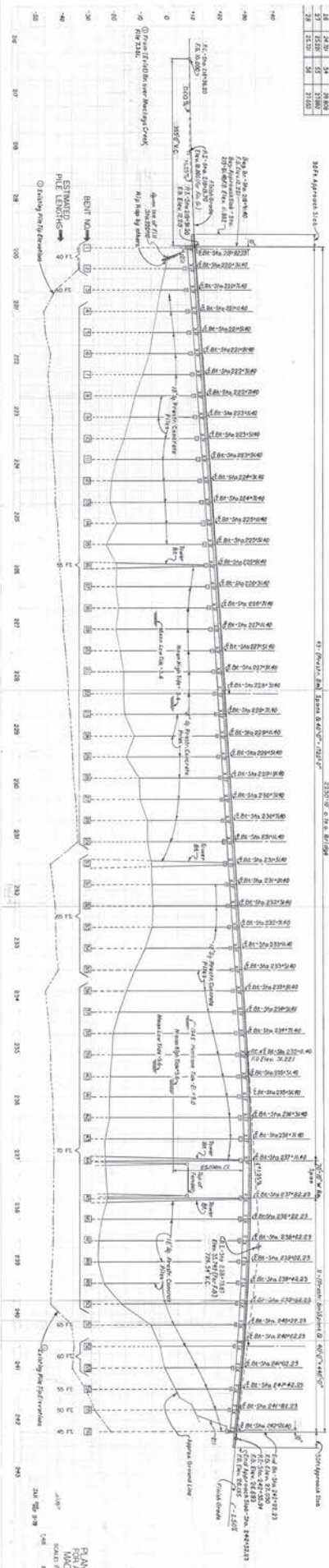
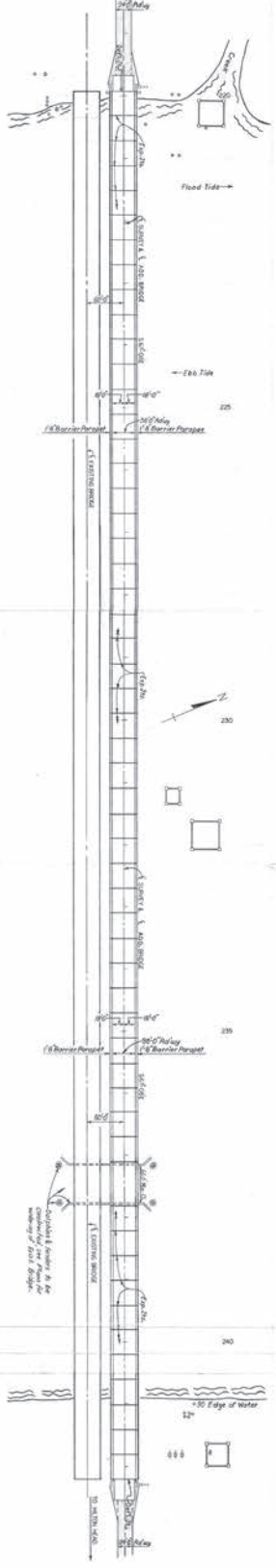
**3. What is the offset of the new bridges from the existing bridges? E.g., "The new bridges will be constructed in a roadway alignment 50-ft-downstream (south) of the existing bridges. The replacement bridges will be built parallel to the existing bridges prior to demolition activities to maintain traffic flow during this project."**

- *The new bridge will be constructed parallel to and approximately 55 feet southwest of the existing structures. The existing structures will remain open to traffic until such time traffic can be shifted onto the new structure prior to demolition.*



FROM COAST ELEVATIONS

1	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00	11.00	12.00	13.00	14.00	15.00	16.00	17.00	18.00	19.00	20.00	21.00	22.00	23.00	24.00	25.00	26.00	27.00	28.00	29.00	30.00	31.00	32.00	33.00	34.00	35.00	36.00	37.00	38.00	39.00	40.00	41.00	42.00	43.00	44.00	45.00	46.00	47.00	48.00	49.00	50.00	51.00	52.00	53.00	54.00	55.00	56.00	57.00	58.00	59.00	60.00	61.00	62.00	63.00	64.00	65.00	66.00	67.00	68.00	69.00	70.00	71.00	72.00	73.00	74.00	75.00	76.00	77.00	78.00	79.00	80.00	81.00	82.00	83.00	84.00	85.00	86.00	87.00	88.00	89.00	90.00	91.00	92.00	93.00	94.00	95.00	96.00	97.00	98.00	99.00	100.00
---	------	------	------	------	------	------	------	------	------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------	--------



PLAN AND PROFILE  
 FROM COAST ELEVATIONS  
 SCALE: 1" = 100'



## NMFS RAI 4

**From:** [Beckham, Chris](#)  
**To:** [Gordon Murphy](#)  
**Subject:** Fwd: SERO-2020-02072 US 278 Corridor Improvements  
**Date:** Tuesday, November 17, 2020 10:16:13 AM

---

Gordon, please see the forwarded email. NMFS has requested additional information on 278.

Sent from my iPhone

Begin forwarded message:

**From:** Sarah Garvin - NOAA Affiliate <sarah.garvin@noaa.gov>  
**Date:** November 17, 2020 at 10:08:54 AM EST  
**To:** "Beckham, Chris" <BeckhamJC@scdot.org>  
**Subject:** Re: SERO-2020-02072 US 278 Corridor Improvements

\*\*\* This is an EXTERNAL email. Please do not click on a link or open any attachments unless you are confident it is from a trusted source. \*\*\*

Hi Chris --

I know we have had a lot of back and forth on this project. There is a lot of documentation to sift through. Some additional concerns have arisen regarding pile driving and noise impacts.

I need clarification on how the 72-inch and larger drill shaft/steel casings are going to be installed. I also need to know whether these casings are temporary or permanent. The biological evaluations provided do not clarify many construction details because these documents focus mostly on where impacts may occur, instead of what specific construction activities are causing impacts. The installation method referred to in the information provided thus far is the use of vibratory and impact hammers for all drill shafts/steel casings. The area of potential noise impacts from this installation method are quite large, even with the combined, concurrent use of wood cushion blocks AND bubble curtains during installation.

If possible, please provide a complete and thorough description of the stepwise methodology for how the 72-inch and larger drill shaft/steel casing piles and bents will be installed in MacKay and Skull Creeks. A complete, stepwise description of the methodology will help us assess the area of potential noise impacts to listed fish and sea turtle species. If these impacts cannot be mitigated because of the methods required for installation, this project may no longer qualify for an informal consultation.

Thank you,  
Sarah

On Mon, Nov 16, 2020 at 7:14 AM Beckham, Chris <[BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)> wrote:

Good morning Sarah,

The attached document has the answers to your questions.

Chris

---

**From:** Sarah Garvin - NOAA Affiliate <[sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)>

**Sent:** Wednesday, November 11, 2020 2:11 PM

**To:** Beckham, Chris <[BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)>

**Subject:** Re: SERO-2020-02072 US 278 Corridor Improvements

\*\*\* This is an EXTERNAL email. Please do not click on a link or open any attachments unless you are confident it is from a trusted source. \*\*\*

Hi Chris --

This is great info. Thank you. A few more quick questions.

1. What is the bank-to-bank distance across MacKay Creek, Skull Creek, and the cove over which the Connector Bridge will be constructed?

3. What is the overwater clearance of the proposed new connector bridge between Jenkins and Hog Islands?

These final details will help me complete my analysis.

Thank you!

Sarah

On Tue, Nov 10, 2020 at 11:28 AM Beckham, Chris <[BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)> wrote:

Hey Sarah,

I reached out to our consultants and design engineers to get some additional information about the project. The attached pdf document contains answers to the questions in your email. I also attached the bridge plan and profile sheets for the existing bridges over Mackay Creek and Skull Creek. If you need anything else to complete your review, let me know.

Thanks,

Chris

---

**From:** Sarah Garvin - NOAA Affiliate <[sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)>

**Sent:** Thursday, November 5, 2020 12:12 PM

**To:** Beckham, Chris <[BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)>

**Subject:** Re: SERO-2020-02072 US 278 Corridor Improvements

\*\*\* This is an EXTERNAL email. Please do not click on a link or open any attachments unless you are confident it is from a trusted source. \*\*\*

Good Morning, Chris --

Thank you for this. After reviewing the information you provided, I am still looking for more specifics concerning the following.

1. Please provide a complete description of the existing proposed project site.
  - a. What are the size and dimensions of the existing bridges to be removed?
  - b. Out of what materials are the existing bridges constructed?



- c. How many piles and bents support each structure proposed for removal?
- d. How old are the existing structures?
- e. What is the over water area of the existing bridges?
- f. What height over the water are the existing bridges?

\*\*\*\*Basically, I need to be able to compare the proposed new structures to the existing structures to evaluate impacts.

2. It is very unclear from all of the information provided which piles and how many of each will be used for which portion of the proposed bridge replacement. From what I can gather, below is how I would summarize that information for each proposed section of the project.

- a. Temporary work trestles, 24" steel pipe piles, 712 total to be installed (see Section 7 checklist)
- b. MacKay/Skull Creek Segments, 72-in and/or 96-in diameter drilled shafts/steel casings, estimated total of 126 and 238 of each size, respectively
- c. Connector Bridge, 24-in prestressed concrete piles, 80 total piles to be installed

\*\*\*\*Please review this for accuracy and provide any corrections.

3. What is the offset of the new bridges from the existing bridges? E.g., "The new bridges will be constructed in a roadway alignment 50-ft-downstream (south) of the existing bridges. The replacement bridges will be built parallel to the existing bridges prior to demolition activities to maintain traffic flow during this project."

Once we have the response to the above questions, I will be able to move forward with this consultation.

Thank you and be well,

Sarah

On Thu, Nov 5, 2020 at 7:45 AM Beckham, Chris <[BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)> wrote:

Hello Sarah,

Please find the attached addendum to the biological evaluation for the US 278 Corridor Improvements project in Beaufort County. This addendum includes updates to the previously submitted biological evaluation and contains the information requested in your email sent to us on September 28, 2020. If you need any additional information or have any further questions about the project, let me know.

Thanks,

Chris Beckham

SCDOT

Environmental Services Office

Office: (803) 737-1332

Mobile: (803) 609-9464

--

Sarah Garvin

Section 7 Biologist

Interagency Cooperation Branch

National Marine Fisheries Service

Southeast Regional Office

Protected Resources

phone: 727/631-7657

email: [sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)

**[Section 7 Guidance Webpage - UPDATED URL](#)**

**[Action Agencies, want your consultations quicker? Check out the Expedited process!](#)**

This is a U.S. government email account. Your emails to this address may be reviewed or archived. Please do not send inappropriate material. Thank you.

--

Sarah Garvin

Section 7 Biologist

Interagency Cooperation Branch

National Marine Fisheries Service

Southeast Regional Office

Protected Resources

phone: 727/631-7657

email: [sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)

**[Section 7 Guidance Webpage - UPDATED URL](#)**

**[Action Agencies, want your consultations quicker? Check out the Expedited process!](#)**

This is a U.S. government email account. Your emails to this address may be reviewed or archived. Please do not send inappropriate material. Thank you.

--

Sarah Garvin  
Section 7 Biologist

Interagency Cooperation Branch  
National Marine Fisheries Service  
Southeast Regional Office  
Protected Resources  
phone: 727/631-7657  
email: [sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)

**[Section 7 Guidance Webpage - UPDATED URL](#)**

**[Action Agencies, want your consultations quicker? Check out the Expedited process!](#)**



This is a U.S. government email account. Your emails to this address may be reviewed or archived. Please do not send inappropriate material. Thank you.

## **Project Team/NMFS Conference Call**



**From:** [Russell Chandler](#)  
**To:** [Gordon Murphy](#)  
**Cc:** [Wade Biltoft](#)  
**Subject:** FW: SERO-2020-02072 US 278 Corridor Improvements  
**Date:** Thursday, January 7, 2021 3:05:41 PM  
**Attachments:** [US278 Pile Types and Construction Conditions.docx](#)

---

---

**From:** Sarah Garvin - NOAA Affiliate <[sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)>  
**Sent:** Thursday, January 7, 2021 11:56 AM  
**To:** Beckham, Chris <[BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)>; Russell Chandler <[russell.chandler@threeoaksengineering.com](mailto:russell.chandler@threeoaksengineering.com)>  
**Subject:** Re: SERO-2020-02072 US 278 Corridor Improvements

Hi Chris, Russell --

Thanks for the call just now. That was helpful for me, and I hope it was for you all, too. Just to reiterate what we discussed, I'm looking for specifics on how the larger pilings will be installed. I attached a table with the information I am including in my consultation to help guide you in your discussions with your team.

As discussed today, use of an impact hammer for these large pilings would result in the largest noise impacts to listed sea turtle and fish species. Therefore, we are looking for installation methods that minimize these effects. Drilling/augering these piles would be the very best case scenario. Vibration only or cofferdams/isolation casings would be the next best option for installation of these larger pilings.

In the attached document, I also included the construction conditions (BMPs) already agreed to in previous emails pertaining to this consultation request. The biggest concern for keeping this consultation informal is minimizing noise impacts to ESA-listed fish and sea turtle species resulting from the installation of 72-in and larger drilled shaft/steel casings.

If you have additional questions, please contact me. Your timeline has reset for this consultation request, with a new 45-day period beginning today. I am happy to keep momentum going and getting this project closed out. Thank you for all of your cooperation!

Sarah

On Wed, Jan 6, 2021 at 9:28 AM Beckham, Chris <[BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)> wrote:

Thanks for working with us on this. I reached out to the consultants and they are going to be contacting you to set up a call this week.

---

**From:** Sarah Garvin - NOAA Affiliate <[sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)>  
**Sent:** Tuesday, January 5, 2021 3:58 PM

**To:** Beckham, Chris <[BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)>

**Subject:** Re: SERO-2020-02072 US 278 Corridor Improvements

\*\*\* This is an EXTERNAL email. Please do not click on a link or open any attachments unless you are confident it is from a trusted source. \*\*\*

Hi Chris --

Thank you for the call today. I heard back from my supervisor about how to proceed with the 45-day deadline and reinitiation. If we could connect this week some time with your consultants, we might be able to find a way to move forward with the current request. Even if we can get to a range of potential options for piling installation and noise abatement methods that may be used, I can proceed with an analysis of the worst case scenario. Anytime between 9 AM and 2 PM Eastern is best most days for my availability for a conference call.

Thank you,  
Sarah

On Tue, Jan 5, 2021 at 10:18 AM Sarah Garvin - NOAA Affiliate <[sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)> wrote:

Hi Chris --

Happy New Year! I hope you enjoyed the holidays. I would still very much like to get this consultation taken care of for you. The 45-day deadline at which we must close out the consultation as inactive as part of NMFS's nationwide policy is \*tomorrow\*. Please see my previous email on this chain for the information I still need to complete this consultation. If you have questions, please feel free to call me at 727-631-7657.

Sincerely,  
Sarah

On Thu, Nov 19, 2020 at 9:27 AM Beckham, Chris <[BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)> wrote:

Sarah,

We are currently in the NEPA phase for this project, and we have not completed the final construction plans for the bridges. When SCDOT projects are developed, we don't usually have a lot of specific information on construction methods during the NEPA phase, and that is why some of the details were not included in the BA. I have forwarded your questions and concerns on to our engineering/design team for consideration. I am hoping that they will be able to address these concerns so the project can continue to move forward. I should have a response back from them soon, and I will forward the information on to you for review.

Thanks,  
Chris

---

**From:** Sarah Garvin - NOAA Affiliate <[sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)>  
**Sent:** Tuesday, November 17, 2020 10:09 AM  
**To:** Beckham, Chris <[BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)>  
**Subject:** Re: SERO-2020-02072 US 278 Corridor Improvements

\*\*\* This is an EXTERNAL email. Please do not click on a link or open any attachments unless you are confident it is from a trusted source. \*\*\*

Hi Chris --

I know we have had a lot of back and forth on this project. There is a lot of documentation to sift through. Some additional concerns have arisen regarding pile driving and noise impacts.

I need clarification on how the 72-inch and larger drill shaft/steel casings are going to be installed. I also need to know whether these casings are temporary or permanent. The biological evaluations provided do not clarify many construction details because these documents focus mostly on where impacts may occur, instead of what specific construction activities are causing impacts. The installation method referred to in the information provided thus far is the use of vibratory and impact hammers for all drill shafts/steel casings. The area of potential noise impacts from this installation method are quite large, even with the combined, concurrent use of wood cushion blocks AND bubble curtains during installation.

If possible, please provide a complete and thorough description of the stepwise methodology for how the 72-inch and larger drill shaft/steel casing piles and bents will be installed in MacKay and Skull Creeks. A complete, stepwise description of the methodology will help us assess the area of potential noise impacts to listed fish and sea turtle species. If these impacts cannot be mitigated because of the methods required for installation, this project may no longer qualify for an informal consultation.

Thank you,  
Sarah

On Mon, Nov 16, 2020 at 7:14 AM Beckham, Chris <[BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)> wrote:

Good morning Sarah,

The attached document has the answers to your questions.

Chris

---

**From:** Sarah Garvin - NOAA Affiliate <[sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)>  
**Sent:** Wednesday, November 11, 2020 2:11 PM  
**To:** Beckham, Chris <[BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)>  
**Subject:** Re: SERO-2020-02072 US 278 Corridor Improvements

\*\*\* This is an EXTERNAL email. Please do not click on a link or open any attachments unless you are confident it is from a trusted source. \*\*\*

Hi Chris --

This is great info. Thank you. A few more quick questions.

1. What is the bank-to-bank distance across MacKay Creek, Skull Creek, and the cove over which the Connector Bridge will be constructed?

3. What is the overwater clearance of the proposed new connector bridge between Jenkins and Hog Islands?

These final details will help me complete my analysis.

Thank you!

Sarah

On Tue, Nov 10, 2020 at 11:28 AM Beckham, Chris <[BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)> wrote:

Hey Sarah,

I reached out to our consultants and design engineers to get some additional information about the project. The attached pdf document contains answers to the questions in your email. I also attached the bridge plan and profile sheets for the existing bridges over Mackay Creek and Skull Creek. If you need anything else to complete your review, let me know.

Thanks,  
Chris

---

**From:** Sarah Garvin - NOAA Affiliate <[sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)>

**Sent:** Thursday, November 5, 2020 12:12 PM

**To:** Beckham, Chris <[BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)>

**Subject:** Re: SERO-2020-02072 US 278 Corridor Improvements

\*\*\* This is an EXTERNAL email. Please do not click on a link or open any attachments unless you are confident it is from a trusted source. \*\*\*

Good Morning, Chris --

Thank you for this. After reviewing the information you provided, I am still looking for more specifics concerning the following.

1. Please provide a complete description of the existing proposed project site.

a. What are the size and dimensions of the existing bridges to be removed?

b. Out of what materials are the existing bridges constructed?

c. How many piles and bents support each structure proposed for removal?

d. How old are the existing structures?

e. What is the over water area of the existing bridges?

f. What height over the water are the existing bridges?

\*\*\*\*Basically, I need to be able to compare the proposed new structures to the existing structures to evaluate impacts.

2. It is very unclear from all of the information provided which piles and how many of each will be used for which portion of the proposed bridge replacement. From what I can gather, below is how I would summarize that information for each proposed section of the project.

a. Temporary work trestles, 24" steel pipe piles, 712 total to be installed (see Section 7 checklist)

b. MacKay/Skull Creek Segments, 72-in and/or 96-in diameter drilled shafts/steel casings, estimated total of 126 and 238 of each size, respectively

c. Connector Bridge, 24-in prestressed concrete piles, 80 total piles to be installed

\*\*\*\*Please review this for accuracy and provide any corrections.

3. What is the offset of the new bridges from the existing bridges? E.g., "The new bridges will be constructed in a roadway alignment 50-ft-downstream (south) of the existing bridges. The replacement bridges will be built parallel to the existing bridges prior to demolition activities to maintain traffic flow during this project."

Once we have the response to the above questions, I will be able to move forward with this consultation.

Thank you and be well,  
Sarah

On Thu, Nov 5, 2020 at 7:45 AM Beckham, Chris <[BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)> wrote:

Hello Sarah,

Please find the attached addendum to the biological evaluation for the US 278 Corridor Improvements project in Beaufort County. This addendum includes updates to the previously submitted biological evaluation and contains the information requested in your email sent to us on September 28, 2020. If you need any additional information or have any further questions about the project, let me know.

Thanks,

Chris Beckham  
SCDOT



Environmental Services Office  
Office: (803) 737-1332  
Mobile: (803) 609-9464

--

Sarah Garvin  
Section 7 Biologist  
Interagency Cooperation Branch  
National Marine Fisheries Service  
Southeast Regional Office  
Protected Resources  
phone: 727/631-7657  
email: [sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)

[Section 7 Guidance Webpage - UPDATED URL](#)

[Action Agencies, want your consultations quicker? Check out the Expedited process!](#)



This is a U.S. government email account. Your emails to this address may be reviewed or archived. Please do not send inappropriate material. Thank you.

--

Sarah Garvin  
Section 7 Biologist  
Interagency Cooperation Branch  
National Marine Fisheries Service  
Southeast Regional Office  
Protected Resources  
phone: 727/631-7657  
email: [sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)

[Section 7 Guidance Webpage - UPDATED URL](#)

[Action Agencies, want your consultations quicker? Check out the Expedited process!](#)



This is a U.S. government email account. Your emails to this address may be reviewed or archived. Please do not send inappropriate material. Thank you.

--

Sarah Garvin  
Section 7 Biologist  
Interagency Cooperation Branch  
National Marine Fisheries Service  
Southeast Regional Office  
Protected Resources  
phone: 727/631-7657  
email: [sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)

[Section 7 Guidance Webpage - UPDATED URL](#)

[Action Agencies, want your consultations quicker? Check out the Expedited process!](#)



This is a U.S. government email account. Your emails to this address may be reviewed or archived. Please do not send inappropriate material. Thank you.

--

Sarah Garvin  
Section 7 Biologist  
Interagency Cooperation Branch  
National Marine Fisheries Service  
Southeast Regional Office  
Protected Resources  
phone: 727/631-7657  
email: [sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)

[Section 7 Guidance Webpage - UPDATED URL](#)

[Action Agencies, want your consultations quicker? Check out the Expedited process!](#)



This is a U.S. government email account. Your emails to this address may be reviewed or archived. Please do not send inappropriate material. Thank you.

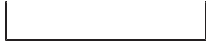
--

Sarah Garvin  
Section 7 Biologist  
Interagency Cooperation Branch  
National Marine Fisheries Service  
Southeast Regional Office  
Protected Resources  
phone: 727/631-7657

email: [sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)

[Section 7 Guidance Webpage - UPDATED URL](#)

[Action Agencies, want your consultations quicker? Check out the Expedited process!](#)



This is a U.S. government email account. Your emails to this address may be reviewed or archived.  
Please do not send inappropriate material. Thank you.

--

Sarah Garvin  
Section 7 Biologist  
Interagency Cooperation Branch  
National Marine Fisheries Service  
Southeast Regional Office  
Protected Resources  
phone: 727/631-7657  
email: [sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)

[Section 7 Guidance Webpage - UPDATED URL](#)

[Action Agencies, want your consultations quicker? Check out the Expedited process!](#)



This is a U.S. government email account. Your emails to this address may be reviewed or archived.  
Please do not send inappropriate material. Thank you.

<b>Pile Size and Type</b>	<b>Installation Method</b>	<b>Number of Piles</b>	<b>No. Piles Driven Per Day</b>	<b>Estimated Strikes Per Pile</b>	<b>Noise mitigation</b>
<b>24-in pre-stressed concrete</b> (Connector Bridge)	Impact Hammer	80	4-6	800	No
<b>24-in steel pipe</b> (Temporary work trestles)	Impact Hammer	506	4-6	800	Yes (cushion block or air bubble curtain)
<b>72-in drilled shaft / steel casing</b> (MacKay Creek Bridge)	N/A	77	2	N/A	N/A
<b>96-in drilled shaft / steel casing</b> (MacKay & Skull Creek Bridges)	N/A	112	2	N/A	N/A
<b>120-in drilled shaft / steel casing</b> (MacKay & Skull Creek Bridges)	N/A	24	2	N/A	N/A

### **Construction Conditions**

The applicant has also agreed to adhere to NMFS's *Sea Turtle and Smalltooth Sawfish Construction Conditions*.<sup>1</sup> Work will be completed during daylight hours only. During construction, the potential effect of in-water noise impacts would be minimized by using vibratory hammers, where practicable. Noise impacts will be mitigated by using either cushion blocks or air bubble curtains for pier and pile installation in Mackay and Skull Creeks. "Slow starts" will be employed, where pile-driving ramps up slowly in an effort to deter species from the work area. A "slow start" is defined as an initial set of 3 strikes from the impact hammer followed by a 1-minute (min) waiting period and then 2 subsequent 3-strike sets which are separated by a 1-min waiting period. Equipment will not block more than 50 percent of either creek.

---

<sup>1</sup> NMFS. 2006. Sea Turtle and Smalltooth Sawfish Construction Conditions revised March 23, 2006. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Regional Office, Protected Resources Division, St. Petersburg, Florida

## BEAUFORT COUNTY

CATEGORY	COMMON NAME/STATUS	SCIENTIFIC NAME	SURVEY WINDOW/ TIME PERIOD	COMMENTS
<b>Amphibians</b>	Frosted flatwoods salamander (T, CH)	<i>Ambystoma cingulatum</i>	January 1-April 30	Larvae present in breeding ponds
	American wood stork (T)	<i>Mycteria americana</i>	February 15-September 1	Nesting season
	Bald eagle (BGEPA)	<i>Haliaeetus leucocephalus</i>	October 1-May 15	Nesting season
	Black-capped petrel (ARS)	<i>Pterodroma hasitata</i>	April-October	Offshore water primarily
<b>Birds</b>	Eastern black rail (P)	<i>Laterallus jamaicensis jamaicensis</i>	April-June	Minimum of five surveys/survey point
	Piping plover (T, CH)	<i>Charadrius melodus</i>	July 15-May 1	Migration and wintering
	Red-cockaded woodpecker (E)	<i>Picoides borealis</i>	March 1-July 31	Nesting season
	Red knot (T)	<i>Calidris canutus rufa</i>	August 1-May 31	Migration and wintering
	Saltmarsh sparrow (ARS)	<i>Ammospiza caudacuta</i>	Fall/winter	Fall/winter surveys
<b>Crustaceans</b>		None Found		
<b>Fishes</b>	Atlantic sturgeon* (E)	<i>Acipenser oxyrinchus*</i>	February 1-April 30	Spawning migration
	Shortnose sturgeon* (E)	<i>Acipenser brevirostrum*</i>	February 1-April 30	Spawning migration
<b>Insects</b>	Monarch butterfly (ARS)	<i>Danaus plexippus</i>	August-December	Overwinter population departs: March-April
	Finback whale* (E)	<i>Balaenoptera physalus*</i>	November 1-April 30	Off the coast
	Humpback whale* (E)	<i>Megaptera novaengliae</i>	January 1-March 31	Migration off the coast
	Little brown bat (ARS)	<i>Myotis lucifugus</i>	Year round	Found in trees, rock crevices, and under bridges
<b>Mammals</b>	Northern long-eared bat (T)	<i>Myotis septentrionalis</i>	Year round	Winter surveys not as successful
	Right whale* (E)	<i>Balaena glacialis</i>	November 1-April 30	Off the coast
	Sei whale* (E)	<i>Balaenoptera borealis</i>		
	Sperm whale* (E)	<i>Physeter macrocephalus</i>		
	Tri-colored bat (ARS)	<i>Perimyotis subflavus</i>	Year round	Found in mines and caves in the winter
	West Indian manatee (T)	<i>Trichechus manatus</i>	May 1-November 15	In coastal waters
<b>Mollusks</b>		None Found		



## BEAUFORT COUNTY

CATEGORY	COMMON NAME/STATUS	SCIENTIFIC NAME	SURVEY WINDOW/ TIME PERIOD	COMMENTS
Plants	American chaffseed (E)	<i>Schwalbea americana</i>	May-August	1-2 months after a fire
	Ciliate-leaf tickseed (ARS)	<i>Coreopsis integrifolia</i>	August-November	
	Pondberry (E)	<i>Lindera melissifolia</i>	February-March	
Reptiles	Eastern diamondback rattlesnake (ARS)	<i>Crotalus adamanteus</i>	Most of the year	Peak: April-November
	Florida pine snake (ARS)	<i>Pituophis melanoleucus mugitus</i>	Most of year	
	Green sea turtle ** (T)	<i>Chelonia mydas</i> **	May 1-October 31	Nesting and hatching
	Kemp's ridley sea turtle ** (E)	<i>Lepidochelys kempii</i> **	May 1-October 31	In coastal waters
	Leatherback sea turtle ** (E)	<i>Dermochelys coriacea</i> **	May 1-October 31	Nesting and hatching
	Loggerhead sea turtle ** (T, CH)	<i>Caretta caretta</i> **	May 1-October 31	Nesting and hatching
	Southern hognose snake (ARS)	<i>Heterodon simus</i>	Most of the year	
	Spotted turtle (ARS)	<i>Clemmys guttata</i>	February-mid April	

\* Contact National Marine Fisheries Service (NMFS) for more information on this species.

\*\* The U.S. Fish and Wildlife Service (FWS) and NMFS share jurisdiction of this species.

ARS Species that the FWS has been petitioned to list and for which a positive 90-day finding has been issued (listing may be warranted); information is provided only for conservation actions as no Federal protections currently exist.

ARS\* Species that are either former Candidate Species or are emerging conservation priority species.

BGEPA Federally protected under the Bald and Golden Eagle Protection Act

C FWS or NMFS has on file sufficient information on biological vulnerability and threat(s) to support proposals to list these species.

CH Critical Habitat

E Federally Endangered

P or P – CH Proposed for listing or critical habitat in the Federal Register

S/A Federally protected due to similarity of appearance to a listed species

T Federally Threatened

These lists should be used only as a guideline, not as the final authority. The lists include known occurrences and areas where the species has a high possibility of occurring. Records are updated as deemed necessary and may differ from earlier lists.

For a list of State endangered, threatened, and species of concern, please visit <https://www.dnr.sc.gov/species/index.html>.



# MEETING NOTES

---

JANUARY 7, 2021

Conference call between NOAA, FHWA, SCDOT: Follow up on NOAA request for additional information for the US 278 Corridor Improvements project

## Roll call and introductions:

Sarah Garvin – NMFS SERO	Phil Leazer – KCI
Shane Belcher – FHWA	Jared Medlin - KCI
Sandra Saint-Surrin – FHWA	Heather Robbins – KCI
Craig Winn – SCDOT	Russell Chandler – 3Oaks
Megan Groves – SCDOT	Gordon Murphy – 3Oaks
Chris Beckham – SCDOT	Wade Biltoft – 3Oaks

## Purpose of the Meeting:

45 day consultation window is set to expire. This meeting is to continue the informal consultation process and discuss how the project may affect protected sturgeon and sea turtle species.

## Discussion Topics:

- Sarah (NMFS) needs clarification on the following:
  - Step by step narrative for how drilled shafts may be installed by the contractor.
  - Will an impact hammer be used or required to install the casings?
  - Will the casings be permanent?
  - How many drilled shafts and/or casings will be required?
  - Estimated duration for installation?
  - What is the “worst-case” scenario for the installation of the casings?
- The drilled shafts require steel casings to be installed prior to construction. The information supplied by SCDOT in the Biological Evaluation (BE) in July 2020, and the supplemental information supplied in November 2020, does not provide enough detail about the construction of the proposed drilled shaft bridge supports.
- SCDOT and KCI confirmed the steel casing will be permanent.
- The large diameter of the steel casings creates relatively high levels of underwater noise. The noise increases as the size of the casing increases. Even with the use of cushion blocks and bubble curtains as noise attenuation methods, using an impact hammer may result in effects up to 2 miles away from the project area. This likely exceeds acceptable thresholds for informal consultation.

- The proposed installation method of impact hammer driving represents the “worst-case” scenario, but vibratory installation is the method most likely to be used by the contractor.
  - SCDOT and FHWA willing to commit to the use of vibratory installation only for the steel casings.
- Shane (FHWA) suggested reviewing the Programmatic Agreement between FHWA and NMFS for projects in GA, NC, and SC for noise mitigation or attenuation methods, as well as possible environmental commitments that may help minimize potential effects.
  - KCI and 3Oaks will coordinate and update the BE, EA, and list of environmental commitments.
- The use of explosives for demolition is not expected. If the contractor wants to use explosives additional coordination and consultation between SCDOT, FHWA, and NMFS will be required.
- This call allows the informal consultation window to extend an additional 45 days.
  - Next deadline is February 21, 2021.

#### Action Items:

- SCDOT, KCI, and 3Oaks will work together to improve the narrative about the drilled shaft construction, including the steel casings, in the BE.
- SCDOT and 3Oaks will update the BE to incorporate all previous requests for additional information so there is a “complete” document.
  - Clear description of installation and methods proposed.
  - Update environmental commitments.

**From:** [Sarah Garvin - NOAA Affiliate](#)  
**To:** [Gordon Murphy](#)  
**Cc:** [Chris Beckham \(BeckhamJC@scdot.org\)](#); [Russell Chandler](#)  
**Subject:** Re: SERO-2020-02072 US 278 Improvements  
**Date:** Thursday, January 28, 2021 9:11:24 AM  
**Attachments:** [image001.png](#)

---

Good morning --

Basically, the best way to calculate vibratory impacts for these pilings is to calculate a ratio using the largest pile size for which we have both impact and vibratory noise data. In this case, it is 72" steel piles. We then multiply that value by the impact data we have available for 96" steel piles and 126" steel piles.

Here is the ratio I calculated for each noise value for 72" vibratory : 72" impact:

Peak = 0.91121495

SEL = 0.98901099

RMS = 0.95238095

For 96" steel piles, I calculated the following vibratory sound values:

Peak =  $0.91121495 \times 220 = 200$  db

SEL =  $0.98901099 \times 195 = 192$  db

RMS =  $0.95238095 \times 205 = 195$  db

For 126" steel piles, I calculated the following vibratory sound values:

Peak =  $0.91121495 \times 213 = 194$  db

SEL =  $0.98901099 \times 188 = 186$  db

RMS =  $0.95238095 \times 202 = 192$  db

Using the vibratory sound values calculated for the largest steel pile size (i.e., 126"), and assuming 2 piles installed per day at 3600 seconds of vibration per pile, I am getting the following impacts:

Peak injury = 5.2 ft radius

Cumulative SEL injury = 7.7 ft radius for sea turtles and fish > 102 g; 5,678.148 ft radius for fish < 102 g

Fish behavior impacts = 20,700.7 ft radius

Sea turtle behavior = 4459.831 ft radius

With a peak injury radius of that size, it is well within the 50 ft observation radius required by NMFS' Sea Turtle and Sawfish Construction Conditions; HOWEVER, the radius for injury to smaller fish (< 102 g; therefore, juveniles) is over 1 mile. That is concerning, as are the behavior impact radiuses.

Let me know if my calculations make sense and if you have additional questions.

Sarah

On Wed, Jan 27, 2021 at 10:28 AM Sarah Garvin - NOAA Affiliate <[sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)> wrote:  
I was using the impact data for my analysis, because that is the installation method described in my current documentation for the proposed project. Thus, I did not go searching for vibratory numbers.

Let me see what I can find to help you out.

Sarah

On Wed, Jan 27, 2021 at 10:10 AM Gordon Murphy <[gordon.murphy@threeoaksengineering.com](mailto:gordon.murphy@threeoaksengineering.com)> wrote:

Good morning Sarah.

We have been working with the acoustic tool this week and realized that there is no data for vibratory installation of 96" or 120" steel pipes in the Pile Driving Noise Data tab. Only impact data for these two sizes are in the spread sheet. Can you provide us with the data that you are using for your analysis?

Thanks again for your assistance.

Gordon

---

**From:** Sarah Garvin - NOAA Affiliate <[sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)>

**Sent:** Friday, January 22, 2021 9:16 AM

**To:** Gordon Murphy <[gordon.murphy@threeoaksengineering.com](mailto:gordon.murphy@threeoaksengineering.com)>

**Cc:** Chris Beckham ([BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)) <[BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)>; Russell Chandler <[russell.chandler@threeoaksengineering.com](mailto:russell.chandler@threeoaksengineering.com)>

**Subject:** Re: SERO-2020-02072 US 278 Improvements

I am here for any questions!

And just one caveat about the tool: NOAA HQ is updating the national noise guidance and it's not yet been released, so the calculator may change at some point. What I sent is the current calculator; however it may change based on national policy. The goal is national consistency.

Thanks,  
Sarah

On Thu, Jan 21, 2021 at 8:25 PM Gordon Murphy <[gordon.murphy@threeoaksengineering.com](mailto:gordon.murphy@threeoaksengineering.com)> wrote:

Thank you Sarah.

I may have a question or two as we dive into the acoustic tool.

Take care,  
Gordon

---

**From:** Sarah Garvin - NOAA Affiliate <[sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)>



**Sent:** Thursday, January 21, 2021 5:24 PM

**To:** Gordon Murphy <[gordon.murphy@threeoaksengineering.com](mailto:gordon.murphy@threeoaksengineering.com)>

**Cc:** Chris Beckham ([BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)) <[BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)>; Russell Chandler <[russell.chandler@threeoaksengineering.com](mailto:russell.chandler@threeoaksengineering.com)>

**Subject:** Re: SERO-2020-02072 US 278 Improvements

Gordon --

I received your voicemail and I apologize for the late reply. I attached a copy of the noise calculator. I tried the link on our website and it did not work for me. Please let me know if the attached Excel file opens for you.

Thanks,  
Sarah

On Thu, Jan 21, 2021 at 9:31 AM Gordon Murphy <[gordon.murphy@threeoaksengineering.com](mailto:gordon.murphy@threeoaksengineering.com)> wrote:

Good morning Sarah.

As a follow up to the voicemail I left for you this morning, we are wondering what noise acoustic tool that you used for your noise level estimations for the US 278 project. Since your noise levels didn't match ours, we would like to re-run the tool with updated information received from the engineers. We used the GARFO acoustic tool, but noticed that the southeast office website has an acoustic tool available for download. However, we are not able to open the downloaded spread sheet and receive an error message about the file extension.

If the GARFO acoustic tool is not what we should be using, would it be possible for you to email the correct tool to us?

Thanks in advance,

Gordon Murphy

Senior Environmental Scientist  
Three Oaks Engineering  
1022 State Street  
Cacye, SC 29033  
(803) 447-0547



---

**From:** Beckham, Chris <BeckhamJC@scdot.org>  
**Sent:** Friday, February 19, 2021 9:46 AM  
**To:** 'Mark\_Caldwell@fws.gov'  
**Cc:** Belcher, Jeffery - FHWA; Kelly, David P.; Heather Robbins; Russell Chandler; Winn, Craig L.  
**Subject:** US 278 Corridor Improvements ESA Consultation  
**Attachments:** USFWS Cover Letter - US 278 Biological Evaluation Version 3 with Addendum - 02-19-21.pdf; US 278 Biological Evaluation Version 3 with Addendum 02-19-21 (003).pdf

Mark,

On July 28, 2020, SCDOT received a concurrence letter from the US Fish and Wildlife Service on the biological evaluation for the US 278 Corridor Improvement Project in Beaufort County. Since receiving the letter, there have been revisions to the project footprint and changes in the status of one listed species that was evaluated in the previous biological evaluation. Due to these changes, SCDOT is requesting additional consultation with your office for the subject project. The attached cover letter summarizes the changes to the project. Although there were no changes to the effect determination for any of the listed species, the attached biological evaluation contains updated project information to be considered in your review. If you have any questions or need additional information, please let me know.

Thanks for your assistance with this project!

Chris Beckham  
SCDOT  
Environmental Services Office  
Office: (803) 737-1332  
Mobile: (803) 609-9464



# United States Department of the Interior

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



March 3, 2021

Mr. Chris Beckham  
Environmental Services  
S.C. Department of Transportation  
P.O. Box 191  
Columbia, South Carolina 29202-0191

Re: S.C. Department of Transportation, Amended Biological Evaluation, US-278 Corridor Improvements, Beaufort County, FWS Log # 2018-CPA-0085

Dear Mr. Beckham:

The South Carolina Ecological Services Field Office for the U.S. Fish and Wildlife Service (Service) received the South Carolina Department of Transportation's (SCDOT) amended Biological Evaluation (BE) for the US-278 Corridor Improvements in Beaufort County, South Carolina. The BE was amended due to project changes and the recent listing of the eastern black rail as a federally threatened species. Potential impacts to the eastern black rail was assessed. The SCDOT is seeking our review of the amended BE and its findings for inclusion into an Environmental Impact Statement (EIS) being developed for the US-278 project pursuant to the National Environmental Policy Act of 1969.

Since the submission of the original BE in July 2020, there have been revisions to the Recommended Preferred Alternative 4A footprint and design elements that required additional analysis regarding the potential effects on species protected under the Endangered Species Act of 1973 (ESA). The eastern black rail (*Laterallus jamaicensis*) gained Federal protection under the ESA in November 2020, after the original BE was published. Therefore, SCDOT has revised the BE to reflect the changes required to meet design standards and the updated status of the eastern black rail.

Upon review of the original project and the aforementioned changes, SCDOT has determined that project *may affect, but is not likely to adversely affect* the eastern black rail. The Service concurs with SCDOT's determination regarding the eastern black rail. Please note that our July 28, 2020, concurrence letter covering other T&E species that may be in the project area remains valid. However, obligations under the ESA must be reconsidered if: (1) new information reveals impacts of this identified action may affect any federally listed species or critical habitat in a manner not previously considered; (2) this action is subsequently modified in a manner, which was not considered in this assessment; or (3) a new species is listed or critical habitat is designated that may be affected by the identified action.

The Service appreciates the opportunity to provide input at this stage of the US 278-project development. If you have any questions regarding our comments, please do not hesitate to contact Mr. Mark Caldwell of the South Carolina Ecological Services Field Office at [mark\\_caldwell@fws.gov](mailto:mark_caldwell@fws.gov) or (843) 300-0426 and reference FWS Log# 2018-CPA-0085.

Sincerely,



Thomas D. McCoy  
Field Supervisor

TDM/MAC

---

**From:** Sarah Garvin - NOAA Affiliate <sarah.garvin@noaa.gov>  
**Sent:** Tuesday, February 23, 2021 10:25 AM  
**To:** Beckham, Chris  
**Cc:** Heather Robbins; Russell Chandler; Belcher, Jeffery - FHWA; Kelly, David P.; Winn, Craig L.  
**Subject:** Re: US 278 Corridor Improvement Biological Evaluation

I have entered this consultation into our internal review process. If you have any questions on its progress, please contact me.

Thank you, stay safe, and be well!

Sarah

On Mon, Feb 22, 2021 at 8:51 AM Sarah Garvin - NOAA Affiliate <[sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)> wrote:

Thank you! I am reviewing this today. If I have additional questions, I will be in touch.

Thanks again,

Sarah

On Fri, Feb 19, 2021 at 9:28 AM Beckham, Chris <[BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)> wrote:

Sarah,

Please find the attached cover letter and updated Biological Evaluation for the US 278 Corridor Improvement Project in Beaufort County. This updated report contains additional information to support our request for consultation under Section 7 of the Endangered Species Act. If you need any additional information to process our request, please let me know.

Thanks for your assistance with this project!

Chris Beckham

SCDOT

Environmental Services Office

Office: (803) 737-1332

Mobile: (803) 609-9464



--

Sarah Garvin  
Section 7 Biologist  
Interagency Cooperation Branch  
National Marine Fisheries Service  
Southeast Regional Office  
Protected Resources  
phone: 727/631-7657  
email: [sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)

[Section 7 Guidance Webpage - UPDATED URL](#)

[Action Agencies, want your consultations quicker? Check out the Expedited process!](#)



This is a U.S. government email account. Your emails to this address may be reviewed or archived. Please do not send inappropriate material. Thank you.

--

Sarah Garvin  
Section 7 Biologist  
Interagency Cooperation Branch  
National Marine Fisheries Service  
Southeast Regional Office  
Protected Resources  
phone: 727/631-7657  
email: [sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)

[Section 7 Guidance Webpage - UPDATED URL](#)

[Action Agencies, want your consultations quicker? Check out the Expedited process!](#)



This is a U.S. government email account. Your emails to this address may be reviewed or archived. Please do not send inappropriate material. Thank you.



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

F/SER31:KR/SG  
SERO-2020-02072

Chris Beckham, RPG 1 Permits Coordinator  
Environmental Services Office  
South Carolina Department of Transportation  
955 Park Street  
Columbia, SC 29201-3959

Dear Sir:

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.

<b>Applicant</b>	<b>SERO Number</b>	<b>Project Types</b>
South Carolina Department of Transportation (SCDOT)	SERO-2020-02072	Bridge demolition and replacement, and boat ramp improvement

#### **Consultation History**

We received your letter requesting consultation on July 22, 2020. We requested additional information on September 28, 2020; November 5, 2020; November 12, 2020; November 17, 2020; and January 7, 2021. We received a final response on February 19, 2021, and initiated consultation that day. The project has been assigned a tracking number in our NMFS Environmental Consultation Organizer (ECO), SERO-2020-02072. Please refer to this number in any future inquiries regarding this project.

#### **Project Location**

<b>Address</b>	<b>Latitude/Longitude</b> (North American Datum 1983)	<b>Water Body</b>
US 278 corridor between Bluffton and Hilton Head Island, Beaufort County, South Carolina	32.224464°N, 80.781447°W	MacKay Creek, Skull Creek, and an unnamed creek with access to the Atlantic Ocean





**Image of the project area and surrounding location (© 2020 Google Earth).**

### **Existing Site Conditions**

The project site is located along the US 278 corridor between Bluffton and Hilton Head Island in Beaufort County, South Carolina. The bridges along this part of the US 278 corridor span the MacKay Creek, Skull Creek, and an unnamed creek between Jenkins and Hog Islands between Bluffton and Hilton Head Island, Beaufort County, South Carolina. The project area is within the Calibogue Sound watershed and Savannah River basin.

The existing eastbound bridge over MacKay Creek was built in 1956. It is 2,190 feet (ft) long and is supported by 51 bents consisting of a total of two hundred seventy-six 18-inch (in) pre-stressed concrete square piles. The bridge is 36.1 ft wide. The existing westbound bridge over MacKay Creek was built in 1983. It is 2,231 ft long and is supported by 51 bents consisting of a total of three hundred seventy-two 18-in pre-stressed concrete square piles. The bridge is 36.1 feet wide. The east- and westbound MacKay Creek bridges cover an overwater area of approximately 3.5 acres (ac). The height of the bridges' substructures over the water is approximately 25 ft at mean high tide. The bank-to-bank distance of MacKay Creek is 2,107 ft.

The existing eastbound and westbound bridges over Skull Creek were constructed in 1982 and are 2,821.9 ft long and 36.1 ft wide. The Skull Creek bridges are concrete with steel girders. Each bridge consists of 12 bents constructed using three hundred 18-in pre-stressed concrete square piles, 6 bents constructed using one hundred ninety 20-in pre-stressed concrete square piles, and 4 bents constructed using two hundred forty-eight 10-in steel H piles. These bridges cover an overwater area of approximately 3.3. ac at high tide. The height of the bridges' substructures over the water are approximately 65 ft at mean high tide. The bank-to-bank distance for Skull Creek is 763 ft.

The proposed project area is comprised of a mixture of urban development, forested uplands, estuarine emergent uplands, estuarine sub-tidal unconsolidated bottom, estuarine tidal creeks,

intertidal non-vegetated flats, and Palustrine wetlands. Urban development includes residences, commercial buildings, and roadways (including maintained rights-of-way, roadside ditches, and utility lines). Forested uplands are dominated by evergreen/pine species with some hardwood/deciduous species. The pine forest habitat shifts near the brackish or saline areas and becomes a “maritime” forest.

Two types of Estuarine Emergent Wetlands occur within the project area: low marsh and high marsh. The low marsh wetlands are a single-species community of saltmarsh cordgrass. The high marsh consists of black needle rush, glasswort, salt grass, and big cordgrass. Estuarine sub-tidal unconsolidated bottom habitat in the corridor is associated with Mackay and Skull Creeks. Flow in the creeks is dependent on tide cycles for flow and even at low tide, water is always present. Channel depths in the creeks range from 14 to 25 ft deep. Survey data and as-built plans of the existing bridges collected during the preliminary engineering indicate that Skull Creek water depths are approximately 30 to 40 ft deep at the center of the channel. Measurements taken by the project biologists documented salinity between 20 and 30 parts per thousand throughout much of the project area. In the estuarine inter-tidal zone, mollusks grow on most hard surfaces, such as bridge piles and utility line pillars. Oyster beds are abundant in the shallow sub-tidal areas and often grow on top of each other to form tall pillars and extensive beds. Substrate within the project area consists of unconsolidated bottom, sand flats, and pluff mud. The overwater area between Jenkins Island and Hog Island where a new bridge is proposed for construction is a cove with a bank-to-bank distance of 388 ft and with water depths of less than one foot at low tide. The action area may provide foraging habitat for sea turtles, and the action agency reported that a benthic survey of the project area was not conducted.

### Project Description

The SCDOT proposes to demolish the existing bridges that span over MacKay Creek and Skull Creek after replacing them with bridges in a roadway alignment 55 ft southwest of existing structures. The purpose of this project is to address structural deficiencies at the existing eastbound Mackay Creek Bridge and reduce congestion along US 278 from Moss Creek Drive to Spanish Wells Road. The replacement bridges will carry 6 lanes of traffic, include a multi-use path, and be built parallel to the existing bridges prior to demolition activities to maintain traffic flow during this project. Improved access to Pickney Island National Wildlife Refuge and to the C.C. Haigh, Jr. Boat Ramp is also part of the proposed action.

Because the existing local access bridge to Hog Island falls within the footprint of the replacement bridge for Skull Creek, a new local access connector bridge will be constructed between Jenkins and Hog Islands.

### Proposed Bridge Dimensions and Design Specifics

	<b>Mackay Creek Bridge</b>	<b>Skull Creek Bridge</b>	<b>Connector Bridge</b>
<b>Dimensions</b>	Width approximately 2,518 ft x 132 ft	Width approximately 1,390 ft x 132 ft	Width approximately 300 ft x 36 ft
<b>Overwater Clearance at High Tide</b>	25 ft	65 ft	5 ft
<b>Overwater Area</b>	333,190 square feet (ft <sup>2</sup> [7.6 ac])	183,950 ft <sup>2</sup> (4.2 ac)	12,000 ft <sup>2</sup> (0.3 ac)
<b>Bents</b>	23	22	10
<b>Piles</b>	66 (96-in drilled shaft / steel casings) 24 (72-in drilled shaft / steel casings)	46 (96-in drilled shaft / steel casings) 16 (120-in drilled shaft / steel casings)	80 (24-in pre-stressed concrete piles)

Only piles that will be installed in wetlands habitat (i.e., estuarine emergent wetland, estuarine sub-tidal unconsolidated bottom, estuarine tidal creek, intertidal non-vegetated flats, and Palustrine wetland) are accounted for in this analysis. Piles installed in upland areas have been excluded. The

installation of piles for the new permanent bridge structures will result in approximately 17,424 ft<sup>2</sup> (0.4 ac) of impacts to wetlands habitat.

Temporary 40-ft-wide work trestles with 30-ft-wide finger piers will also be constructed for access in marshes and shallow water during the construction of the new, permanent MacKay and Skull Creek Bridges. Up to a total of 400 pipe piles (24-in diameter) will be installed using an impact hammer to support the temporary work trestles. For bridge construction access in these deeper waters of Mackay Creek and Skull Creek, the contractor will likely use work barges anchored in place by spuds set in the substrate. Construction access for the new connector bridge will be achieved through adjacent upland habitat, bridge approach fills, and top-down methods as the bridge is built. The installation of temporary work trestles also will result in approximately 17,424 ft<sup>2</sup> (0.4 ac) of impacts to wetlands habitat.

Pile installation will require augers and vibratory and impact hammers. The table below summarizes the number and types of piles to be used and the installation requirements for each.

<b>Pile Size and Type</b>	<b>Installation Method</b>	<b>Number of Piles</b>	<b>Piles Driven Per Day</b>	<b>Estimated Strikes/Time Per Pile</b>	<b>Noise mitigation</b>
<b>24-in pre-stressed concrete</b> (Connector Bridge)	Impact Hammer	80	5	800	Yes (cushion blocks and “slow start”)
<b>24-in steel pipe</b> (Temporary work trestles)	Impact Hammer	400	5	800	Yes (cushion blocks and “slow start”)
<b>72-in drilled shaft / steel casing</b> (MacKay Creek Bridge)	Vibratory/Auger	24	2	180 minutes (min)	N/A
<b>96-in drilled shaft / steel casing</b> (MacKay and Skull Creek Bridges)	Vibratory/Auger	112	2	180 min	N/A
<b>120-in drilled shaft / steel casing</b> (MacKay and Skull Creek Bridges)	Vibratory/Auger	16	2	480 min	N/A

The construction of drilled shaft bridge columns sized 72 in and larger will require the contractor to install a permanent steel casing to ensure the drilled shaft remains open and does not collapse prior to the pouring of concrete. The permanent casing will also act as a concrete form for the shaft. Casings are expected to be installed by first using a vibratory hammer until refusal or a depth specified by Geotechnical Engineer of Record. Then, the final depth of the casing will be set using a drill/auger inside the casing (if necessary) to prepare for rebar cage installation. No impact hammers will be used to install the steel casings for drilled shafts. Following the installation of the rebar cage, concrete will be poured inside the casing.

Clean fill material will be placed in the following areas: (1) in estuarine emergent wetlands to re-align the bridge approach from the mainland, (2) on the east side of Hog Island to create a bridge approach for the new connector road, (3) along the southwest side of Blue Heron Point Road between Hog and Jenkins Islands for roadway US 278 relocation purposes, and (4) on either side of the US 278 causeway between Jenkins Island and Hilton Head Island. It is anticipated also that either a geotextile or soil treatment will be required in the wetlands to prevent the roadway from sinking into the marsh soils. Approximately 997,524 ft<sup>2</sup> (22.9 ac) of wetlands habitat will be impacted by the placement of



fill in the project area. Less than 4,356 ft<sup>2</sup> (0.1 ac) of these impacts will occur in estuarine sub-tidal unconsolidated bottom habitat. Once the contractor has completed construction of bridge support structures, all temporary trestle piles will be removed or cut off 2 ft below the mudline. If required, any fill materials for bridge construction access will also be removed once the contractor has completed work in those locations.

Following completion of the new bridges, it is anticipated that the contractor will implement standard bridge demolition techniques, such as the use of concrete saws and jack hammers, to dismantle the bridge decks, substructure, and piers/piles. Old piers/piles may be sawn off below the substrate or removed by vibratory methods. Because Mackay and Skull Creeks are navigable waters, the extent of the pier/pile removal below the substrate will be coordinated with the United States (U.S.) Coast Guard. A total of 1,628 piles will be removed. Demolition debris will be hauled off site and will be disposed of in accordance with the SC Department of Health and Environmental Control landfill requirements. The contractor may opt to use explosives, in which case the contractor, through SCDOT and the Federal Highway Administration, will be responsible for additional coordination and consultation with the U.S. Fish and Wildlife Service and NMFS. The proposed demolition and construction will take approximately 3 years to complete.

### Construction Conditions

The applicant has agreed to adhere to NMFS's *Sea Turtle and Smalltooth Sawfish Construction Conditions*.<sup>1</sup> Work will be completed during daylight hours only. During construction, the potential effect of in-water noise impacts would be minimized by using cushion blocks for pile installation in Mackay and Skull Creeks. "Slow starts" will be employed for all impact pile driving, where pile-driving ramps up slowly in an effort to deter species from the work area. A "slow start" is defined as an initial set of 3 strikes from the impact hammer followed by a 1-min waiting period and then 2 subsequent 3-strike sets which are separated by a 1-min waiting period. Equipment and materials will not block more than 50% of either creek at any time.

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

Species	ESA Listing Status <sup>2</sup>	Action Agency Effect Determination <sup>3</sup>	NMFS Effect Determination <sup>3</sup>
<b>Sea Turtles</b>			
Green (North Atlantic distinct population segment [DPS])	T	NLAA	NLAA
Green (South Atlantic [SA] DPS)	T	NLAA	NLAA
Kemp's ridley	E	NLAA	NLAA
Loggerhead (Northwest Atlantic DPS)	E	NLAA	NLAA
Leatherback	E	NLAA	NE
<b>Fish</b>			
Atlantic sturgeon (SA DPS)	E	NLAA	NLAA
Shortnose sturgeon	E	NLAA	NLAA

<sup>1</sup> NMFS. 2006. Sea Turtle and Smalltooth Sawfish Construction Conditions revised March 23, 2006. National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Southeast Regional Office, Protected Resources Division, St. Petersburg, Florida.

<https://www.fisheries.noaa.gov/webdam/download/92937961>

<sup>2</sup> E = endangered; T = threatened

<sup>3</sup> NLAA = not likely to adversely affect; NE = no effect

We believe the proposed action will have no effect on leatherback sea turtles, due to the species' very specific life history strategy, which is not supported at the project site. Leatherback sea turtles have a pelagic, deepwater life history, where they forage primarily on jellyfish.

### **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 Effects to Species**

Listed species may be physically injured if struck by construction equipment, vessels, or materials. We believe this effect is extremely unlikely to occur. Because these species are highly mobile, we expect them to move away from the project if disturbed. The applicant's implementation of NMFS's *Sea Turtle and Smalltooth Sawfish Construction Conditions* will further reduce the risk by requiring all construction workers to watch for sea turtles. Operation of any mechanical construction equipment will cease immediately if a sea turtle is seen within a 50-ft radius of the equipment. Project activities will not resume until the protected species has departed the project area of their own volition. Further, construction would be limited to daylight hours and construction workers are more likely to see listed species, if present, and avoid interactions with them.

The proposed action includes the use of barges and the use of turbidity curtains. Project activities and related construction noise may preclude or deter listed species from entering a project area. We believe the temporary exclusion from the project area due to the project activities, including related construction noise and presence of turbidity curtains, will have an insignificant effect on listed species. Turbidity curtains will enclose only portions of the project site at any given time and will be removed after project completion. However, listed species excluded from the project area will be able to use surrounding areas with similar available habitat during the project and return to the project site when the activity is complete.

The project will result in a permanent loss of 1,032,372 ft<sup>2</sup> (23.7 ac) wetlands habitat from the placement of piles and clean fill in the project area. Of the habitat impacted, only 13,068 ft<sup>2</sup> (0.3 ac) is estuarine sub-tidal unconsolidated bottom habitat, which may support foraging habitat for sea turtles. We believe that this effect will be insignificant for sea turtles. All of the filled habitat will consist of shallow waters where sea turtles are less likely to occur, and there are similar resources and undisturbed habitat available nearby.

Noise created by pile-driving activities can physically injure animals or change animal behavior in the affected areas. Injurious effects can occur in 2 ways. First, immediate adverse effects can occur to listed species if a single noise event exceeds the threshold for direct physical injury. 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 Opinion for SAJ-82.<sup>4</sup> The noise analysis in this consultation evaluates effects to ESA-listed fish and sea turtles identified by NMFS as potentially affected in the table above.

Based on our noise calculations, installation of 24-in steel piles by impact hammer with noise abatement (i.e., cushion blocks and slow starts) has the highest potential for injurious and behavioral impacts to listed species. Installation of these piles may cause single-strike or peak-pressure injury to sea turtles or ESA-listed fish that are within 15 ft (4.6 meters [m]) of pile-driving activities; however, this radius is smaller than the radius construction personnel will visually monitor for listed species (i.e., 50 ft). If they detect an animal within that zone, they will cease construction activities per

---

<sup>4</sup> NMFS. Biological Opinion on Regional General Permit SAJ-82 (SAJ-2007-01590), Florida Keys, Monroe County, Florida. June 10, 2014.

NMFS's *Sea Turtle and Smalltooth Sawfish Construction Conditions*. Given these conditions, we believe any single-strike or peak-pressure injury effects are extremely unlikely to occur.

Based on our noise calculations, the cumulative sound exposure level (cSEL) of multiple pile strikes over the course of a day for installation of 24-in steel piles by impact hammer may cause injury to ESA-listed fish and sea turtles. The installation of 5 steel piles per day using an impact hammer will result in a daily cumulative sound injury zone ranging from 431 ft (131 m) for sea turtles to 707 ft (215 m) for ESA-listed fishes. Due to the mobility of sea turtles and ESA-listed fish species, the use of "slow starts, and because the project occurs in open water, we expect them to move away from noise disturbances. Because we anticipate the animal will move away, we believe that an animal's suffering physical injury from noise is extremely unlikely to occur. An animal's movement away from the injurious sound radius is a behavioral response, with the same effects discussed below.

The installation of 24-in metal piles using an impact hammer with noise abatement could also result in behavioral responses at radii of 2,414 ft (736 m) for ESA-listed fish and 519 ft (158 m) for sea turtles. Due to the mobility of sea turtles and ESA-listed fish species and the use of "slow starts, we expect them to move away from noise disturbances in this open-water environment. Because there is similar habitat nearby, we believe behavioral effects will be insignificant. If an individual chooses to remain within the behavioral response zone, it could be exposed to behavioral noise impacts during pile installation. Since installation will occur only during the day, these species will be able to resume normal activities during quiet periods between pile installations and at night. Therefore, we anticipate any behavioral effects will be insignificant.

Based on our noise calculations, installation of 96-in steel casings by vibratory hammer may cause single-strike or peak-pressure injury to sea turtles or ESA-listed fish that are within 13 ft (4 m) of pile-driving activities; however, this radius is smaller than the radius construction personnel will visually monitor for listed species (i.e., 50 ft). If they detect an animal within that zone, they will cease construction activities per NMFS's *Sea Turtle and Smalltooth Sawfish Construction Conditions*. Given these conditions, we believe any single-strike or peak-pressure injury effects are extremely unlikely to occur.

Based on our noise calculations, the cumulative sound exposure level (cSEL) of multiple pile strikes over the course of a day for installation of 96-in steel casings by vibratory hammer may cause injury to ESA-listed fish and sea turtles. The installation of 2 steel casings per day using a vibratory hammer will result in a daily cumulative sound injury zone ranging from 40 ft (12 m) for sea turtles to 20,700 ft (6,310 m) for ESA-listed fishes. Due to the mobility of sea turtles and ESA-listed fish species, the use of "slow starts, and because the project occurs in open water, we expect them to move away from noise disturbances. Because we anticipate the animal will move away, we believe that an animal's suffering physical injury from noise is extremely unlikely to occur. An animal's movement away from the injurious sound radius is a behavioral response with the same effects discussed below.

The installation of 96-in steel piles using an impact hammer could also result in behavioral effects at radii 32,808 ft (10,000 m) for ESA-listed fishes and 7,068 ft (2,154 m) for sea turtles. Due to the mobility of sea turtles and ESA-listed fish species, we expect them to move away from noise disturbances in this open-water environment. Because there is similar habitat nearby, we believe behavioral effects will be insignificant. If an individual chooses to remain within the behavioral response zone, it could be exposed to behavioral noise impacts during pile installation. Since installation will occur only during the day, these species will be able to resume normal activities during quiet periods between pile installations and at night. Therefore, we anticipate any behavioral effects will be insignificant.

Based on our noise calculations, removal of piles by vibratory hammer will not result in any form of injurious noise effects. In the analysis in SAJ-82 (SAJ-82, Appendix B, Table 11 footnote), the noise source level used for this analysis was based on the vibratory installation of a 13-in steel pipe pile as a surrogate for the vibratory installation of a wood pile. This is a very conservative approach since the installation of a 13-in steel pipe pile would be considerably louder than a similarly sized wood or concrete pile or vinyl sheet pile. This removal method could result in behavioral effects at radii of up

to 16 ft (5 m) for sea turtles and up to 72 ft (22 m) for ESA-listed fishes. Given the mobility of sea turtles and ESA-listed fish species, we expect them to move away from noise disturbances. Because there is similar habitat nearby, we believe this effect will be insignificant. If an individual chooses to remain within the behavioral response zone, it could be exposed to behavioral noise impacts during pile removal. Since removal will occur only during the day, these species will be able to resume normal activities during quiet periods between pile removals and at night. Therefore, removal of piles by vibratory hammer will not result in any injurious noise effect, and we anticipate any behavioral effects will be insignificant.

### **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 Karla Reece, Section 7 Team Lead, at [karla.reece@noaa.gov](mailto:karla.reece@noaa.gov).

Sincerely,

David Bernhart  
Assistant Regional Administrator  
for Protected Resources

File: 1514-22.1.2



## APPENDIX C

### PHOTOGRAPHS OF HABITATS WITHIN THE PROJECT STUDY AREA



## SITE PHOTOGRAPHS



**Facing northeast. Estuarine emergent wetlands (lower left) along the mainland causeway; Mackay Creek (center); and forested uplands and palustrine forested wetlands on Pinkney Island (upper right).**



**Facing north northeast. Mackay Creek (center) and Pinkney Island National Wildlife Refuge (right).**





**Facing northwest. Skull Creek (foreground) and Pinkney Island (background) with forested uplands and palustrine wetlands.**



**Facing northwest. Estuarine emergent wetlands and intertidal unvegetated flats on the west side of Hog Island.**





**Facing northwest. Intertidal unvegetated flats between Hog Island and Pinkney Island.**



**Facing southeast. Disturbed areas and upland forests on Hog Island.**





**Facing northwest. Estuarine emergent wetland along Blue Heron Point Road between Hog Island (center) and Jenkins Island (foreground).**



**Palustrine forested wetland (left) and palustrine emergent wetland (right) on Pinkney Island.**



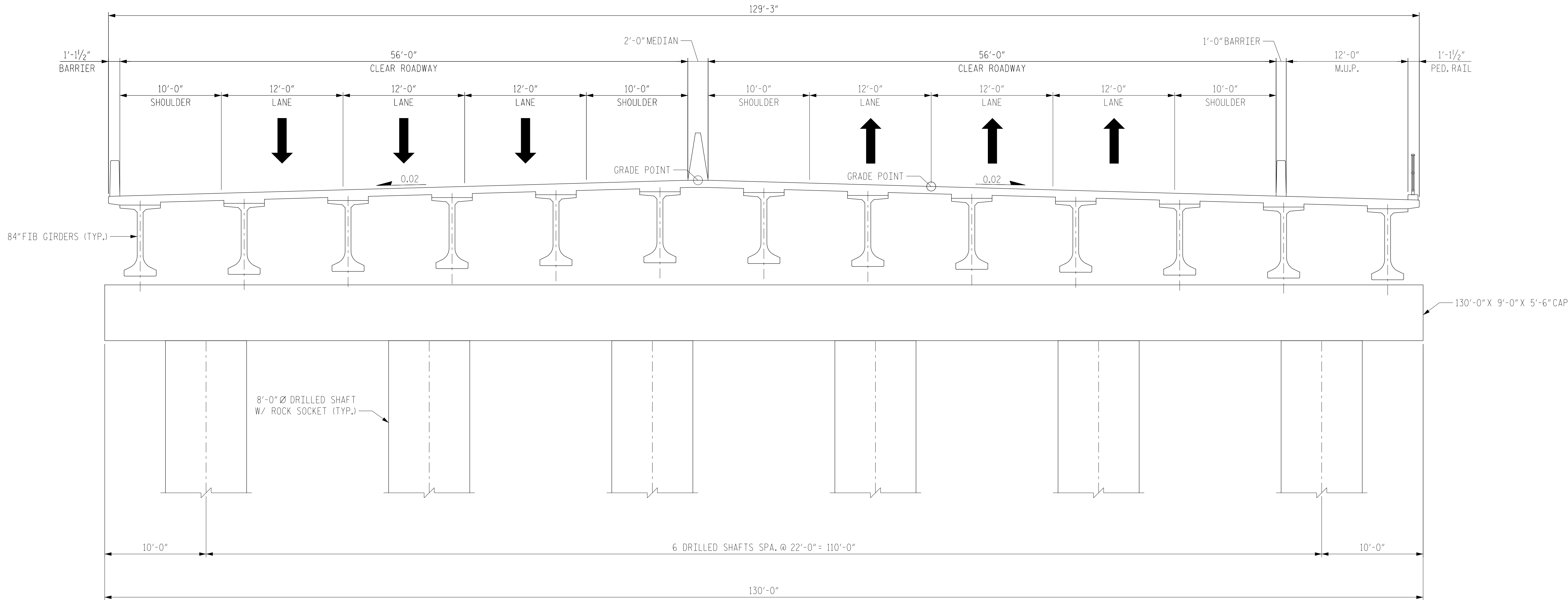
## APPENDIX D

### PROPOSED BRIDGE TYPICAL SECTIONS






BRIDGE PLANS ID	SHEET NO.
X	



c:\dms\pwise\cylon.drnks\009\732\2 Elevation (Bents 8-13).dgn 3:56:29 PM 11/20/2020 MSB

CONCEPTUAL  
PLANS

REV.			
REV.			
REV.			
REVIEWED			
QUAN.			
DR.			
DES.			
BY	CHK.	DATE	

**KCI TECHNOLOGIES**  
ENGINEERS | PLANNERS | SCIENTISTS | CONSTRUCTION MANAGERS

**SOUTH CAROLINA**  
**DEPARTMENT OF TRANSPORTATION**

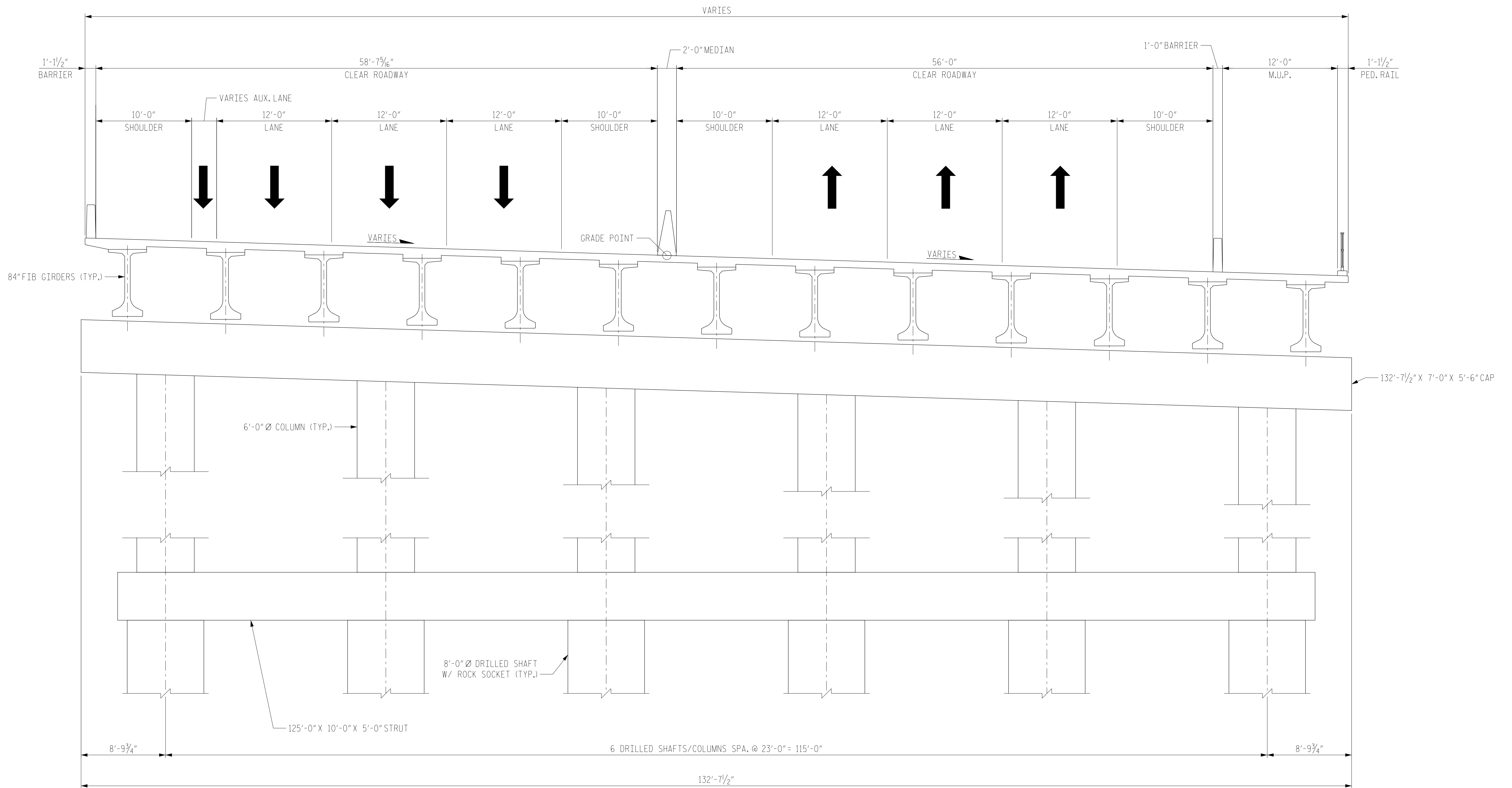
**ELEVATION (BENTS 8-13)**  
**US 278 CORRIDOR IMPROVEMENT**  
**OVER INTERCOASTAL WATERWAY**

**COUNTY**  
BEAUFORT

**ROUTE**  
US 278


MSB 11/20/2020 3:56:30 PM c:\pms\pwise\cylon.drnks\0019132\13 Elevation (Bents 14).dgn

BRIDGE PLANS ID	SHEET NO.
X	



CONCEPTUAL  
PLANS

REV.			
REV.			
REV.			
REVIEWED			
QUAN.			
DR.			
DES.			
BY	CHK.	DATE	

**KCI TECHNOLOGIES**  
ENGINEERS | PLANNERS | SCIENTISTS | CONSTRUCTION MANAGERS

**SOUTH CAROLINA**  
**DEPARTMENT OF TRANSPORTATION**

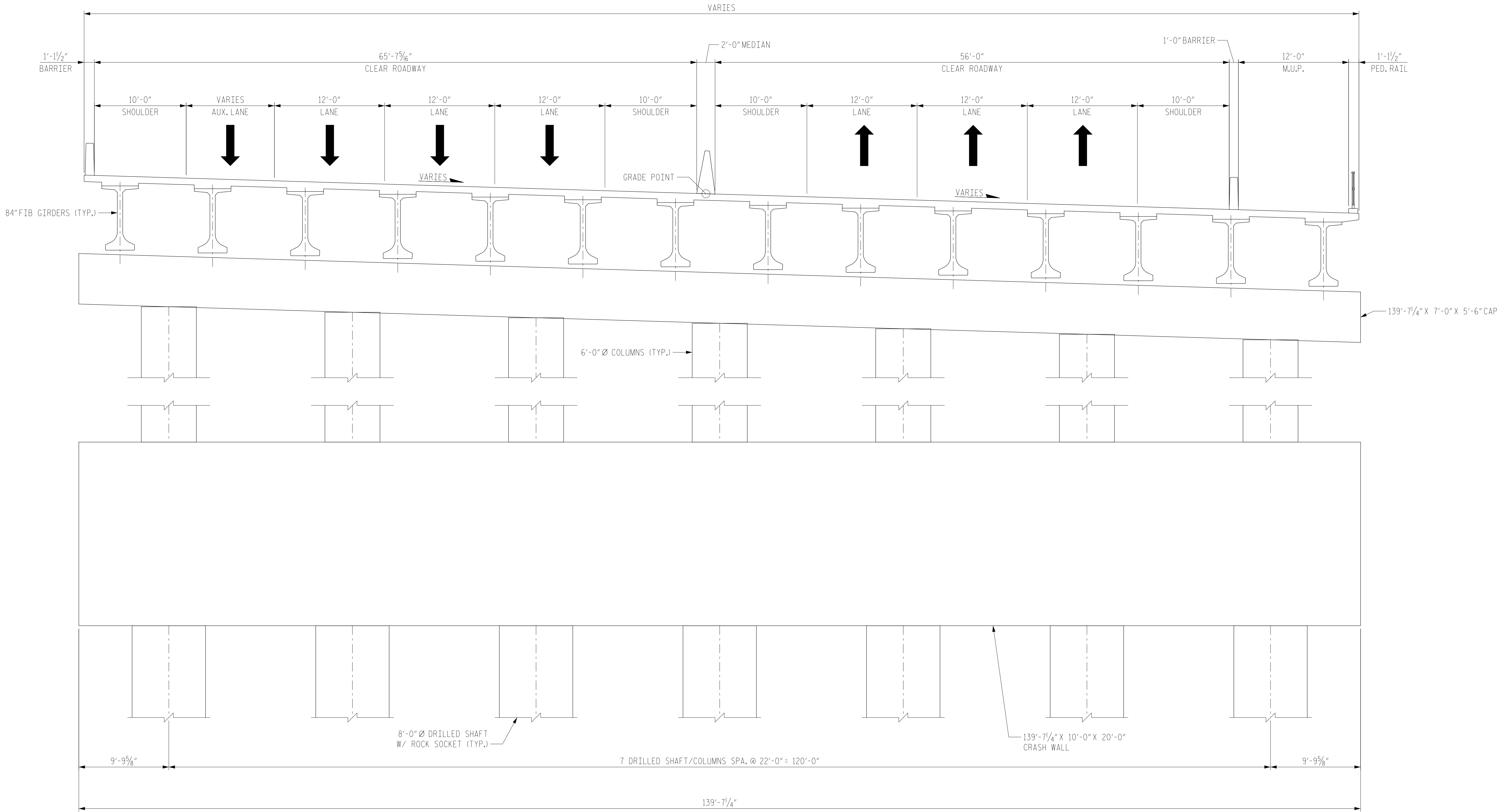
**ELEVATION (BENT 14)**  
**US 278 CORRIDOR IMPROVEMENT**  
**OVER INTERCOASTAL WATERWAY**

COUNTY  
BEAUFORT

ROUTE  
US 278

MSB 11/20/2020 3:56:32 PM c:\pms\pwise\cylon.drnks\001973214 Elevation (Bents) 15.dgn

BRIDGE PLANS ID	SHEET NO.
X	



CONCEPTUAL  
PLANS

REV.			
REV.			
REV.			
REVIEWED			
QUAN.			
DR.			
DES.			
BY	CHK.	DATE	

**KCI TECHNOLOGIES**  
KCI ENGINEERS | PLANNERS | SCIENTISTS | CONSTRUCTION MANAGERS

**SOUTH CAROLINA**  
**DEPARTMENT OF TRANSPORTATION**

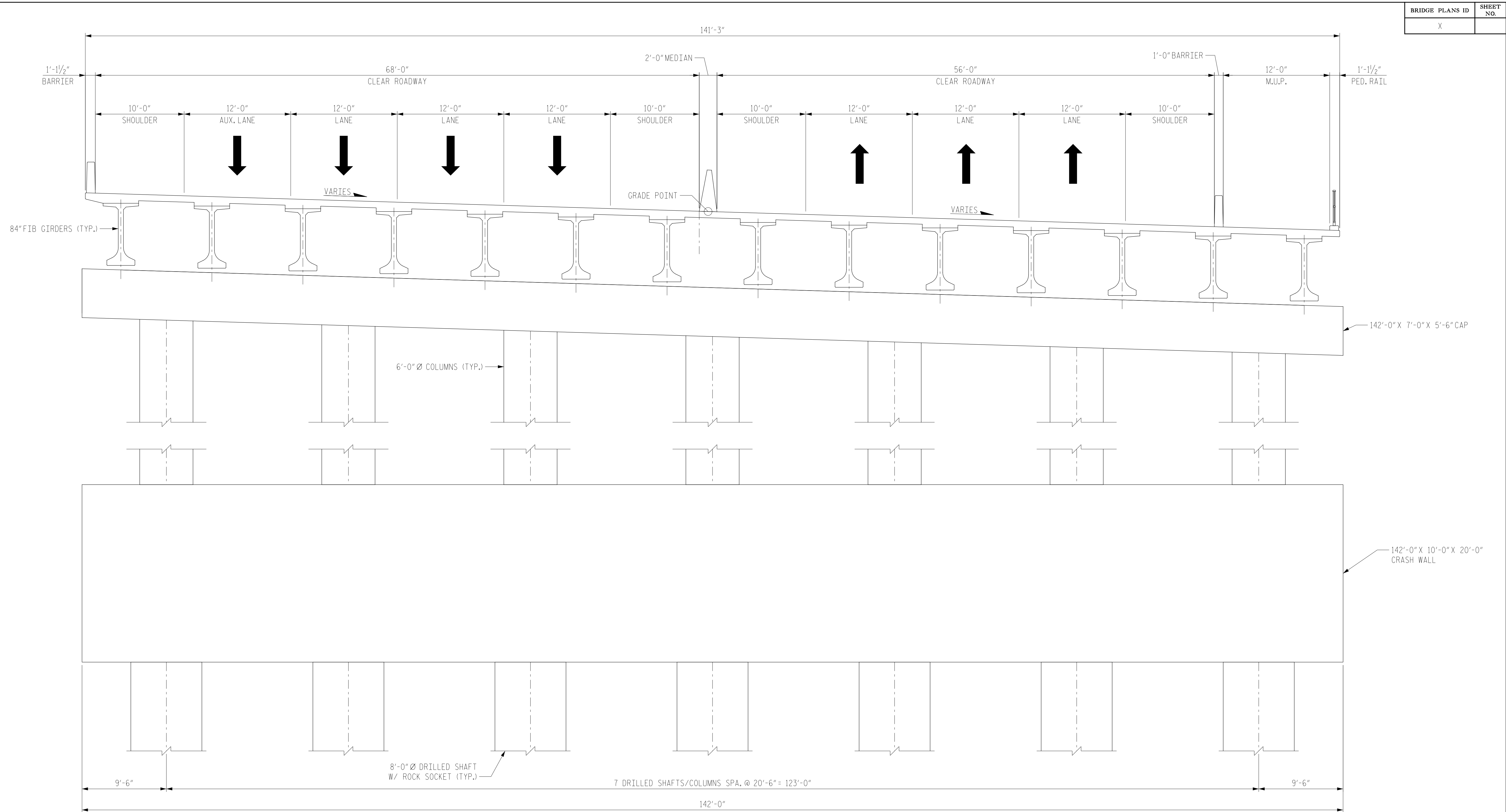
**ELEVATION (BENT 15)**

**US 278 CORRIDOR IMPROVEMENT  
OVER INTERCOASTAL WATERWAY**

COUNTY  
BEAUFORT

ROUTE  
US 278


MSB 11/20/2020 3:56:33 PM c:\pms\pwise\cylondrinks\009\732\15\_Elevation (Bents 16 & 17).dgn



BRIDGE PLANS ID	SHEET NO.
X	

CONCEPTUAL  
PLANS

REV.			
REV.			
REV.			
REVIEWED			
QUAN.			
DR.			
DES.			
BY	CHK.	DATE	

**KCI TECHNOLOGIES**  
ENGINEERS | PLANNERS | SCIENTISTS | CONSTRUCTION MANAGERS

**SOUTH CAROLINA**  
**DEPARTMENT OF TRANSPORTATION**  
**ELEVATION**  
**(BENTS 16 & 17)**  
**US 278 CORRIDOR IMPROVEMENT**  
**OVER INTERCOASTAL WATERWAY**

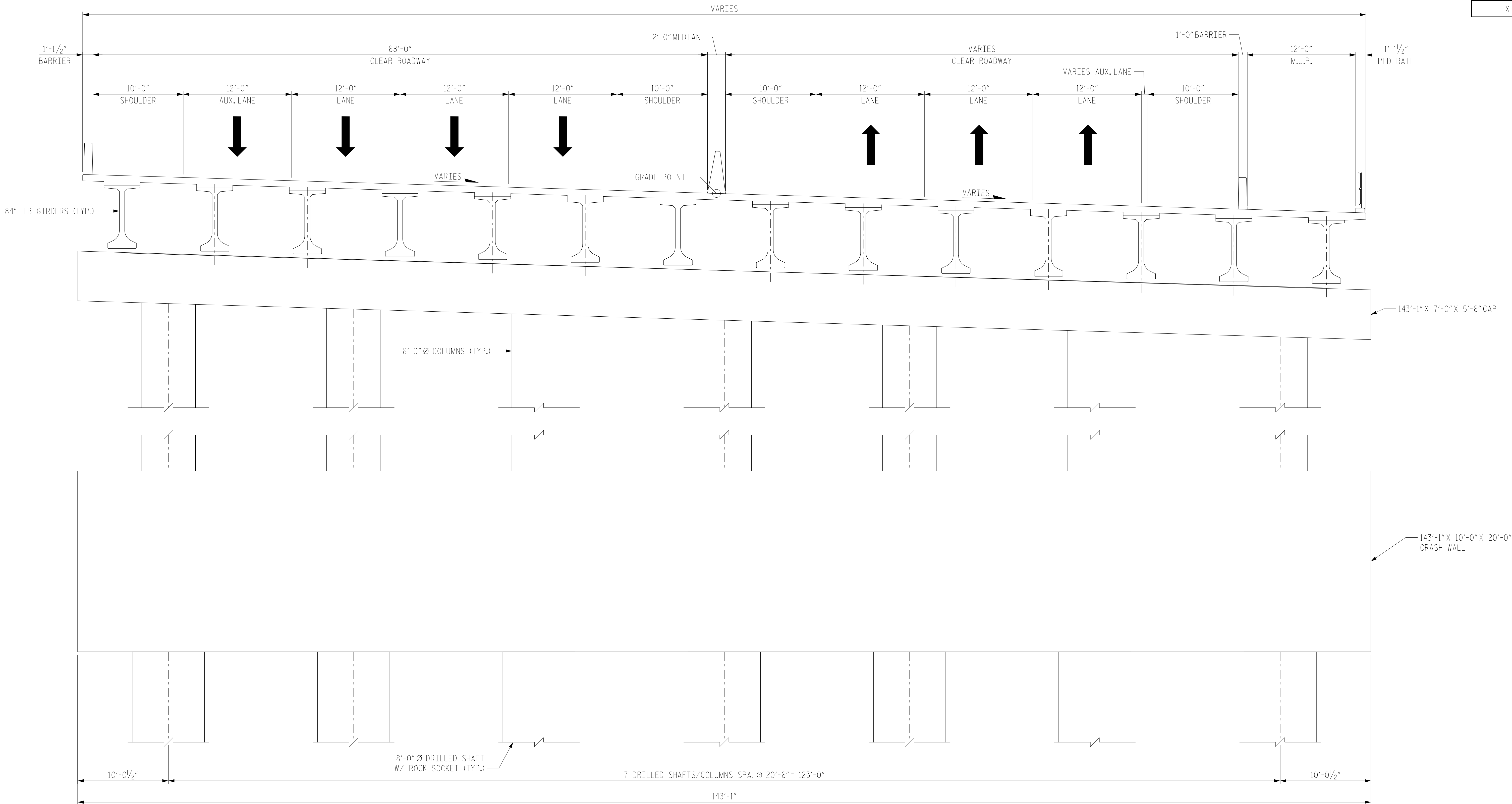
**COUNTY**  
BEAUFORT

**ROUTE**  
US 278



MSB 11/20/2020 3:56:35 PM c:\dms\pwise\cylon.drnks\00173216 Elevation (Bents) (B).dgn

BRIDGE PLANS ID	SHEET NO.
X	



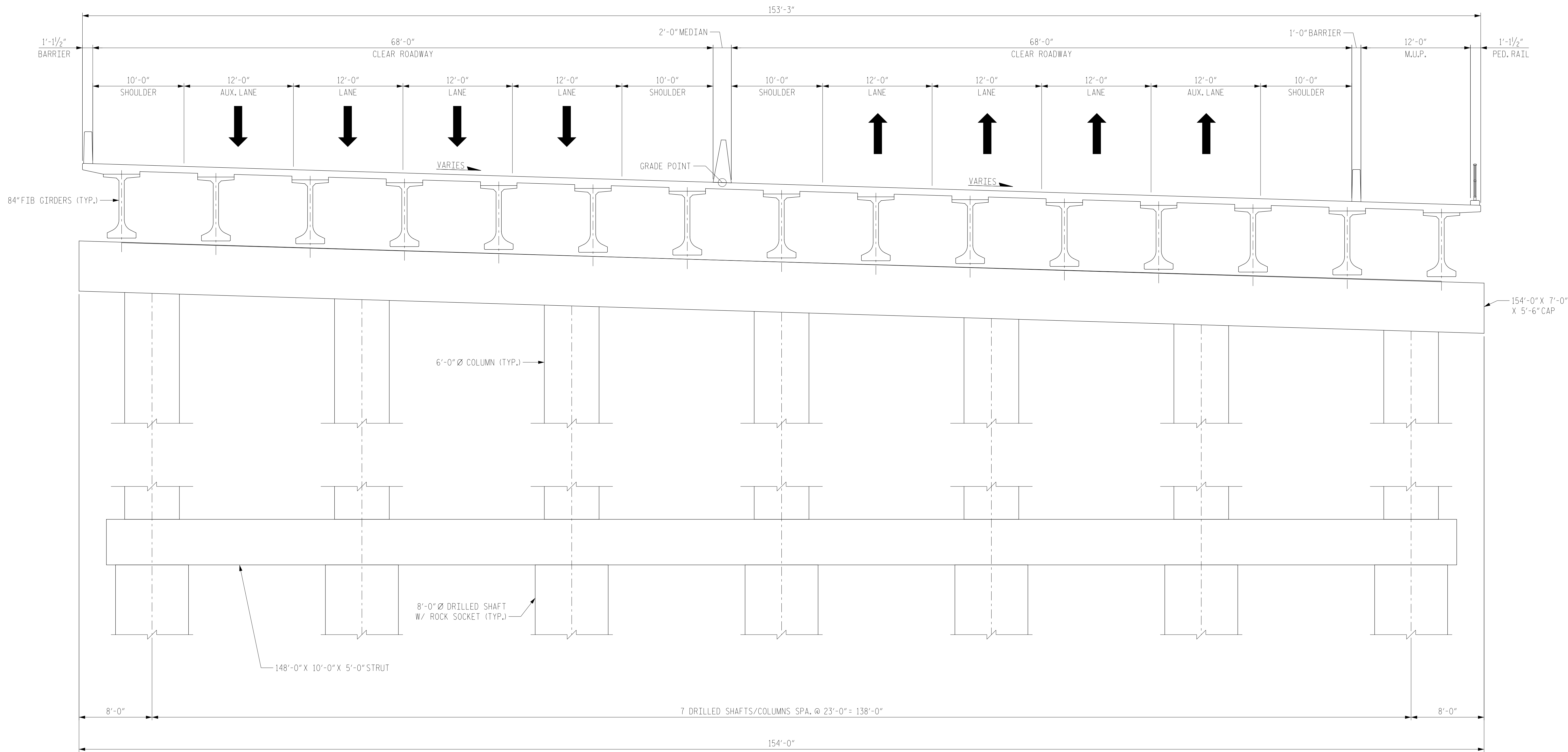
CONCEPTUAL  
PLANS

REV.			
REV.			
REV.			
REVIEWED			
QUAN.			
DR.			
DES.			
BY	CHK.	DATE	

KCI TECHNOLOGIES	
KCI	ENGINEERS   PLANNERS   SCIENTISTS   CONSTRUCTION MANAGERS
SOUTH CAROLINA DEPARTMENT OF TRANSPORTATION	
ELEVATION (BENT 18)	
US 278 CORRIDOR IMPROVEMENT OVER INTERCOASTAL WATERWAY	
COUNTY BEAUFORT	ROUTE US 278


MSB 11/20/2020 3:56:36 PM c:\pms\pwise\cylon.drnks\0019\132\17 Elevation (Bents) (b).dgn

BRIDGE PLANS ID	SHEET NO.
X	



CONCEPTUAL  
PLANS

REV.			
REV.			
REV.			
REVIEWED			
QUAN.			
DR.			
DES.			
BY	CHK.	DATE	

**KCI TECHNOLOGIES**  
ENGINEERS | PLANNERS | SCIENTISTS | CONSTRUCTION MANAGERS

**SOUTH CAROLINA**  
**DEPARTMENT OF TRANSPORTATION**

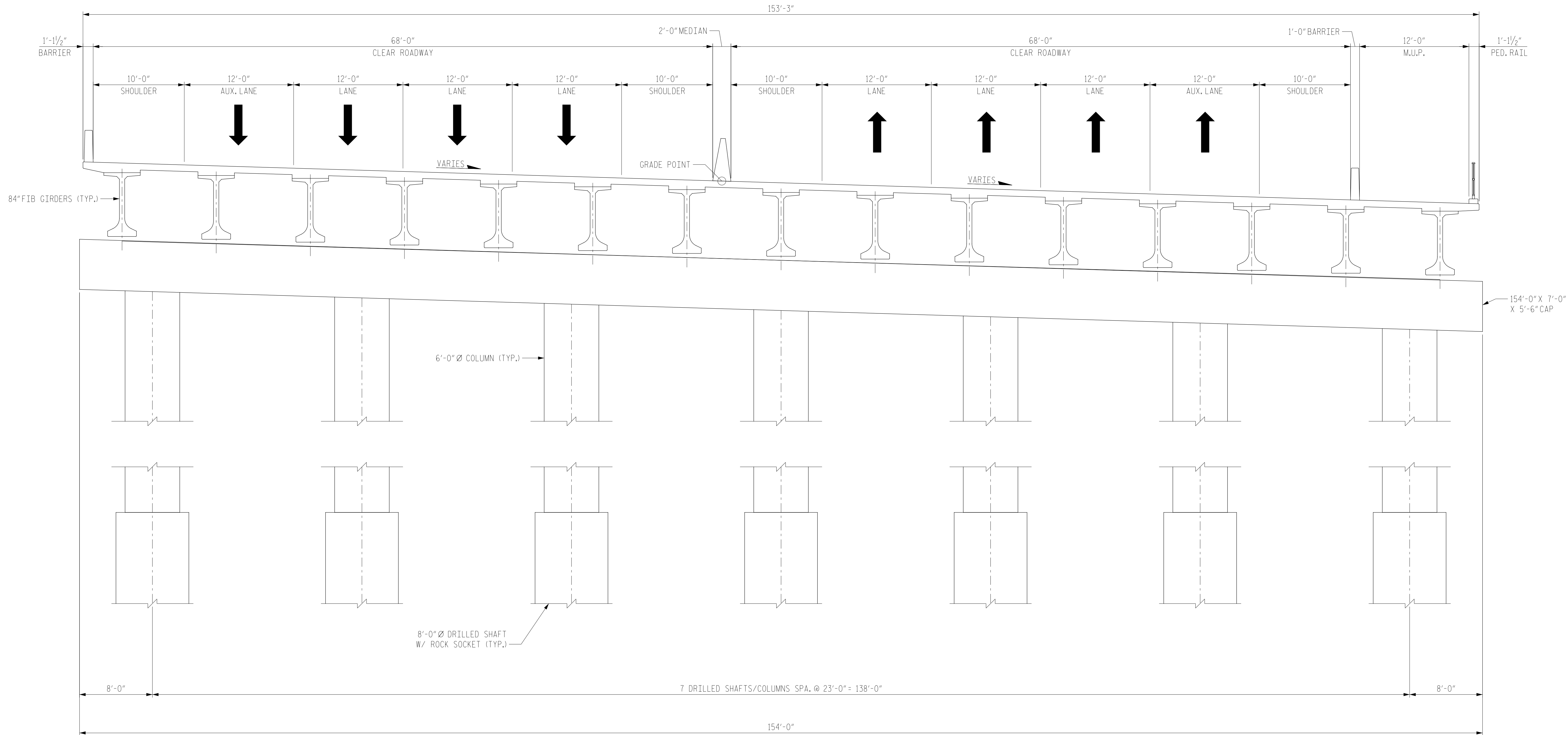
**ELEVATION (BENT 19)**  
**US 278 CORRIDOR IMPROVEMENT**  
**OVER INTERCOASTAL WATERWAY**

COUNTY  
BEAUFORT

ROUTE  
US 278


MSB 11/20/2020 3:56:38 PM c:\pms\pwise\cylon.drnks\00191321\8\_Elevation (Bents 20-26).dgn

BRIDGE PLANS ID	SHEET NO.
X	



CONCEPTUAL  
PLANS

REV.			
REV.			
REV.			
REVIEWED			
QUAN.			
DR.			
DES.			
BY	CHK.	DATE	

**KCI TECHNOLOGIES**  
ENGINEERS | PLANNERS | SCIENTISTS | CONSTRUCTION MANAGERS

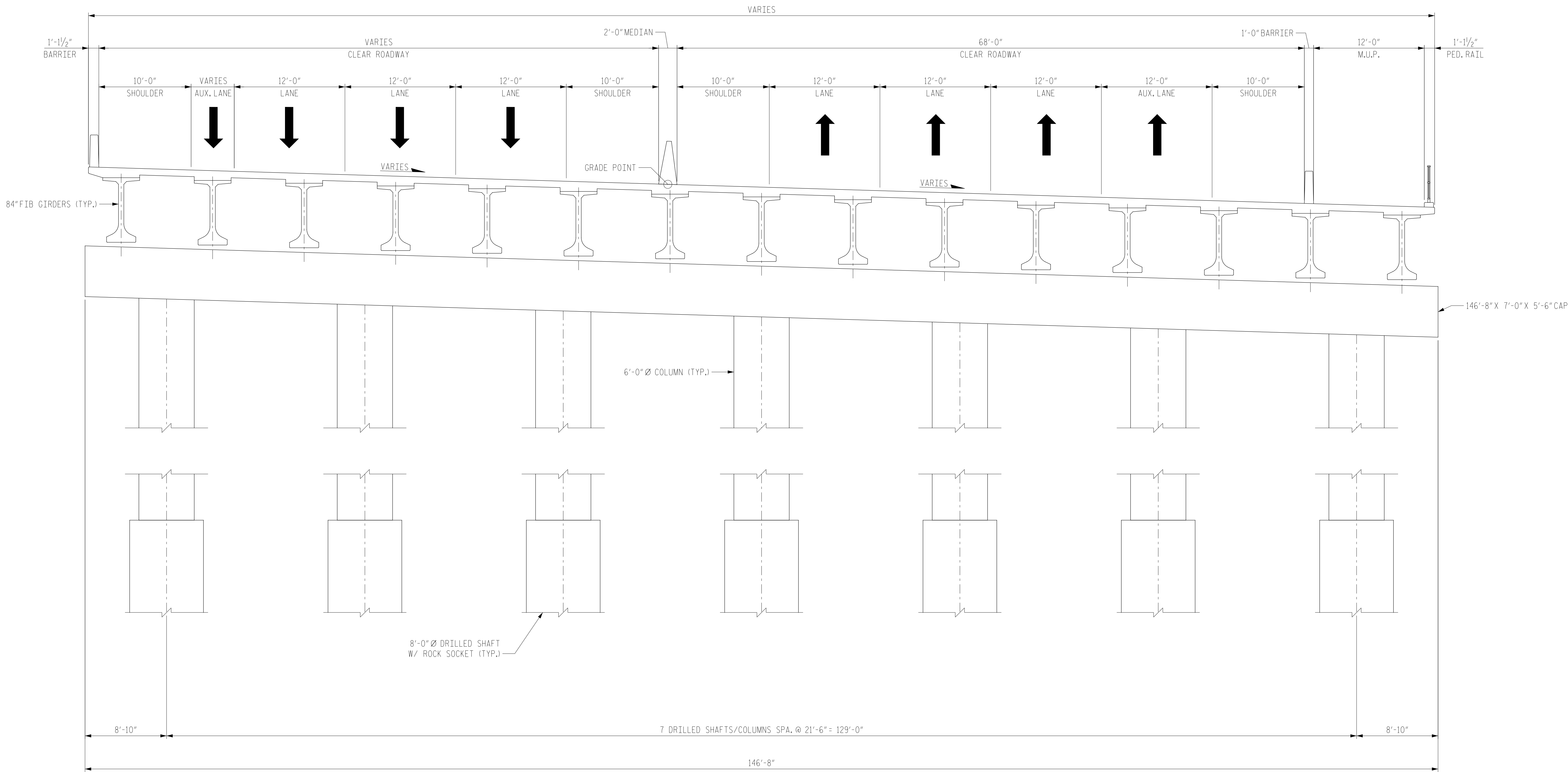
**SOUTH CAROLINA**  
**DEPARTMENT OF TRANSPORTATION**  
**ELEVATION (BENTS 20-26)**  
**US 278 CORRIDOR IMPROVEMENT**  
**OVER INTERCOASTAL WATERWAY**

COUNTY  
BEAUFORT

ROUTE  
US 278

MSB 11/20/2020 3:56:40 PM c:\gms\pwise\cylon.drnk\0019\32\19 Elevation (Bents 27).dgn

BRIDGE PLANS ID	SHEET NO.
X	



CONCEPTUAL  
PLANS

REV.			
REV.			
REV.			
REVIEWED			
QUAN.			
DR.			
DES.			
BY	CHK.	DATE	

**KCI TECHNOLOGIES**  
KCI ENGINEERS | PLANNERS | SCIENTISTS | CONSTRUCTION MANAGERS

**SOUTH CAROLINA**  
DEPARTMENT OF TRANSPORTATION

**ELEVATION (BENT 27)**

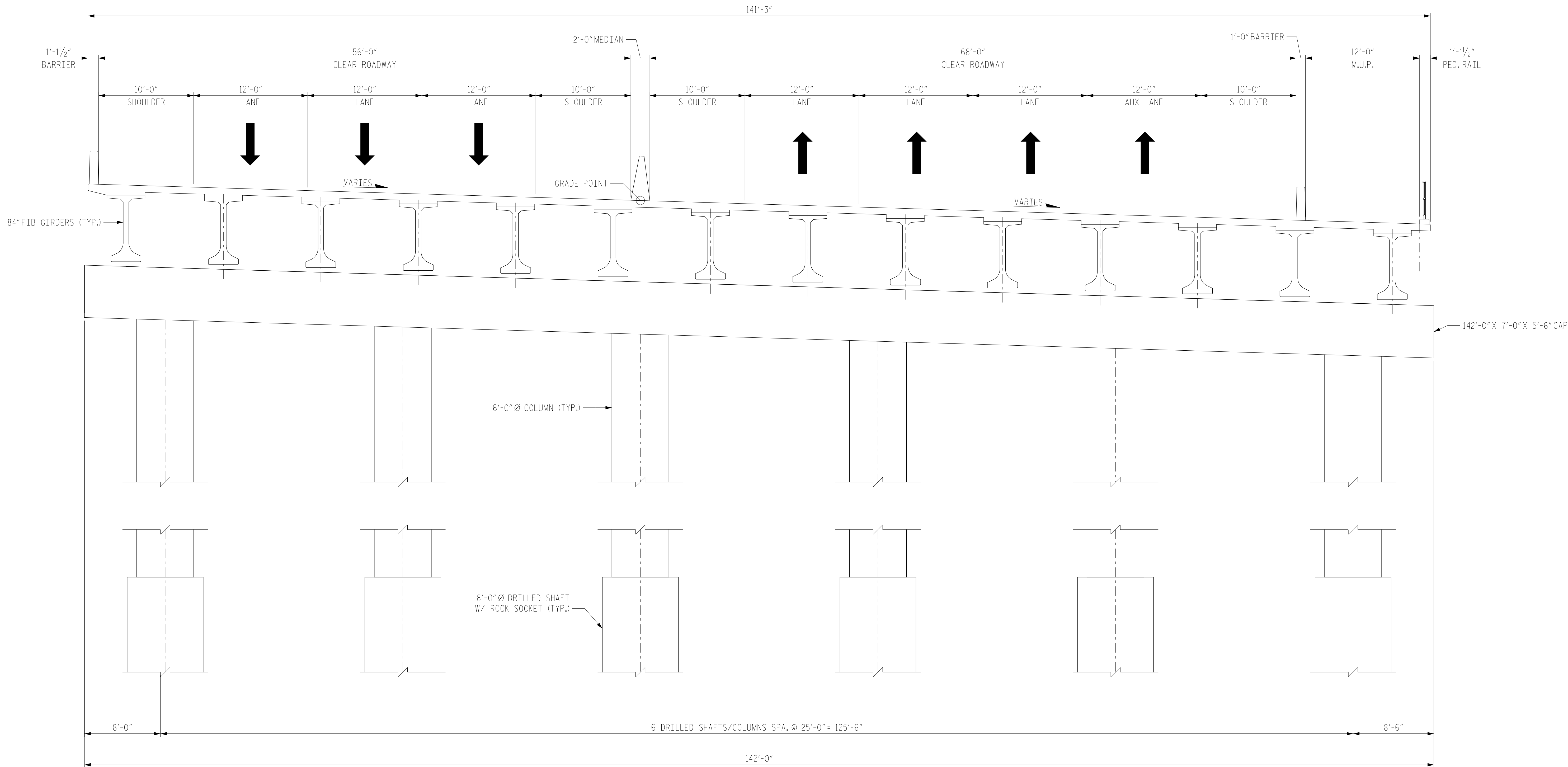
**US 278 CORRIDOR IMPROVEMENT  
OVER INTERCOASTAL WATERWAY**

COUNTY  
BEAUFORT

ROUTE  
US 278


MSB 11/20/2020 3:56:41 PM c:\dms\pwise\cylondrks\0019132120.Elevation (Bents 28-31).dgn

BRIDGE PLANS ID	SHEET NO.
X	



CONCEPTUAL  
PLANS

REV.			
REV.			
REV.			
REVIEWED			
QUAN.			
DR.			
DES.			
BY	CHK.	DATE	

**KCI TECHNOLOGIES**  
ENGINEERS | PLANNERS | SCIENTISTS | CONSTRUCTION MANAGERS

**SOUTH CAROLINA**  
**DEPARTMENT OF TRANSPORTATION**  
**ELEVATION**  
**(BENTS 28-31)**  
**US 278 CORRIDOR IMPROVEMENT**  
**OVER INTERCOASTAL WATERWAY**

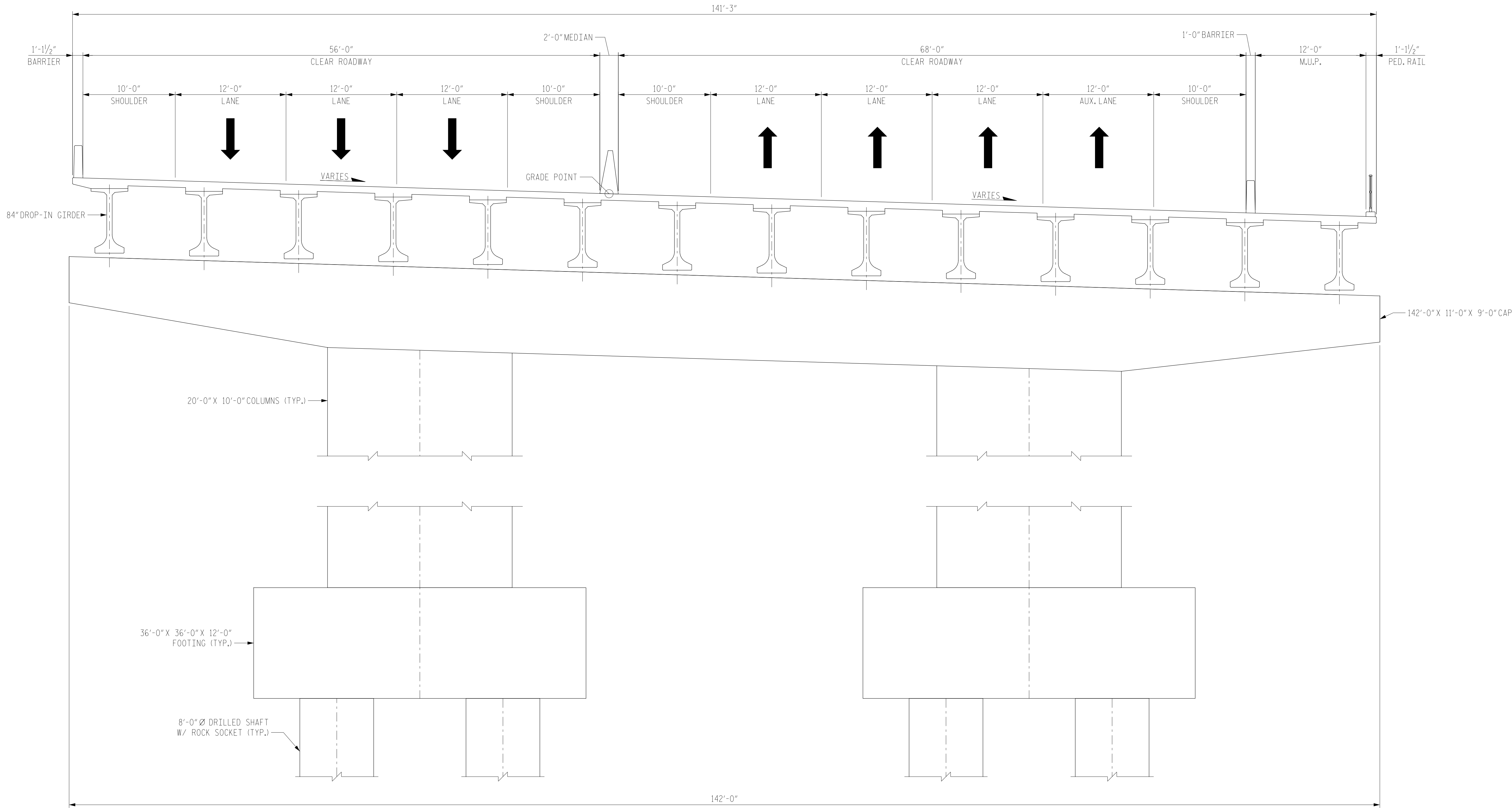
COUNTY  
BEAUFORT

ROUTE  
US 278



MSB 11/20/2020 3:56:43 PM c:\pms\pwise\cylon.drnks\001\732\21 Elevation (Bents 32).dgn

BRIDGE PLANS ID	SHEET NO.
X	



CONCEPTUAL  
PLANS

REV.			
REV.			
REV.			
REVIEWED			
QUAN.			
DR.			
DES.			
BY	CHK.	DATE	

**KCI TECHNOLOGIES**  
KCI ENGINEERS | PLANNERS | SCIENTISTS | CONSTRUCTION MANAGERS

**SOUTH CAROLINA**  
DEPARTMENT OF TRANSPORTATION

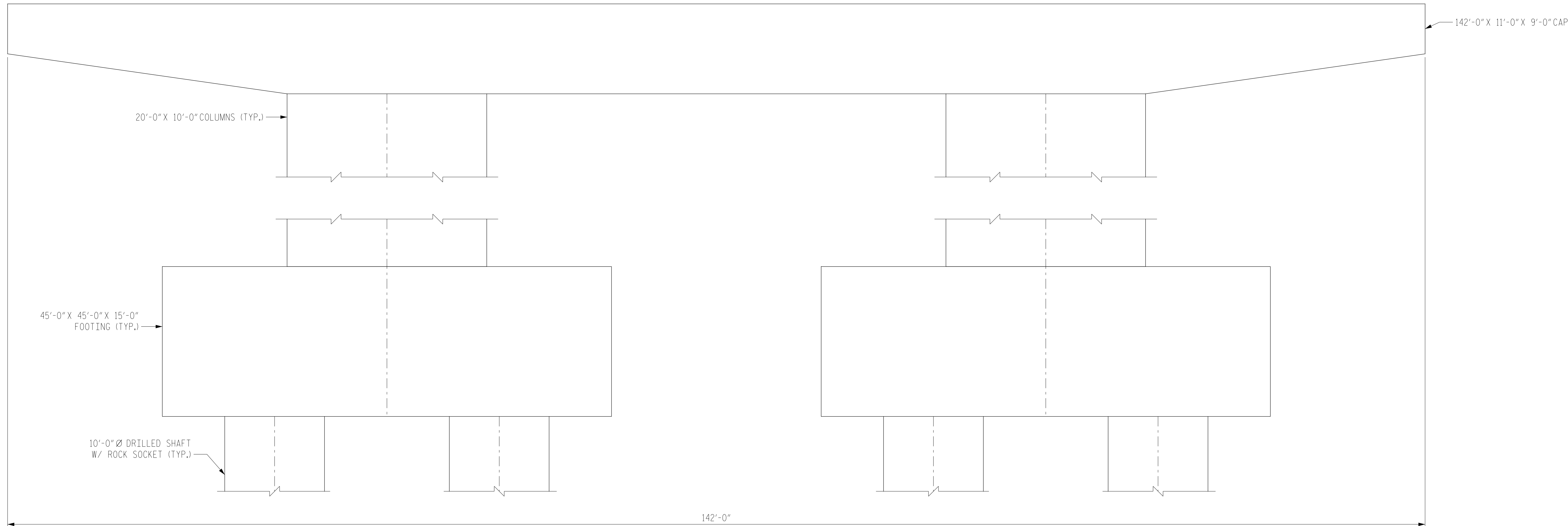
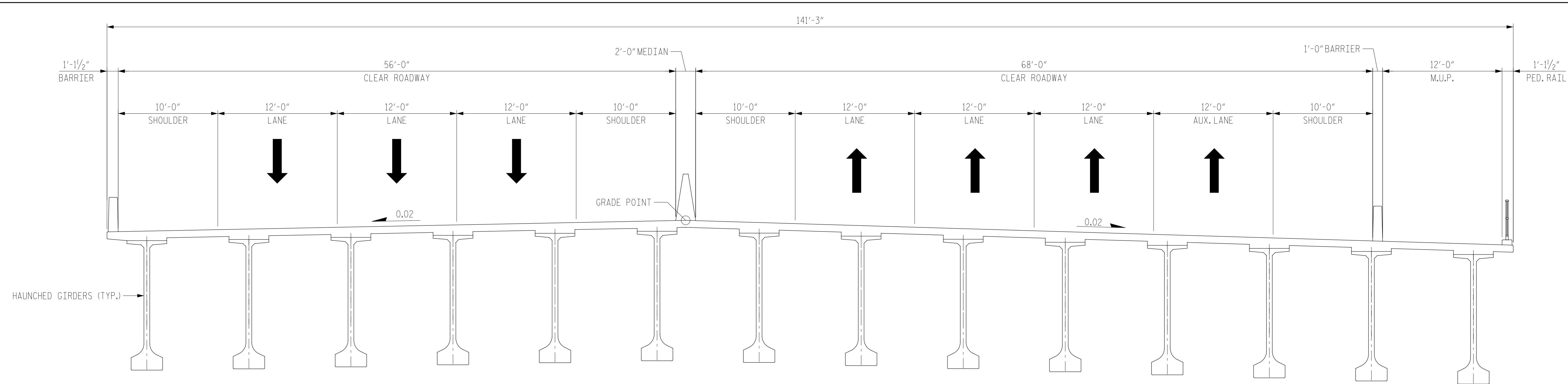
**ELEVATION (BENT 32)**

**US 278 CORRIDOR IMPROVEMENT  
OVER INTERCOASTAL WATERWAY**

COUNTY  
BEAUFORT


ROUTE  
US 278

c:\pms\pwise\cody\on-drns\001\732\22 Elevation (Bents 33 & 34).dgn 11/20/2020 3:56:44 PM MSB



CONCEPTUAL  
PLANS

REV.			
REV.			
REV.			
REVIEWED			
QUAN.			
DR.			
DES.			
BY	CHK.	DATE	

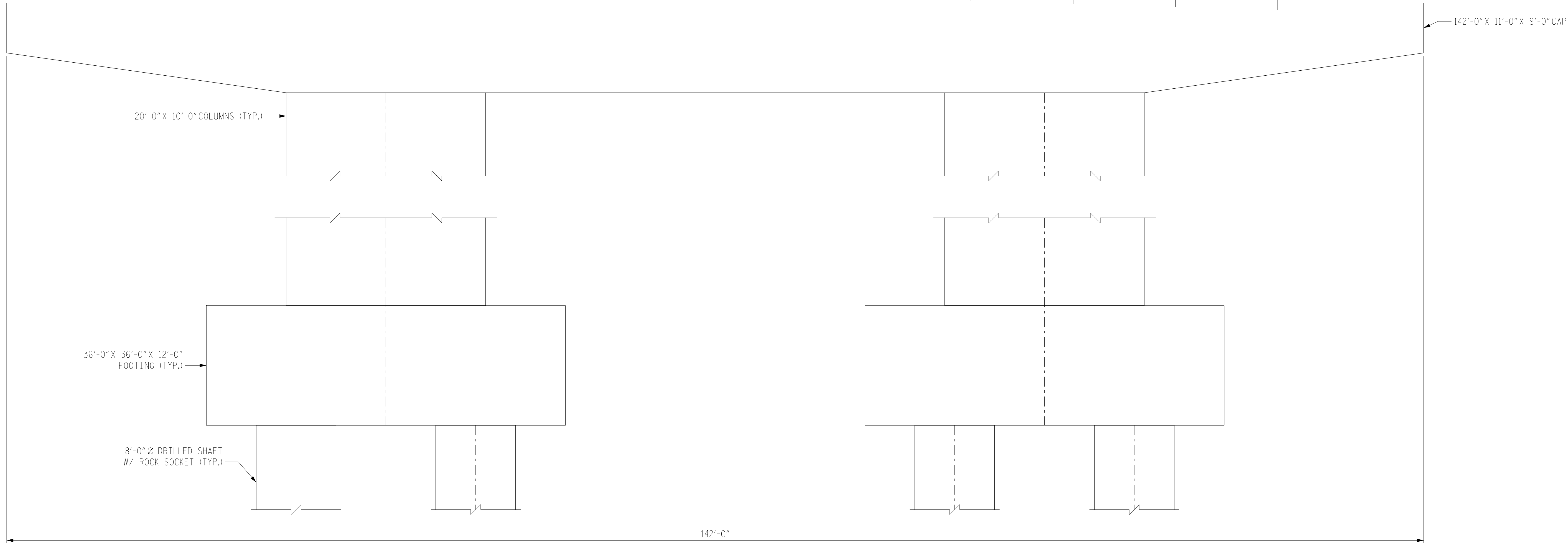
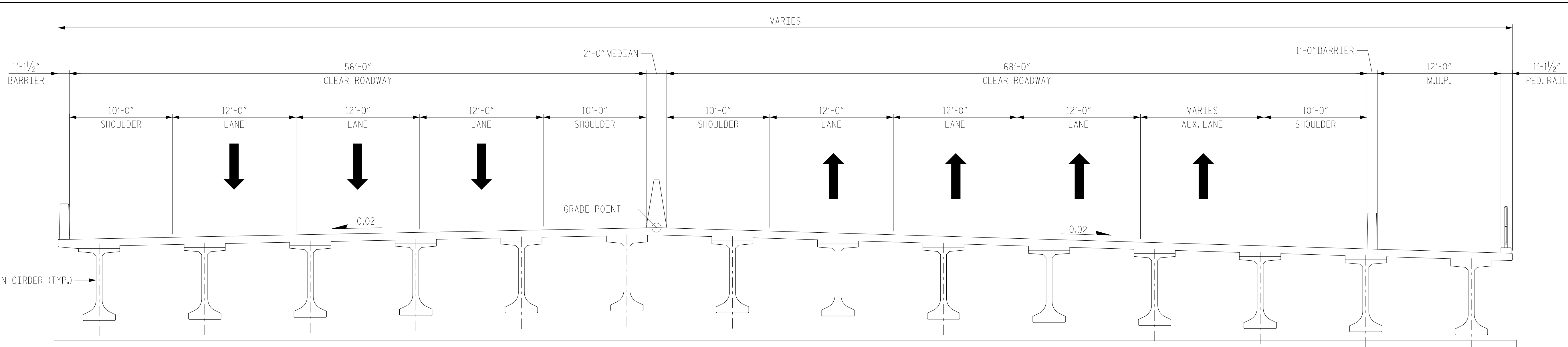
**KCI TECHNOLOGIES**  
ENGINEERS | PLANNERS | SCIENTISTS | CONSTRUCTION MANAGERS

**SOUTH CAROLINA**  
**DEPARTMENT OF TRANSPORTATION**  
**ELEVATION**  
**(BENTS 33 & 34)**  
**US 278 CORRIDOR IMPROVEMENT**  
**OVER INTERCOASTAL WATERWAY**

COUNTY  
BEAUFORT


ROUTE  
US 278

MSB 11/20/2020 3:56:46 PM c:\dms\pwise\cody\ndrns\0019732\23 Elevation (Bents 35).dgn



CONCEPTUAL  
PLANS

REV.			
REV.			
REV.			
REVIEWED			
QUAN.			
DR.			
DES.			
BY	CHK.	DATE	

**KCI TECHNOLOGIES**  
ENGINEERS | PLANNERS | SCIENTISTS | CONSTRUCTION MANAGERS

**SOUTH CAROLINA**  
**DEPARTMENT OF TRANSPORTATION**

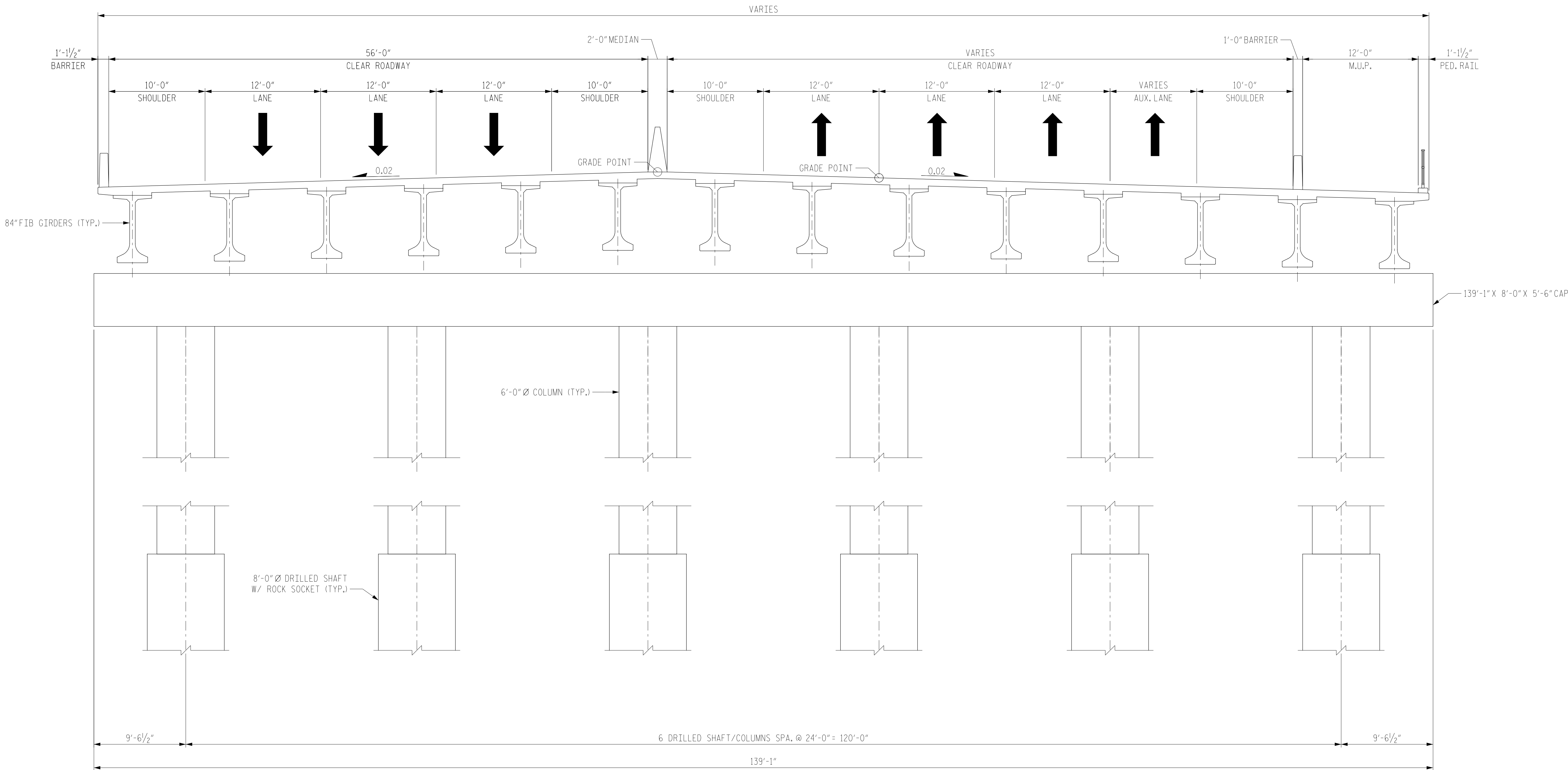
**ELEVATION (BENT 35)**  
**US 278 CORRIDOR IMPROVEMENT**  
**OVER INTERCOASTAL WATERWAY**

COUNTY  
BEAUFORT

ROUTE  
US 278


c:\dms\pwise\cylon.drnks\0019732124 Elevation (Bents 36).dgn 3:56:47 PM 11/20/2020 MSB

BRIDGE PLANS ID	SHEET NO.
X	



CONCEPTUAL  
PLANS

REV.			
REV.			
REV.			
REVIEWED			
QUAN.			
DR.			
DES.			
BY	CHK.	DATE	

**KCI TECHNOLOGIES**  
ENGINEERS | PLANNERS | SCIENTISTS | CONSTRUCTION MANAGERS

**SOUTH CAROLINA**  
**DEPARTMENT OF TRANSPORTATION**

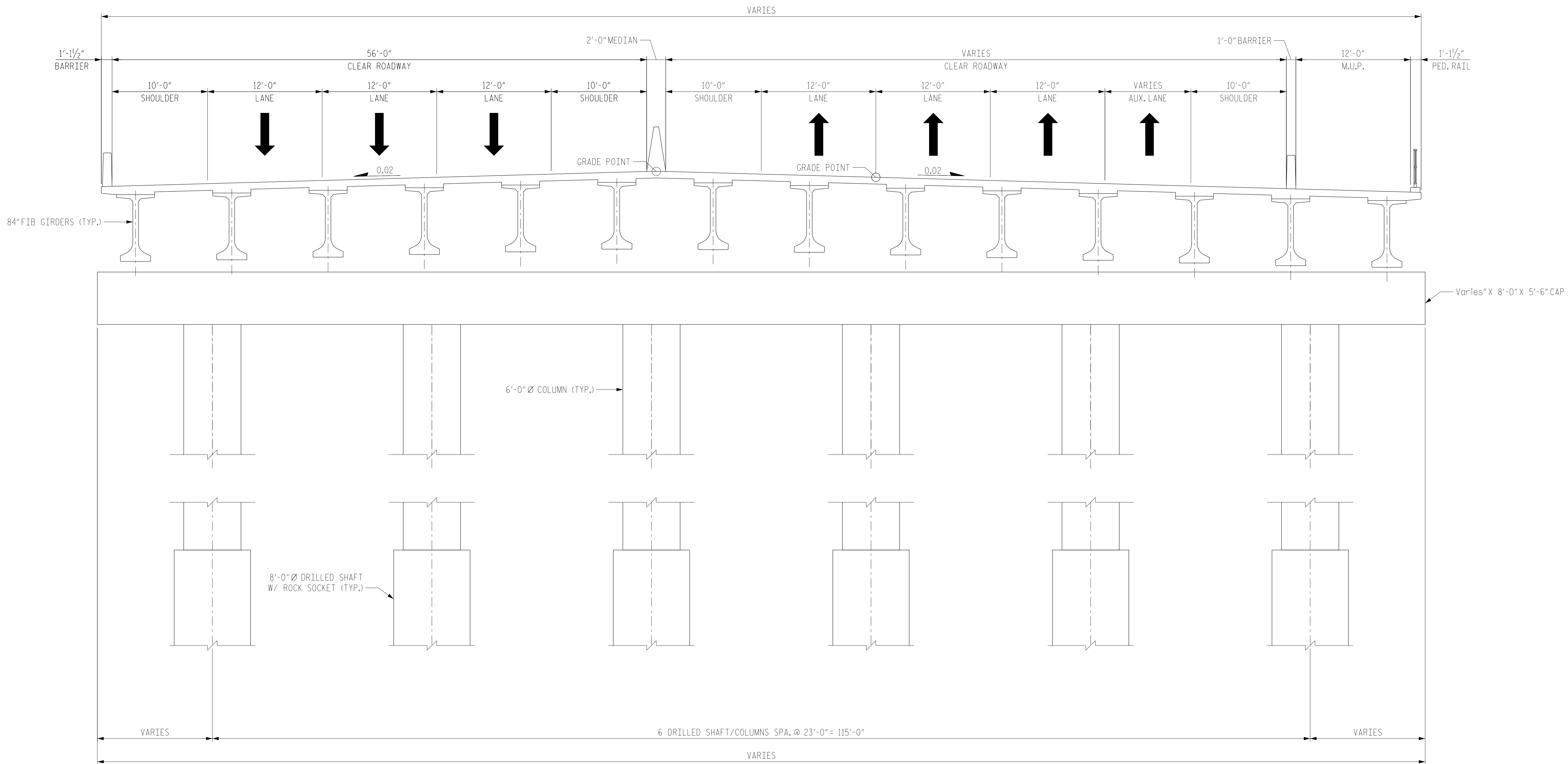
**ELEVATION (BENT 36)**  
**US 278 CORRIDOR IMPROVEMENT**  
**OVER INTERCOASTAL WATERWAY**

**COUNTY**  
BEAUFORT

**ROUTE**  
US 278


c:\dms\pwise\cylon.drnks\001\732\25 Elevation (Bents 37 & 38).dgn 11/20/2020 3:56:49 PM MSB

BRIDGE PLANS ID	SHEET NO.
X	



CONCEPTUAL  
PLANS

REV.			
REV.			
REV.			
REVIEWED			
QUAN.			
DR.			
DES.			
BY	CHK.	DATE	

**KCI TECHNOLOGIES**  
ENGINEERS | PLANNERS | SCIENTISTS | CONSTRUCTION MANAGERS

**SOUTH CAROLINA**  
**DEPARTMENT OF TRANSPORTATION**  
**ELEVATION**  
**(BENT 37 & 38)**  
**US 278 CORRIDOR IMPROVEMENT**  
**OVER INTERCOASTAL WATERWAY**

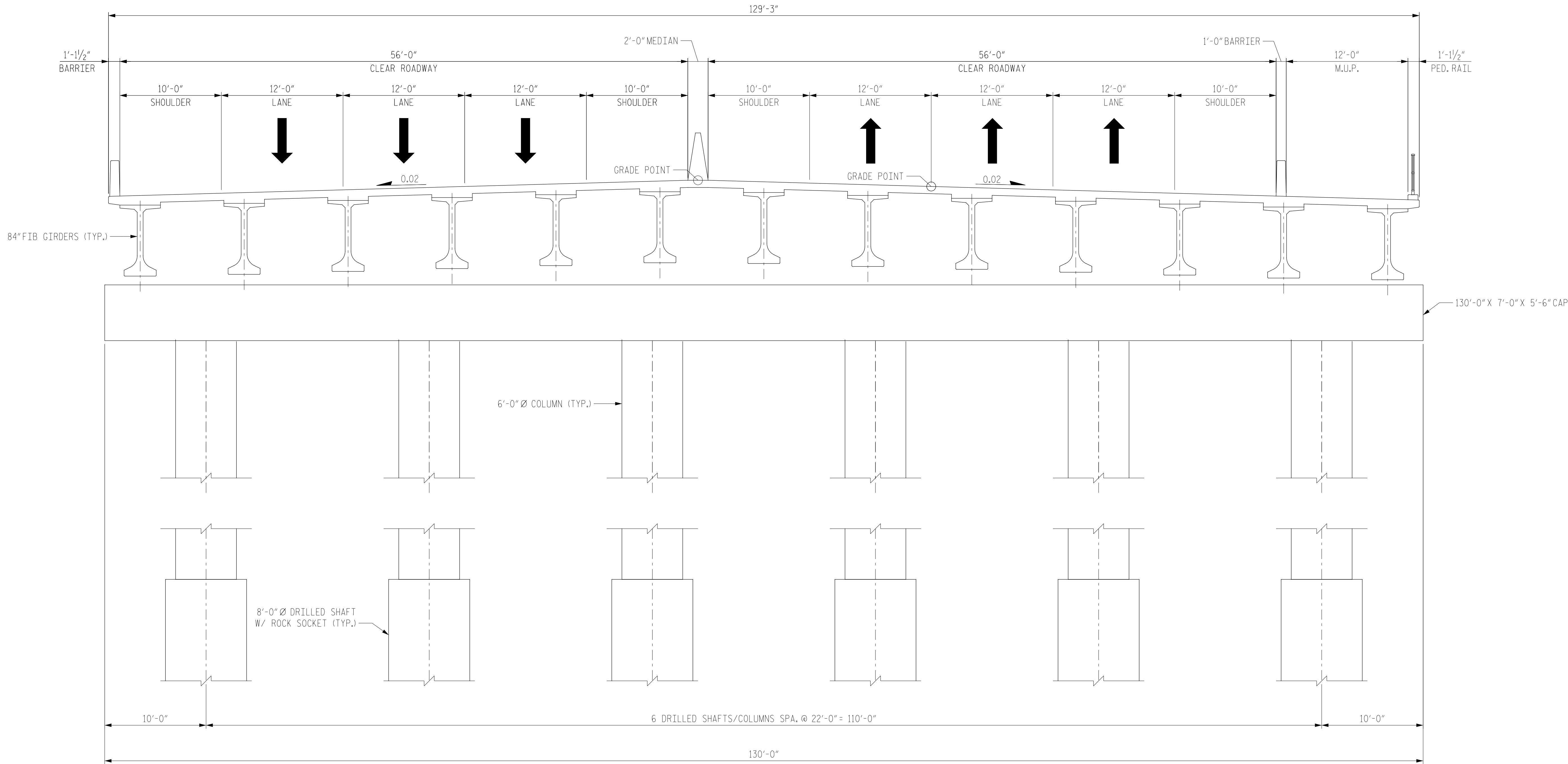
COUNTY  
BEAUFORT

ROUTE  
US 278



c:\dms\pwise\cylton.drnks\001732\26 Elevation (Bents 39-43).dgn 3:56:50 PM 11/20/2020 MSB

BRIDGE PLANS ID	SHEET NO.
X	



CONCEPTUAL  
PLANS

REV.			
REV.			
REV.			
REVIEWED			
QUAN.			
DR.			
DES.			
BY	CHK.	DATE	



SOUTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

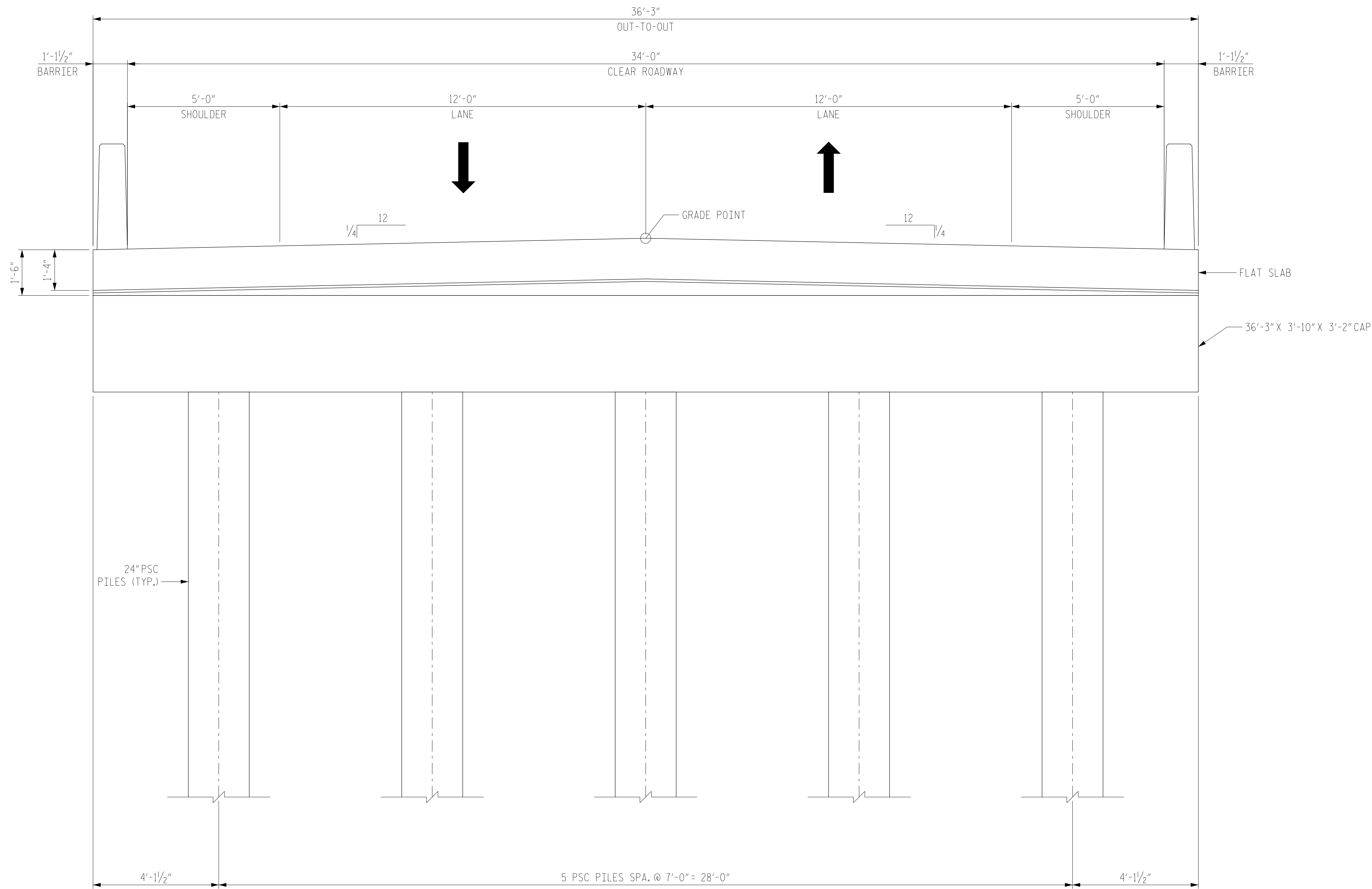
ELEVATION (BENTS 39-43)

US 278 CORRIDOR IMPROVEMENT  
OVER INTERCOASTAL WATERWAY

COUNTY BEAUFORT ROUTE US 278


MSB 11/20/2020 3:51:04 PM c:\pms\pwise\cody\on-dmrks\0019\732\29- Hog Island Elevation.dgn

BRIDGE PLANS ID	SHEET NO.
X	3



CONCEPTUAL  
PLANS

REV.			
REV.			
REV.			
REVIEWED			
QUAN.			
DR.			
DES.			
BY	CHK.	DATE	

**KCI TECHNOLOGIES**  
ENGINEERS | PLANNERS | SCIENTISTS | CONSTRUCTION MANAGERS

**SOUTH CAROLINA**  
**DEPARTMENT OF TRANSPORTATION**

**BENT ELEVATION**  
**S-7-772 (BLUE HERON POINT RD EXT.)**  
**OVER INTERCOASTAL WATERWAY**

COUNTY  
BEAUFORT

ROUTE  
S-7-772

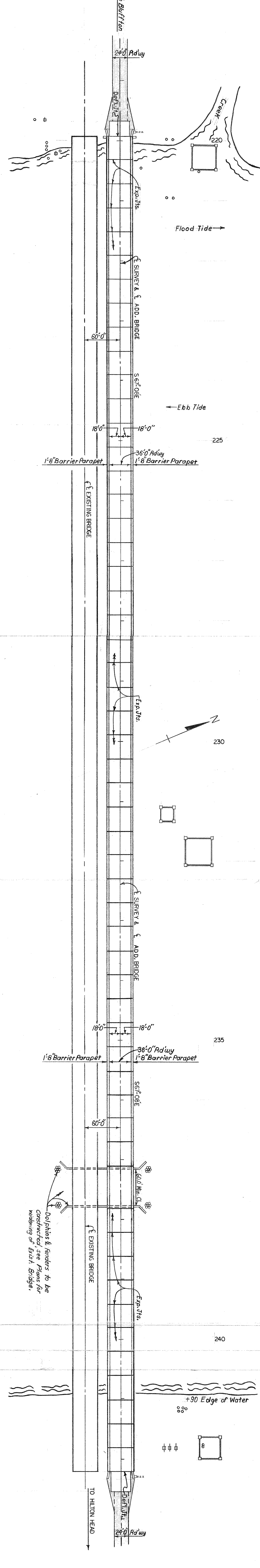


# APPENDIX E

## EXISTING US 278 BRIDGES OVER MACKAY CREEK AND SKULL CREEK PROFILES



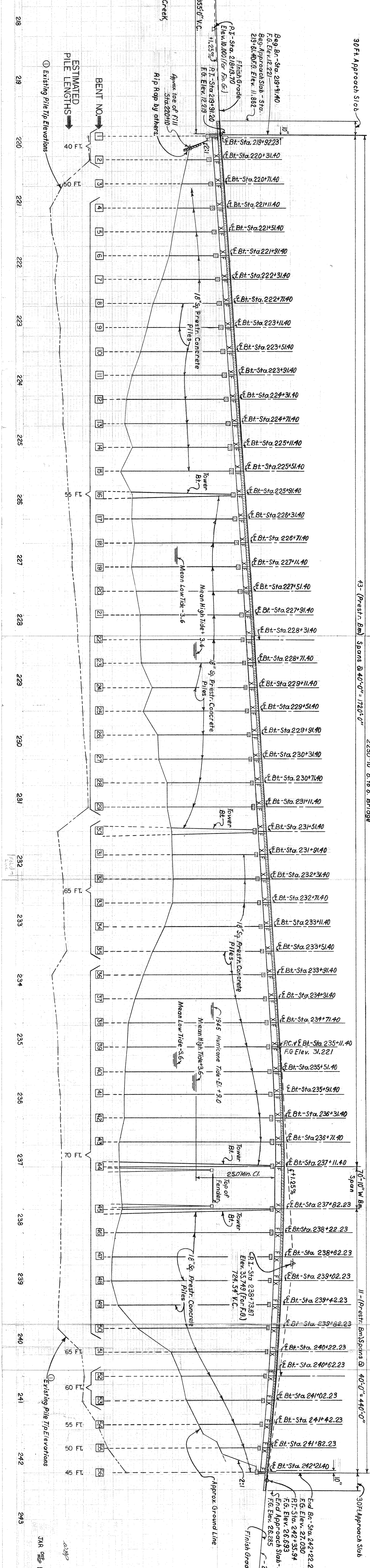
FINISH GRADE ELEVATIONS			
BENT NO.	ELEV.	BENT NO.	ELEV.
1	12.232	23	26.221
2	12.721	30	26.721
3	13.221	31	27.221
4	13.721	32	27.721
5	14.221	33	28.221
6	14.721	34	28.721
7	15.221	35	29.221
8	15.721	36	29.721
9	16.221	37	30.221
10	16.721	38	30.721
11	17.221	39	31.221
12	17.721	40	31.721
13	18.221	41	32.221
14	18.721	42	32.721
15	19.221	43	33.221
16	19.721	44	33.721
17	20.221	45	34.221
18	20.721	46	34.721
19	21.221	47	35.221
20	21.721	48	35.721
21	22.221	49	36.221
22	22.721	50	36.721
23	23.221	51	37.221
24	23.721	52	37.721
25	24.221	53	38.221
26	24.721	54	38.721
27	25.221	55	39.221
28	25.721	56	39.721



BEAUFORT 7418 U.S. 278 7 21

NOTES:  
Datum: Mean Sea Level = Elev. 0.0.  
Design Speed = 60 M.P.H.  
For Summary of Quantities, see S4.9.  
Construct Curb & Gutter with Catch Basin  
and Pipe Slope Down on Left Side of  
Rightway, at Beg. & End of Bridge and  
Construct Curb & Gutter on Right Side  
of Rightway, at Beg. & End of Bridge.  
For Standard Notes & Details, see S4.9,  
p. 25.

FINISH GRADE ELEVATIONS			
BENT NO.	ELEV.	BENT NO.	ELEV.
1	12.232	23	26.221
2	12.721	30	26.721
3	13.221	31	27.221
4	13.721	32	27.721
5	14.221	33	28.221
6	14.721	34	28.721
7	15.221	35	29.221
8	15.721	36	29.721
9	16.221	37	30.221
10	16.721	38	30.721
11	17.221	39	31.221
12	17.721	40	31.721
13	18.221	41	32.221
14	18.721	42	32.721
15	19.221	43	33.221
16	19.721	44	33.721
17	20.221	45	34.221
18	20.721	46	34.721
19	21.221	47	35.221
20	21.721	48	35.721
21	22.221	49	36.221
22	22.721	50	36.721
23	23.221	51	37.221
24	23.721	52	37.721
25	24.221	53	38.221
26	24.721	54	38.721
27	25.221	55	39.221
28	25.721	56	39.721



PLAN AND PROFILE  
FOR ADD. BRIDGE OVER  
MACKAYS CREEK

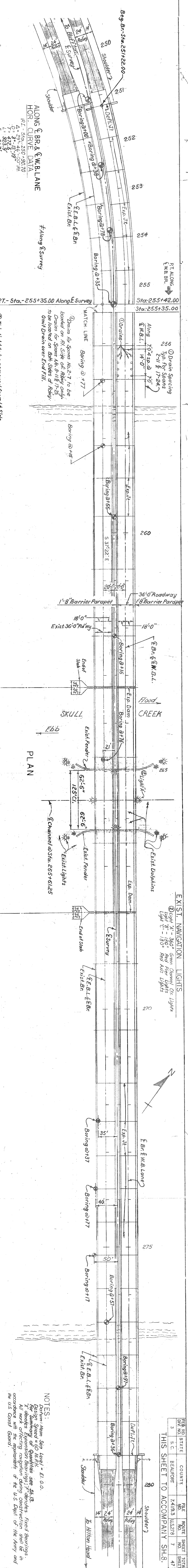
SCALE: 1" = 50' (VERT)  
1" = 50' (PLAN)

JAN 11-79  
7418  
BEAUFORT U.S. 278 1 - 80



PROJECT NO.	STATE	COUNTY	FILE NO.	SHEET NO.	TOTAL SHEETS
3	S.C.	BEAUFORT	7419.3	US278	7
THIS SHEET TO ACCOMPANY SH.8.					

EXIST. NAVIGATION LIGHTS  
② Light A - 360° Green Channel Light  
Light C - 180° Red Aft Light



NOTE: Stationing shown on this sheet is along EBR & CWBL unless otherwise indicated.

PI - Sta. 255+35.00 Along E Survey  
PT - Sta. 255+35.00 Along E Survey

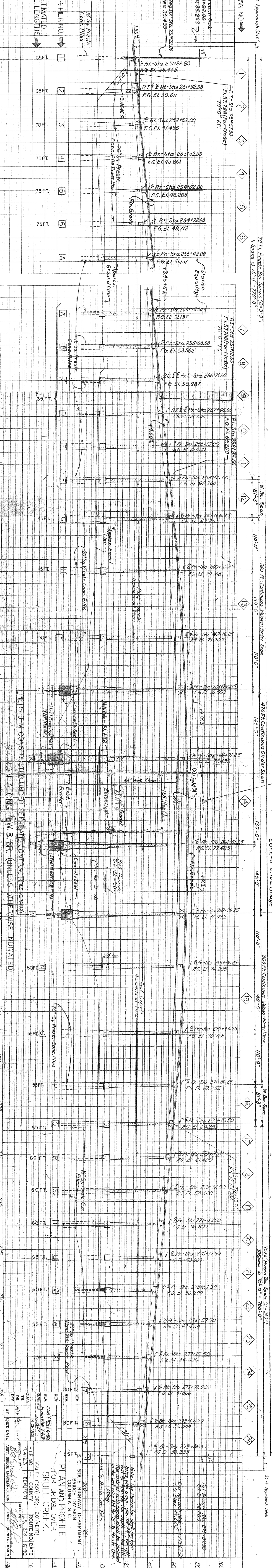
PI - Sta. 265+61.25  
EI 91.250 (For Fm. 6)

PI - Sta. 265+61.25  
EI 91.250 (For Fm. 6)

PI - Sta. 265+61.25  
EI 91.250 (For Fm. 6)

PI - Sta. 265+61.25  
EI 91.250 (For Fm. 6)

PI - Sta. 265+61.25  
EI 91.250 (For Fm. 6)



PLAN AND PROFILE FOR BRIDGE OVER SKULL CREEK

PLAN AND PROFILE FOR BRIDGE OVER SKULL CREEK

PLAN AND PROFILE FOR BRIDGE OVER SKULL CREEK

PLAN AND PROFILE FOR BRIDGE OVER SKULL CREEK

PLAN AND PROFILE FOR BRIDGE OVER SKULL CREEK

PLAN AND PROFILE FOR BRIDGE OVER SKULL CREEK

PLAN AND PROFILE FOR BRIDGE OVER SKULL CREEK

PLAN AND PROFILE FOR BRIDGE OVER SKULL CREEK

PLAN AND PROFILE FOR BRIDGE OVER SKULL CREEK

PLAN AND PROFILE FOR BRIDGE OVER SKULL CREEK





## APPENDIX F

### NMFS-SERO PILE DRIVING CALCULATOR TOOL RESULTS

<b>Title</b>	<b>US 278 Corridor Improvements - 24-inch Pipe Piles</b>
<b>Description</b>	The contractor will install 24-inch pipe piles to support temporary work trestles for bridge construction access in estuarine emergent wetlands adjacent to Mackay and Skull Creeks. The trestles will be built from the top down eliminating the need for temporary fill, timber mats, or barges in the wetland habitats for trestle construction access. A total of 400 piles will be required to support the 40-
<b>Assumptions</b>	A total of 400 pipe piles will be required for the temporary structures. 800 strikes per pile is anticipated with 4 to 5 piles being installed each day. Wooden cushion blocks and air bubble curtains will be used to mitigate the potential noise impacts. Assume water is 5 meters deep. Noise reduction of 26 was used for wood cushion blocks.

#### Instructions:

##### Input: Fill in the green colored cells

B1: Enter a descriptive title for the analysis.

B2: Enter complete information about the pile driving operation, including the type of pile, size of pile, pile driver type, noise attenuation, hours of operation, etc.

B3: Enter any assumptions you need to make about the choice of parameter values, project methods, environment, etc.

B26: Enter the number of strikes required to drive a single pile to final depth (from the Action Agency's description or from the No. Strikes per Pile Data tab)

B27: Enter the maximum number of piles to be installed in a single day (from the Action Agency's description of the project)

**For the next 6 values, use the information on the Pile Driving Noise Data tab if possible, otherwise request information from the Action Agency or search the internet for another source.**

B32: Enter the estimated single strike peak pressure (dB re: 1µPa)

B33: Enter the distance (m) from the pile where B7 was measured

B34: Enter any noise reduction (from unattenuated noise levels) due to noise abatement methods. See the Noise Abatement Data Tab.

C32: Enter the estimated single strike SEL (dB re: 1µPa<sup>2</sup>s). If no direct measurement is available, use peak pressure minus 25 dB

C33: Enter the distance (m) from the pile where C9 was measured

D32: Enter the estimated single strike RMS pressure (dB re: 1µPa). If no direct measurement is available, use peak pressure minus 15 dB

D33: Enter the distance (m) from the pile where D9 was measured

B38: Enter the transmission loss constant (attenuation with distance), which depends on the model used:

For deep water (depth is greater than the cSEL radius of effect) use the spherical model attenuation constant = 20

For shallow water use a cylindrical model attenuation constant = 10 to 15; use 15 if unknown.

If you use an attenuation constant that was reported with the noise data, be sure that the depth profile and bottom type of your project is similar to the project that generated the data.

**Output: Read the values in the blue cells in the Calculated Distances Table**

Pile Driving Parameters	
Number of strikes per pile	800
Number of piles per day	5
Estimated number of strikes per day	4000

Acoustic Measurements			
Measurement	Peak	SEL	RMS
Measured single strike level	203	178	189
Distance from source (m)	10	10	10
Noise reduction due to abatement (dB)	26		

← The pre-filled values are the most common--be s

Model Assumptions	
Effective Quiet	150
Transmission loss constant (15 if unknown)	15
Cumulative SEL at measured distance	203

Calculated Acoustic Values Used by the Model			
Measurement	Peak	SEL	RMS
Single Strike Levels	192	167	178
Distance from source (m)	1	1	1

Calculated Distances					
	Onset of Physical Injury			Fish Behavior	Sea Turtle Behavior
	Peak	Cumulative SEL dB**		RMS	RMS
	Sea Turtles & Fish	Sea Turtles & Fish ≥ 2 g	Fish < 2 g	dB	dB
Threshold value	206	187	183	150	160
Distance to threshold (meters)	0	11.69607095	13.59356391	73.56422545	15.84893192
Distance to threshold (US Standard)	0.0 ft	38.373 ft	44.598 ft	241.352 ft	51.998 ft
** This calculation assumes that single strike SELs < 150 dB do not accumulate to cause injury (Effective Quiet)					

<b>Title</b>	<b>US 278 Corridor Improvements - 24-inch Pre-stressed Concrete Piles</b>
<b>Description</b>	The contractor will install 24-inch pre-stressed concrete piles to support connector bridge in estuarine emergent wetlands, a tidal creek, and intertidal non-vegetated flats between Jenkins and Hog Islands. A total of 30 piles will be required to support the connector bridge. An impact hammer will be utilized in conjunction with wooden cushion blocks to install 4 to 5 piles per day. It is
<b>Assumptions</b>	A total of 30 pre-stressed concrete piles will be required for the bridge. 800 strikes per pile is anticipated with 4 to 5 piles being installed each day. Wooden cushion blocks or air bubble curtains will be used to mitigate the potential noise impacts. Assume water is 5 meters deep. Noise reduction of 26 was used for wood cushion blocks

#### Instructions:

##### Input: Fill in the green colored cells

B1: Enter a descriptive title for the analysis.

B2: Enter complete information about the pile driving operation, including the type of pile, size of pile, pile driver type, noise attenuation, hours of operation, etc.

B3: Enter any assumptions you need to make about the choice of parameter values, project methods, environment, etc.

B26: Enter the number of strikes required to drive a single pile to final depth (from the Action Agency's description or from the No. Strikes per Pile Data tab)

B27: Enter the maximum number of piles to be installed in a single day (from the Action Agency's description of the project)

**For the next 6 values, use the information on the Pile Driving Noise Data tab if possible, otherwise request information from the Action Agency or search the internet for another source.**

B32: Enter the estimated single strike peak pressure (dB re: 1µPa)

B33: Enter the distance (m) from the pile where B7 was measured

B34: Enter any noise reduction (from unattenuated noise levels) due to noise abatement methods. See the Noise Abatement Data Tab.

C32: Enter the estimated single strike SEL (dB re: 1µPa<sup>2</sup>s). If no direct measurement is available, use peak pressure minus 25 dB

C33: Enter the distance (m) from the pile where C9 was measured

D32: Enter the estimated single strike RMS pressure (dB re: 1µPa). If no direct measurement is available, use peak pressure minus 15 dB

D33: Enter the distance (m) from the pile where D9 was measured

B38: Enter the transmission loss constant (attenuation with distance), which depends on the model used:

For deep water (depth is greater than the cSEL radius of effect) use the spherical model attenuation constant = 20

For shallow water use a cylindrical model attenuation constant = 10 to 15; use 15 if unknown.

If you use an attenuation constant that was reported with the noise data, be sure that the depth profile and bottom type of your project is similar to the project that generated the data.

**Output: Read the values in the blue cells in the Calculated Distances Table**

Pile Driving Parameters	
Number of strikes per pile	800
Number of piles per day	5
Estimated number of strikes per day	4000

Acoustic Measurements			
Measurement	Peak	SEL	RMS
Measured single strike level	185	160	170
Distance from source (m)	10	10	10
Noise reduction due to abatement (dB)	26		

← The pre-filled values are the most common--be

Model Assumptions	
Effective Quiet	150
Transmission loss constant (15 if unknown)	15
Cumulative SEL at measured distance	185

Calculated Acoustic Values Used by the Model			
Measurement	Peak	SEL	RMS
Single Strike Levels	174	149	159
Distance from source (m)	1	1	1

Calculated Distances					
	Onset of Physical Injury			Fish Behavior	Sea Turtle Behavior
	Peak	Cumulative SEL dB**		RMS	RMS
	Sea Turtles & Fish	Sea Turtles & Fish ≥ 2 g	Fish < 2 g	dB	dB
Threshold value	206	187	183	150	160
Distance to threshold (meters)	0	0.737972187	0.857695899	3.981071706	0.857695899
Distance to threshold (US Standard)	0.0 ft	2.421 ft	2.814 ft	13.061 ft	2.814 ft
** This calculation assumes that single strike SELs < 150 dB do not accumulate to cause injury (Effective Quiet)					

<b>Title</b>	<b>US 278 Corridor Improvements - 72-Inch Steel Casing</b>
<b>Description</b>	The contractor will install 24 72-inch steel casings with a vibratory hammer in Mackay Creek to construct drilled shaft piers for the new US 278 bridge. It is anticipated that each casing will take 3 hours to vibrate into the substrate until refusal. An auger will be used to remove sediment from the casing and seat it into bedrock, if required.
<b>Assumptions</b>	3 hours(10,800 seconds) per casing to install; 2 casings installed per day

#### Instructions:

##### Input: Fill in the green colored cells

B1: Enter a descriptive title for the analysis.

B2: Enter complete information about the pile driving operation, including the type of pile, size of pile, pile driver type, noise attenuation, hours of operation, etc.

B3: Enter any assumptions you need to make about the choice of parameter values, project methods, environment, etc.

B26: Enter the number of seconds of vibration to drive a single pile to final depth (from the Action Agency's description)

B27: Enter the maximum number of piles to be installed in a single day (from the Action Agency's description of the project)

**For the next 6 values, use the information on the Pile Driving Noise Data tab if possible, otherwise contact the Action Agency or search the internet for another source.**

B32: Enter the estimated single strike peak pressure (dB re: 1µPa)

B33: Enter the distance (m) from the pile where B7 was measured

C32: Enter the estimated single strike SEL (dB re: 1µPa<sup>2</sup>s). If no direct measurement is available, use peak pressure minus 25 dB

C33: Enter the distance (m) from the pile where C9 was measured

D32: Enter the estimated single strike RMS pressure (dB re: 1µPa). If no direct measurement is available, use peak pressure minus 15 dB

D33: Enter the distance (m) from the pile where D9 was measured

B38: Enter the transmission loss constant (attenuation with distance), which depends on the model used:

For deep water (depth is greater than the cSEL radius of effect) use the spherical model attenuation constant = 20

For shallow water use a cylindrical model attenuation constant = 10 to 15; use 15 if unknown.

If you use an attenuation constant that was reported with the noise data, be sure that the depth profile and bottom type of your project is similar to the project that generated the data.

##### Output: Read the values in the blue cells in the Calculated Distances Table

Pile Driving Parameters	
Number of seconds of vibration per pile	10800
Number of piles per day	2
Estimated number of seconds per day	21600

Acoustic Measurements			
Measurement	Peak	SEL	RMS
Measured peak levels at the indicated distance	195	180	180
Measurement distance from source (m)	10	10	10
Calculated levels at the source	210	195	195

← The pre-filled values are the most common--be

Model Assumptions	
Effective Quiet	150
Transmission loss constant (15 if unknown)	15
Cumulative SEL at measured distance	223

Calculated Distances					
	Onset of Physical Injury			Fish Behavior	Sea Turtle Behavior
	Peak	Cumulative SEL dB**		RMS dB	RMS dB
	Sea Turtles & Fish	Sea Turtles & Fish ≥ 102 g	Fish < 102 g		
Threshold value	206	234	191	150	160
Distance to threshold (meters)	1.847849797	1.948210296	1000	1000	215.443469
Distance to threshold (US Standard)	6.062 ft	6.392 ft	3280.84 ft	3280.84 ft	706.836 ft
** This calculation assumes that single strike SELs < 150 dB do not accumulate to cause injury (Effective Quiet)					

<b>Title</b>	<b>US 278 Corridor Improvements - 96-Inch Steel Casing</b>
<b>Description</b>	The contractor will install 112 96-inch steel casings in Mackay and Skull Creeks with a vibratory hammer to construct drilled shaft piers for the new US 278 bridge. It is anticipated that each casing will take 3 hours to vibrate into the substrate until refusal. An auger will be used to remove sediment from the casings and seat it into bedrock, if required.
<b>Assumptions</b>	3 hours(10,800 seconds) per casing to install; Maximum of 2 casings per day

<b>Instructions:</b>	
<b>Input: Fill in the green colored cells</b>	
B1: Enter a descriptive title for the analysis.	
B2: Enter complete information about the pile driving operation, including the type of pile, size of pile, pile driver type, noise attenuation, hours of operation, etc.	
B3: Enter any assumptions you need to make about the choice of parameter values, project methods, environment, etc.	
B26: Enter the number of seconds of vibration to drive a single pile to final depth (from the Action Agency's description)	
B27: Enter the maximum number of piles to be installed in a single day (from the Action Agency's description of the project)	
<b>For the next 6 values, use the information on the Pile Driving Noise Data tab if possible, otherwise contact the Action Agency or search the internet for another source.</b>	
B32: Enter the estimated single strike peak pressure (dB re: 1μPa)	
B33: Enter the distance (m) from the pile where B7 was measured	
C32: Enter the estimated single strike SEL (dB re: 1μPa <sup>2</sup> s). If no direct measurement is available, use peak pressure minus 25 dB	
C33: Enter the distance (m) from the pile where C9 was measured	
D32: Enter the estimated single strike RMS pressure (dB re: 1μPa). If no direct measurement is available, use peak pressure minus 15 dB	
D33: Enter the distance (m) from the pile where D9 was measured	
B38: Enter the transmission loss constant (attenuation with distance), which depends on the model used:	
For deep water (depth is greater than the cSEL radius of effect) use the spherical model attenuation constant = 20	
For shallow water use a cylindrical model attenuation constant = 10 to 15; use 15 if unknown.	
If you use an attenuation constant that was reported with the noise data, be sure that the depth profile and bottom type of your project is similar to the project that generated the data.	
<b>Output: Read the values in the blue cells in the Calculated Distances Table</b>	

Pile Driving Parameters	
Number of seconds of vibration per pile	10800
Number of piles per day	2
Estimated number of seconds per day	21600

Acoustic Measurements			
Measurement	Peak	SEL	RMS
Measured peak levels at the indicated distance	200	192	195
Measurement distance from source (m)	10	10	10
Calculated levels at the source	220	212	215

← The pre-filled values are the most common--be

Model Assumptions	
Effective Quiet	150
Transmission loss constant (15 if unknown)	20
Cumulative SEL at measured distance	235

Calculated Distances					
	Onset of Physical Injury			Fish Behavior	Sea Turtle Behavior
	Peak	Cumulative SEL dB**		RMS dB	RMS dB
	Sea Turtles & Fish	Sea Turtles & Fish ≥ 102 g	Fish < 102 g		
Threshold value	206	234	191	150	160
Distance to threshold (meters)	5.011872336	11.67419318	1258.925412	1778.27941	562.3413252
Distance to threshold (US Standard)	16.443 ft	38.301 ft	4130.333 ft	5834.25 ft	1844.952 ft
** This calculation assumes that single strike SELs < 150 dB do not accumulate to cause injury (Effective Quiet)					



<b>Title</b>	<b>US 278 Corridor Improvements - 120-Inch Steel Casing</b>
<b>Description</b>	The contractor will install 16 120-inch steel casings with a vibratory hammer in Skull Creek to construct drilled shaft piers for the new US 278 bridge. It is anticipated that each casing will take 3 hours to vibrate into the substrate until refusal. An auger will be used to remove sediment from the casings and seat it into bedrock, if required.
<b>Assumptions</b>	3 hours(10,800 seconds) per casing to install; 2 casings per day

<b>Instructions:</b>	
<b>Input: Fill in the green colored cells</b> B1: Enter a descriptive title for the analysis. B2: Enter complete information about the pile driving operation, including the type of pile, size of pile, pile driver type, noise attenuation, hours of operation, etc. B3: Enter any assumptions you need to make about the choice of parameter values, project methods, environment, etc. B26: Enter the number of seconds of vibration to drive a single pile to final depth (from the Action Agency's description) B27: Enter the maximum number of piles to be installed in a single day (from the Action Agency's description of the project) <b>For the next 6 values, use the information on the Pile Driving Noise Data tab if possible, otherwise contact the Action Agency or search the internet for another source.</b> B32: Enter the estimated single strike peak pressure (dB re: 1µPa) B33: Enter the distance (m) from the pile where B7 was measured C32: Enter the estimated single strike SEL (dB re: 1µPa <sup>2</sup> s). If no direct measurement is available, use peak pressure minus 25 dB C33: Enter the distance (m) from the pile where C9 was measured D32: Enter the estimated single strike RMS pressure (dB re: 1µPa). If no direct measurement is available, use peak pressure minus 15 dB D33: Enter the distance (m) from the pile where D9 was measured B38: Enter the transmission loss constant (attenuation with distance), which depends on the model used: For deep water (depth is greater than the cSEL radius of effect) use the spherical model attenuation constant = 20 For shallow water use a cylindrical model attenuation constant = 10 to 15; use 15 if unknown. If you use an attenuation constant that was reported with the noise data, be sure that the depth profile and bottom type of your project is similar to the project that generated the data.	
<b>Output: Read the values in the blue cells in the Calculated Distances Table</b>	

Pile Driving Parameters	
Number of seconds of vibration per pile	10800
Number of piles per day	2
Estimated number of seconds per day	21600

Acoustic Measurements			
Measurement	Peak	SEL	RMS
Measured peak levels at the indicated distance	194	186	192
Measurement distance from source (m)	10	10	10
Calculated levels at the source	214	206	212

← The pre-filled values are the most common--be

Model Assumptions	
Effective Quiet	150
Transmission loss constant (15 if unknown)	20
Cumulative SEL at measured distance	229

Calculated Distances					
	Onset of Physical Injury			Fish Behavior	Sea Turtle Behavior
	Peak	Cumulative SEL dB**		RMS dB	RMS dB
	Sea Turtles & Fish	Sea Turtles & Fish ≥ 102 g	Fish < 102 g		
Threshold value	206	234	191	150	160
Distance to threshold (meters)	2.511886432	5.850956585	630.9573445	1258.925412	398.1071706
Distance to threshold (US Standard)	8.241 ft	19.196 ft	2070.07 ft	4130.333 ft	1306.126 ft
** This calculation assumes that single strike SELs < 150 dB do not accumulate to cause injury (Effective Quiet)					

<b>Title</b>	<b>US 278 Corridor Improvements - All Drilled Shafts (Auger)</b>
<b>Description</b>	The use of an auger will be required for the installation of all drilled shafts. Using an auger to remove the soil and rock from within the casings will produce a non-impulsive noise that will contribute to the increased levels of underwater noise during construction. An auger may be used for up to eight hours per day as part of the drilled shaft installation process. A total of 152 drilled shafts will be installed in estuarine habitats.
<b>Assumptions</b>	Up to 8 hours(10,800 seconds) per shaft; 1 shaft per day  Auger noise information: Dazey, E., McIntosh, B., Brown, S., and Dudzinski, K.M. 2012. Assessment of Underwater Anthropogenic Noise Associated with Construction Activities in Bechers Bay, Santa Rosa Island, California. Journal of Environmental Protection. 3: 1286-1294.

#### Instructions:

##### Input: Fill in the green colored cells

- B1: Enter a descriptive title for the analysis.  
 B2: Enter complete information about the pile driving operation, including the type of pile, size of pile, pile driver type, noise attenuation, hours of operation, etc.  
 B3: Enter any assumptions you need to make about the choice of parameter values, project methods, environment, etc.  
 B26: Enter the number of seconds of vibration to drive a single pile to final depth (from the Action Agency's description)  
 B27: Enter the maximum number of piles to be installed in a single day (from the Action Agency's description of the project)  
**For the next 6 values, use the information on the Pile Driving Noise Data tab if possible, otherwise contact the Action Agency or search the internet for another source.**  
 B32: Enter the estimated single strike peak pressure (dB re: 1µPa)  
 B33: Enter the distance (m) from the pile where B7 was measured  
 C32: Enter the estimated single strike SEL (dB re: 1µPa<sup>2</sup>s). If no direct measurement is available, use peak pressure minus 25 dB  
 C33: Enter the distance (m) from the pile where C9 was measured  
 D32: Enter the estimated single strike RMS pressure (dB re: 1µPa). If no direct measurement is available, use peak pressure minus 15 dB  
 D33: Enter the distance (m) from the pile where D9 was measured  
 B38: Enter the transmission loss constant (attenuation with distance), which depends on the model used:  
     For deep water (depth is greater than the cSEL radius of effect) use the spherical model attenuation constant = 20  
     For shallow water use a cylindrical model attenuation constant = 10 to 15; use 15 if unknown.  
 If you use an attenuation constant that was reported with the noise data, be sure that the depth profile and bottom type of your project is similar to the project that generated the data.

##### Output: Read the values in the blue cells in the Calculated Distances Table

Pile Driving Parameters	
Number of seconds of vibration per pile	28800
Number of piles per day	1
Estimated number of seconds per day	28800

Acoustic Measurements			
Measurement	Peak	SEL	RMS
Measured peak levels at the indicated distance	185	154	160
Measurement distance from source (m)	10	10	10
Calculated levels at the source	200	169	175

← The pre-filled values are the most common--be

Model Assumptions	
Effective Quiet	150
Transmission loss constant (15 if unknown)	15
Cumulative SEL at measured distance	199

Calculated Distances					
	Onset of Physical Injury			Fish Behavior	Sea Turtle Behavior
	Peak	Cumulative SEL dB**		RMS	RMS
	Sea Turtles & Fish	Sea Turtles & Fish ≥ 102 g	Fish < 102 g	dB	dB
Threshold value	206	234	191	150	160
Distance to threshold (meters)	0	0.043610894	18.47849797	46.41588834	10
Distance to threshold (US Standard)	0.0 ft	0.143 ft	60.625 ft	152.283 ft	32.808 ft
** This calculation assumes that single strike SELs < 150 dB do not accumulate to cause injury (Effective Quiet)					

**From:** [Sarah Garvin - NOAA Affiliate](#)  
**To:** [Gordon Murphy](#)  
**Cc:** [Chris Beckham \(BeckhamJC@scdot.org\)](#); [Russell Chandler](#)  
**Subject:** Re: SERO-2020-02072 US 278 Improvements  
**Date:** Thursday, January 28, 2021 9:11:24 AM  
**Attachments:** [image001.png](#)

---

Good morning --

Basically, the best way to calculate vibratory impacts for these pilings is to calculate a ratio using the largest pile size for which we have both impact and vibratory noise data. In this case, it is 72" steel piles. We then multiply that value by the impact data we have available for 96" steel piles and 126" steel piles.

Here is the ratio I calculated for each noise value for 72" vibratory : 72" impact:

Peak = 0.91121495

SEL = 0.98901099

RMS = 0.95238095

For 96" steel piles, I calculated the following vibratory sound values:

Peak =  $0.91121495 \times 220 = 200$  db

SEL =  $0.98901099 \times 195 = 192$  db

RMS =  $0.95238095 \times 205 = 195$  db

For 126" steel piles, I calculated the following vibratory sound values:

Peak =  $0.91121495 \times 213 = 194$  db

SEL =  $0.98901099 \times 188 = 186$  db

RMS =  $0.95238095 \times 202 = 192$  db

Using the vibratory sound values calculated for the largest steel pile size (i.e., 126"), and assuming 2 piles installed per day at 3600 seconds of vibration per pile, I am getting the following impacts:

Peak injury = 5.2 ft radius

Cumulative SEL injury = 7.7 ft radius for sea turtles and fish > 102 g; 5,678.148 ft radius for fish < 102 g

Fish behavior impacts = 20,700.7 ft radius

Sea turtle behavior = 4459.831 ft radius

With a peak injury radius of that size, it is well within the 50 ft observation radius required by NMFS' Sea Turtle and Sawfish Construction Conditions; HOWEVER, the radius for injury to smaller fish (< 102 g; therefore, juveniles) is over 1 mile. That is concerning, as are the behavior impact radiuses.

Let me know if my calculations make sense and if you have additional questions.

Sarah

On Wed, Jan 27, 2021 at 10:28 AM Sarah Garvin - NOAA Affiliate <[sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)> wrote:  
I was using the impact data for my analysis, because that is the installation method described in my current documentation for the proposed project. Thus, I did not go searching for vibratory numbers.

Let me see what I can find to help you out.

Sarah

On Wed, Jan 27, 2021 at 10:10 AM Gordon Murphy <[gordon.murphy@threeoaksengineering.com](mailto:gordon.murphy@threeoaksengineering.com)> wrote:

Good morning Sarah.

We have been working with the acoustic tool this week and realized that there is no data for vibratory installation of 96" or 120" steel pipes in the Pile Driving Noise Data tab. Only impact data for these two sizes are in the spread sheet. Can you provide us with the data that you are using for your analysis?

Thanks again for your assistance.

Gordon

---

**From:** Sarah Garvin - NOAA Affiliate <[sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)>

**Sent:** Friday, January 22, 2021 9:16 AM

**To:** Gordon Murphy <[gordon.murphy@threeoaksengineering.com](mailto:gordon.murphy@threeoaksengineering.com)>

**Cc:** Chris Beckham ([BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)) <[BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)>; Russell Chandler <[russell.chandler@threeoaksengineering.com](mailto:russell.chandler@threeoaksengineering.com)>

**Subject:** Re: SERO-2020-02072 US 278 Improvements

I am here for any questions!

And just one caveat about the tool: NOAA HQ is updating the national noise guidance and it's not yet been released, so the calculator may change at some point. What I sent is the current calculator; however it may change based on national policy. The goal is national consistency.

Thanks,  
Sarah

On Thu, Jan 21, 2021 at 8:25 PM Gordon Murphy <[gordon.murphy@threeoaksengineering.com](mailto:gordon.murphy@threeoaksengineering.com)> wrote:

Thank you Sarah.

I may have a question or two as we dive into the acoustic tool.

Take care,  
Gordon

---

**From:** Sarah Garvin - NOAA Affiliate <[sarah.garvin@noaa.gov](mailto:sarah.garvin@noaa.gov)>

**Sent:** Thursday, January 21, 2021 5:24 PM

**To:** Gordon Murphy <[gordon.murphy@threeoaksengineering.com](mailto:gordon.murphy@threeoaksengineering.com)>

**Cc:** Chris Beckham ([BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)) <[BeckhamJC@scdot.org](mailto:BeckhamJC@scdot.org)>; Russell Chandler <[russell.chandler@threeoaksengineering.com](mailto:russell.chandler@threeoaksengineering.com)>

**Subject:** Re: SERO-2020-02072 US 278 Improvements

Gordon --

I received your voicemail and I apologize for the late reply. I attached a copy of the noise calculator. I tried the link on our website and it did not work for me. Please let me know if the attached Excel file opens for you.

Thanks,  
Sarah

On Thu, Jan 21, 2021 at 9:31 AM Gordon Murphy <[gordon.murphy@threeoaksengineering.com](mailto:gordon.murphy@threeoaksengineering.com)> wrote:

Good morning Sarah.

As a follow up to the voicemail I left for you this morning, we are wondering what noise acoustic tool that you used for your noise level estimations for the US 278 project. Since your noise levels didn't match ours, we would like to re-run the tool with updated information received from the engineers. We used the GARFO acoustic tool, but noticed that the southeast office website has an acoustic tool available for download. However, we are not able to open the downloaded spread sheet and receive an error message about the file extension.

If the GARFO acoustic tool is not what we should be using, would it be possible for you to email the correct tool to us?

Thanks in advance,

Gordon Murphy

Senior Environmental Scientist  
Three Oaks Engineering  
1022 State Street  
Cacye, SC 29033  
(803) 447-0547







## APPENDIX G

### IPAC NORTHERN LONG-EARED BAT COORDINATION



## United States Department of the Interior

### FISH AND WILDLIFE SERVICE

South Carolina Ecological Services  
176 Croghan Spur Road, Suite 200  
Charleston, SC 29407-7558  
Phone: (843) 727-4707 Fax: (843) 727-4218  
<http://www.fws.gov/charleston/>



IPaC Record Locator: 393-21875499

May 22, 2020

Subject: Consistency letter for the 'US 278' project (TAILS 04ES1000-2020-R-0871) under the revised February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat.

To whom it may concern:

The U.S. Fish and Wildlife Service (Service) has received your request to verify that the **US 278** (Proposed Action) may rely on the revised February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO) to satisfy requirements under Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 *et seq.*).

Based on the information you provided (Project Description shown below), you have determined that the Proposed Action will have no effect on the endangered Indiana bat (*Myotis sodalis*) or the threatened Northern long-eared bat (*Myotis septentrionalis*). If the Proposed Action is not modified, **no consultation is required for these two species.**

**For Proposed Actions that include bridge/structure removal, replacement, and/or maintenance activities:** If your initial bridge/structure assessments failed to detect Indiana bats, but you later detect bats during construction, please submit the Post Assessment Discovery of Bats at Bridge/Structure Form (User Guide Appendix E) to this Service Office. In these instances, potential incidental take of Indiana bats may be exempted provided that the take is reported to the Service.

If the Proposed Action may affect any other federally-listed or proposed species and/or designated critical habitat, additional consultation between the lead Federal action agency and this Service Office is required. If the proposed action has the potential to take bald or golden eagles, additional coordination with the Service under the Bald and Golden Eagle Protection Act may also be required. In either of these circumstances, please advise the lead Federal action agency accordingly.

The following species may occur in your project area and **are not** covered by this determination:

- American Chaffseed, *Schwalbea americana* (Endangered)
  - Canby's Dropwort, *Oxypolis canbyi* (Endangered)
  - Eastern Black Rail, *Laterallus jamaicensis ssp. jamaicensis* (Proposed Threatened)
  - Frosted Flatwoods Salamander, *Ambystoma cingulatum* (Threatened)
  - Green Sea Turtle, *Chelonia mydas* (Threatened)
  - Kemp's Ridley Sea Turtle, *Lepidochelys kempii* (Endangered)
  - Leatherback Sea Turtle, *Dermochelys coriacea* (Endangered)
  - Loggerhead Sea Turtle, *Caretta caretta* (Threatened)
  - Piping Plover, *Charadrius melodus* (Threatened)
  - Pondberry, *Lindera melissifolia* (Endangered)
  - Red Knot, *Calidris canutus rufa* (Threatened)
  - Red-cockaded Woodpecker, *Picoides borealis* (Endangered)
  - West Indian Manatee, *Trichechus manatus* (Threatened)
  - Wood Stork, *Mycteria americana* (Threatened)
-

## Project Description

The following project name and description was collected in IPaC as part of the endangered species review process.

### Name

US 278

### Description

US 278

---

## Determination Key Result

Based on the information you provided, you have determined that the Proposed Action will have no effect on the endangered Indiana bat and/or the threatened Northern long-eared bat. Therefore, no consultation with the U.S. Fish and Wildlife Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended 16 U.S.C. 1531 *et seq.*) is required for these two species.

## Qualification Interview

1. Is the project within the range of the Indiana bat<sup>[1]</sup>?

[1] See [Indiana bat species profile](#)

**Automatically answered**

No

2. Is the project within the range of the Northern long-eared bat<sup>[1]</sup>?

[1] See [Northern long-eared bat species profile](#)

**Automatically answered**

Yes

3. Which Federal Agency is the lead for the action?

*A) Federal Highway Administration (FHWA)*

4. Are *all* project activities limited to non-construction<sup>[1]</sup> activities only? (examples of non-construction activities include: bridge/abandoned structure assessments, surveys, planning and technical studies, property inspections, and property sales)

[1] Construction refers to activities involving ground disturbance, percussive noise, and/or lighting.

No

5. Does the project include *any* activities that are **greater than** 300 feet from existing road/rail surfaces<sup>[1]</sup>?

[1] Road surface is defined as the actively used [e.g. motorized vehicles] driving surface and shoulders [may be pavement, gravel, etc.] and rail surface is defined as the edge of the actively used rail ballast.

No

---



6. Does the project include *any* activities **within** 0.5 miles of a known Indiana bat and/or NLEB hibernaculum<sup>[1]</sup>?

[1] For the purpose of this consultation, a hibernaculum is a site, most often a cave or mine, where bats hibernate during the winter (see suitable habitat), but could also include bridges and structures if bats are found to be hibernating there during the winter.

No

7. Is the project located **within** a karst area?

No

8. Is there *any* suitable<sup>[1]</sup> summer habitat for Indiana Bat or NLEB **within** the project action area<sup>[2]</sup>? (includes any trees suitable for maternity, roosting, foraging, or travelling habitat)

[1] See the Service's [summer survey guidance](#) for our current definitions of suitable habitat.

[2] The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR Section 402.02). Further clarification is provided by the [national consultation FAQs](#).

Yes

9. Will the project remove *any* suitable summer habitat<sup>[1]</sup> and/or remove/trim any existing trees **within** suitable summer habitat?

[1] See the Service's [summer survey guidance](#) for our current definitions of suitable habitat.

No

10. Does the project include activities **within documented NLEB habitat**<sup>[1][2]</sup>?

[1] Documented roosting or foraging habitat – for the purposes of this consultation, we are considering documented habitat as that where Indiana bats and/or NLEB have actually been captured and tracked using (1) radio telemetry to roosts; (2) radio telemetry biangulation/triangulation to estimate foraging areas; or (3) foraging areas with repeated use documented using acoustics. Documented roosting habitat is also considered as suitable summer habitat within 0.25 miles of documented roosts.)

[2] For the purposes of this key, we are considering documented corridors as that where Indiana bats and/or NLEB have actually been captured and tracked to using (1) radio telemetry; or (2) treed corridors located directly between documented roosting and foraging habitat.

No

---

11. Does the project include wetland or stream protection activities associated with compensatory wetland mitigation?

No

12. Does the project include slash pile burning?

No

13. Does the project include *any* bridge removal, replacement, and/or maintenance activities (e.g., any bridge repair, retrofit, maintenance, and/or rehabilitation work)?

Yes

14. Is there *any* suitable habitat<sup>[1]</sup> for Indiana bat or NLEB **within** 1,000 feet of the bridge? (includes any trees suitable for maternity, roosting, foraging, or travelling habitat)

[1] See the Service's current [summer survey guidance](#) for our current definitions of suitable habitat.

No

15. Does the project include the removal, replacement, and/or maintenance of *any* structure other than a bridge? (e.g., rest areas, offices, sheds, outbuildings, barns, parking garages, etc.)

No

16. Will the project involve the use of **temporary** lighting *during* the active season?

No

17. Will the project install new or replace existing **permanent** lighting?

No

18. Does the project include percussives or other activities (**not including tree removal/trimming or bridge/structure work**) that will increase noise levels above existing traffic/background levels?

No

19. Are *all* project activities that are **not associated with** habitat removal, tree removal/trimming, bridge and/or structure activities, temporary or permanent lighting, or use of percussives, limited to actions that DO NOT cause any additional stressors to the bat species?

Examples: lining roadways, unlighted signage, rail road crossing signals, signal lighting, and minor road repair such as asphalt fill of potholes, etc.

Yes

---

20. Will the project raise the road profile **above the tree canopy**?

*No*

21. Are the project activities that are not associated with habitat removal, tree removal/trimming, bridge and/or structure activities, temporary or permanent lighting, or use of percussives consistent with a No Effect determination in this key?

**Automatically answered**

*Yes, other project activities are limited to actions that DO NOT cause any additional stressors to the bat species as described in the BA/BO*

22. Is the bridge removal, replacement, or maintenance activities portion of this project consistent with a No Effect determination in this key?

**Automatically answered**

*Yes, because the bridge is more than 1,000 feet from the nearest suitable habitat and is therefore considered unsuitable for use by bats*

---

## **Determination Key Description: FHWA, FRA, FTA Programmatic Consultation For Transportation Projects Affecting NLEB Or Indiana Bat**

This key was last updated in IPaC on December 02, 2019. Keys are subject to periodic revision.

This decision key is intended for projects/activities funded or authorized by the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), and/or Federal Transit Administration (FTA), which may require consultation with the U.S. Fish and Wildlife Service (Service) under Section 7 of the Endangered Species Act (ESA) for the endangered **Indiana bat** (*Myotis sodalis*) and the threatened **Northern long-eared bat** (NLEB) (*Myotis septentrionalis*).

This decision key should only be used to verify project applicability with the Service's [February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects](#). The programmatic biological opinion covers limited transportation activities that may affect either bat species, and addresses situations that are both likely and not likely to adversely affect either bat species. This decision key will assist in identifying the effect of a specific project/activity and applicability of the programmatic consultation. The programmatic biological opinion is not intended to cover all types of transportation actions. Activities outside the scope of the programmatic biological opinion, or that may affect ESA-listed species other than the Indiana bat or NLEB, or any designated critical habitat, may require additional ESA Section 7 consultation.

---



## United States Department of the Interior



### FISH AND WILDLIFE SERVICE

South Carolina Ecological Services

176 Croghan Spur Road, Suite 200

Charleston, SC 29407-7558

Phone: (843) 727-4707 Fax: (843) 727-4218

<http://www.fws.gov/charleston/>

IPaC Record Locator: 974-99400973

February 18, 2021

Subject: Consistency letter for the 'US 278' project (no current TAILS record) under the revised February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat.

To whom it may concern:

The U.S. Fish and Wildlife Service (Service) has received your request to verify that the **US 278** (Proposed Action) may rely on the revised February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO) to satisfy requirements under Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 *et seq.*).

Based on the information you provided (Project Description shown below), you have determined that the Proposed Action will have no effect on the endangered Indiana bat (*Myotis sodalis*) or the threatened Northern long-eared bat (*Myotis septentrionalis*). If the Proposed Action is not modified, **no consultation is required for these two species.**

**For Proposed Actions that include bridge/structure removal, replacement, and/or maintenance activities:** If your initial bridge/structure assessments failed to detect Indiana bats, but you later detect bats during construction, please submit the Post Assessment Discovery of Bats at Bridge/Structure Form (User Guide Appendix E) to this Service Office. In these instances, potential incidental take of Indiana bats may be exempted provided that the take is reported to the Service.

If the Proposed Action may affect any other federally-listed or proposed species and/or designated critical habitat, additional consultation between the lead Federal action agency and this Service Office is required. If the proposed action has the potential to take bald or golden eagles, additional coordination with the Service under the Bald and Golden Eagle Protection Act may also be required. In either of these circumstances, please advise the lead Federal action agency accordingly.



The following species may occur in your project area and **are not** covered by this determination:

- American Chaffseed *Schwalbea americana* Endangered
  - Canby's Dropwort *Oxypolis canbyi* Endangered
  - Eastern Black Rail *Laterallus jamaicensis* ssp. *jamaicensis* Threatened
  - Frosted Flatwoods Salamander *Ambystoma cingulatum* Threatened
  - Green Sea Turtle *Chelonia mydas* Threatened
  - Kemp's Ridley Sea Turtle *Lepidochelys kempii* Endangered
  - Leatherback Sea Turtle *Dermochelys coriacea* Endangered
  - Loggerhead Sea Turtle *Caretta caretta* Threatened
  - Piping Plover *Charadrius melodus* Threatened
  - Pondberry *Lindera melissifolia* Endangered
  - Red Knot *Calidris canutus rufa* Threatened
  - Red-cockaded Woodpecker *Picoides borealis* Endangered
  - West Indian Manatee *Trichechus manatus* Threatened
  - Wood Stork *Mycteria americana* Threatened
-

## **Project Description**

The following project name and description was collected in IPaC as part of the endangered species review process.

### ***Name***

US 278

### ***Description***

US 278 Corridor Improvements

---

## Determination Key Result

Based on the information you provided, you have determined that the Proposed Action will have no effect on the endangered Indiana bat and/or the threatened Northern long-eared bat. Therefore, no consultation with the U.S. Fish and Wildlife Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended 16 U.S.C. 1531 *et seq.*) is required for these two species.

## Qualification Interview

1. Is the project within the range of the Indiana bat<sup>[1]</sup>?

[1] See [Indiana bat species profile](#)

**Automatically answered**

No

2. Is the project within the range of the Northern long-eared bat<sup>[1]</sup>?

[1] See [Northern long-eared bat species profile](#)

**Automatically answered**

Yes

3. Which Federal Agency is the lead for the action?

A) *Federal Highway Administration (FHWA)*

4. Are *all* project activities limited to non-construction<sup>[1]</sup> activities only? (examples of non-construction activities include: bridge/abandoned structure assessments, surveys, planning and technical studies, property inspections, and property sales)

[1] Construction refers to activities involving ground disturbance, percussive noise, and/or lighting.

No

5. Does the project include *any* activities that are **greater than** 300 feet from existing road/rail surfaces<sup>[1]</sup>?

[1] Road surface is defined as the actively used [e.g. motorized vehicles] driving surface and shoulders [may be pavement, gravel, etc.] and rail surface is defined as the edge of the actively used rail ballast.

Yes

6. Are *all* project activities **greater than** 300 feet from existing road/rail surfaces<sup>[1]</sup>?

[1] Road surface is defined as the actively used [e.g. motorized vehicles] driving surface and shoulders [may be pavement, gravel, etc.] and rail surface is defined as the edge of the actively used rail ballast.

No

---

7. Does the project include *any* activities **within** 0.5 miles of a known Indiana bat and/or NLEB hibernaculum<sup>[1]</sup>?

[1] For the purpose of this consultation, a hibernaculum is a site, most often a cave or mine, where bats hibernate during the winter (see suitable habitat), but could also include bridges and structures if bats are found to be hibernating there during the winter.

No

8. Is the project located **within** a karst area?

No

9. Is there *any* suitable<sup>[1]</sup> summer habitat for Indiana Bat or NLEB **within** the project action area<sup>[2]</sup>? (includes any trees suitable for maternity, roosting, foraging, or travelling habitat)

[1] See the Service's [summer survey guidance](#) for our current definitions of suitable habitat.

[2] The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR Section 402.02). Further clarification is provided by the [national consultation FAQs](#).

Yes

10. Will the project remove *any* suitable summer habitat<sup>[1]</sup> and/or remove/trim any existing trees **within** suitable summer habitat?

[1] See the Service's [summer survey guidance](#) for our current definitions of suitable habitat.

No

11. Does the project include activities **within documented NLEB habitat**<sup>[1][2]</sup>?

[1] Documented roosting or foraging habitat – for the purposes of this consultation, we are considering documented habitat as that where Indiana bats and/or NLEB have actually been captured and tracked using (1) radio telemetry to roosts; (2) radio telemetry triangulation/triangulation to estimate foraging areas; or (3) foraging areas with repeated use documented using acoustics. Documented roosting habitat is also considered as suitable summer habitat within 0.25 miles of documented roosts.)

[2] For the purposes of this key, we are considering documented corridors as that where Indiana bats and/or NLEB have actually been captured and tracked to using (1) radio telemetry; or (2) treed corridors located directly between documented roosting and foraging habitat.

No

12. Does the project include maintenance of the surrounding landscape at existing facilities (e.g., rest areas, stormwater detention basins)?

No

13. Does the project include wetland or stream protection activities associated with compensatory wetland mitigation?

No

14. Does the project include slash pile burning?

No

---

15. Does the project include *any* bridge removal, replacement, and/or maintenance activities (e.g., any bridge repair, retrofit, maintenance, and/or rehabilitation work)?

No

16. Does the project include the removal, replacement, and/or maintenance of *any* structure other than a bridge? (e.g., rest areas, offices, sheds, outbuildings, barns, parking garages, etc.)

No

17. Will the project involve the use of **temporary** lighting *during* the active season?

No

18. Will the project install new or replace existing **permanent** lighting?

No

19. Does the project include percussives or other activities (**not including tree removal/trimming or bridge/structure work**) that will increase noise levels above existing traffic/background levels?

No

20. Are *all* of the project activities that will be conducted **greater than** 0.5 miles of a known Indiana bat and/or NLEB hibernaculum<sup>[1]</sup> and **greater than** 300 feet from the existing road/rail surface<sup>[2]</sup> limited to one or more of the following activities:

- maintenance of the surrounding landscape at existing facilities (e.g., rest areas, stormwater detention basins);
- wetland or stream protection activities associated with compensatory wetland/stream mitigation that will not clear suitable habitat (i.e. tree removal/trimming);
- involves slash pile burning;
- within an area with negative presence/probable absence (P/A) summer surveys<sup>[3]</sup>;
- limited to activities that **DO NOT** cause any stressors to the bat species, including, but not limited to those described in the BA/BO (i.e. do not involve habitat removal, tree removal/trimming, bridge or structure activities, temporary or permanent lighting, or use of percussives) (e.g., lining roadways, unlighted signage, rail road crossing signals, signal lighting, and minor road repair such as asphalt fill of potholes, etc.))?

[1] For the purpose of this consultation, a hibernaculum is a site, most often a cave or mine, where bats hibernate during the winter (see suitable habitat), but could also include bridges and structures if bats are found to be hibernating there during the winter.

[2] Road surface is defined as the actively used [e.g. motorized vehicles] driving surface and shoulders [may be pavement, gravel, etc.] and rail surface is defined as the edge of the actively used rail ballast. (example activities include road line painting)

[3] See the Service's [summer survey guidance](#) for our current definitions of suitable habitat.

*Yes, all of the project activities that are greater than 0.5 miles from a hibernaculum and greater than 300' from the road/rail surface are limited to one or more of these activities*

---



21. Are *all* project activities limited to actions that DO NOT cause any stressors to the bat species, including as described in the BA/BO (i.e., habitat removal, tree removal/trimming, bridge and/or structure activities, temporary or permanent lighting, or use of percussives)?

Examples: lining roadways, unlighted signage , rail road crossing signals, signal lighting, and minor road repair such as asphalt fill of potholes, etc.

Yes

22. Will the project raise the road profile **above the tree canopy**?

No

23. Are *all* project activities consistent with a No Effect determination in this key?

**Automatically answered**

*Yes, all project activities are limited to actions that DO NOT cause any stressors to the bat species as described in the BA/BO*

---

## **Determination Key Description: FHWA, FRA, FTA Programmatic Consultation For Transportation Projects Affecting NLEB Or Indiana Bat**

This key was last updated in IPaC on December 29, 2020. Keys are subject to periodic revision.

This decision key is intended for projects/activities funded or authorized by the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), and/or Federal Transit Administration (FTA), which may require consultation with the U.S. Fish and Wildlife Service (Service) under Section 7 of the Endangered Species Act (ESA) for the endangered **Indiana bat** (*Myotis sodalis*) and the threatened **Northern long-eared bat** (NLEB) (*Myotis septentrionalis*).

This decision key should only be used to verify project applicability with the Service's [February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects](#). The programmatic biological opinion covers limited transportation activities that may affect either bat species, and addresses situations that are both likely and not likely to adversely affect either bat species. This decision key will assist in identifying the effect of a specific project/activity and applicability of the programmatic consultation. The programmatic biological opinion is not intended to cover all types of transportation actions. Activities outside the scope of the programmatic biological opinion, or that may affect ESA-listed species other than the Indiana bat or NLEB, or any designated critical habitat, may require additional ESA Section 7 consultation.

---



## APPENDIX H

### USFWS STANDARD MANATEE CONDITIONS FOR IN-WATER WORK

## STANDARD MANATEE CONDITIONS FOR IN-WATER ACTIVITIES

During in-water work in areas that potentially support manatees all personnel associated with the project should be instructed about the potential presence of manatees, manatee speed zones, and the need to avoid collisions with and injury to manatees. All personnel should be advised that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act of 1972 and the Endangered Species Act of 1973. Additionally, personnel should be instructed not to attempt to feed or otherwise interact with the animal, although passively taking pictures or video would be acceptable.

All on-site personnel are responsible for observing water-related activities for the presence of manatee(s). We recommend the following to minimize potential impacts to manatees in areas of their potential presence:

- All work, equipment, and vessel operation should cease if a manatee is spotted within a 50-foot radius (buffer zone) of the active work area. Once the manatee has left the buffer zone on its own accord (manatees must not be herded or harassed into leaving), or after 30 minutes have passed without additional sightings of manatee(s) in the buffer zone, in-water work can resume under careful observation for manatee(s).
- If a manatee(s) is sighted in or near the project area, all vessels associated with the project should operate at “no wake/idle” speeds within the construction area and at all times while in waters where the draft of the vessel provides less than a four-foot clearance from the bottom. Vessels should follow routes of deep water whenever possible.
- If used, siltation or turbidity barriers should be properly secured, made of material in which manatees cannot become entangled, and be monitored to avoid manatee entrapment or impeding their movement.
- Temporary signs concerning manatees should be posted prior to and during all in-water project activities and removed upon completion. Each vessel involved in construction activities should display at the vessel control station or in a prominent location, visible to all employees operating the vessel, a temporary sign at least 8½" X 11" reading language similar to the following: “CAUTION BOATERS: MANATEE AREA/ IDLE SPEED IS REQUIRED IN CONSTRUCTION AREA AND WHERE THERE IS LESS THAN FOUR FOOT BOTTOM CLEARANCE WHEN MANATEE IS PRESENT”. A second temporary sign measuring 8½" X 11" should be posted at a location prominently visible to all personnel engaged in water-related activities and should read language similar to the following: “CAUTION: MANATEE AREA/ EQUIPMENT MUST BE SHUTDOWN IMMEDIATELY IF A MANATEE COMES WITHIN 50 FEET OF OPERATION”.
- Collisions with, injury to, or sightings of manatees should be immediately reported to the Service’s Louisiana Ecological Services Office (337/291-3100) and the Louisiana Department of Wildlife and Fisheries, Natural Heritage Program (225/765-2821). Please provide the nature of the call (i.e., report of an incident, manatee sighting, etc.); time of incident/sighting; and the approximate location, including the latitude and longitude coordinates, if possible.

# CAUTION: MANATEE HABITAT

**All project vessels**

**IDLE SPEED / NO WAKE**

When a manatee is within 50 feet of work  
all in-water activities must

**SHUT DOWN**

Report any collision with or injury to a manatee:



**Wildlife Alert:**

**1-888-404-FWCC(3922)**

cell \*FWC or #FWC





## APPENDIX I

### NMFS SEA TURTLE AND SMALLTOOTH SAWFISH

### CONSTRUCTION CONDITIONS



**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
**NATIONAL MARINE FISHERIES SERVICE**  
Southeast Regional Office  
263 13th Avenue South  
St. Petersburg, FL 33701

## **SEA TURTLE AND SMALLTOOTH SAWFISH CONSTRUCTION CONDITIONS**

The permittee shall comply with the following protected species construction conditions:

- a. The permittee shall instruct all personnel associated with the project of the potential presence of these species and the need to avoid collisions with sea turtles and smalltooth sawfish. All construction personnel are responsible for observing water-related activities for the presence of these species.
- b. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing sea turtles or smalltooth sawfish, which are protected under the Endangered Species Act of 1973.
- c. Siltation barriers shall be made of material in which a sea turtle or smalltooth sawfish cannot become entangled, be properly secured, and be regularly monitored to avoid protected species entrapment. Barriers may not block sea turtle or smalltooth sawfish entry to or exit from designated critical habitat without prior agreement from the National Marine Fisheries Service's Protected Resources Division, St. Petersburg, Florida.
- d. All vessels associated with the construction project shall operate at "no wake/idle" speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will preferentially follow deep-water routes (e.g., marked channels) whenever possible.
- e. If a sea turtle or smalltooth sawfish is seen within 100 yards of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include cessation of operation of any moving equipment closer than 50 feet of a sea turtle or smalltooth sawfish. Operation of any mechanical construction equipment shall cease immediately if a sea turtle or smalltooth sawfish is seen within a 50-ft radius of the equipment. Activities may not resume until the protected species has departed the project area of its own volition.
- f. Any collision with and/or injury to a sea turtle or smalltooth sawfish shall be reported immediately to the National Marine Fisheries Service's Protected Resources Division (727-824-5312) and the local authorized sea turtle stranding/rescue organization.
- g. Any special construction conditions, required of your specific project, outside these general conditions, if applicable, will be addressed in the primary consultation.

Revised: March 23, 2006

O:\forms\Sea Turtle and Smalltooth Sawfish Construction Conditions.doc

